

Source and Effective Utilization of Textile Waste in Tirupur

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Abstract

The textiles and clothing industry in Tirupur comprises approximately 710 firms. As well as being the supplier of textile related materials to consumers, the industry also supplies materials to other manufacturing sectors including automotive, filtration, mining, building, marine, composites and outdoor protection. One of the many sustainability issues facing the industry is the quantity of textile waste that is sent to landfill at great cost to the industry and the taxpayer. It is not only the Textile and Clothing companies which generate textile waste, but also their customers in the industrial manufacturing sector. This paper is an initial attempt to scope the issue of textile waste in Tirupur. The aim is to open discussion on the issue, to develop policies and programs to assist the intelligent management of the issue and to elicit industry support for these undertakings. The limited and inadequate data available in Tirupur is an impediment to intelligent and effective recovery and/or regeneration of textile waste. This paper advocates that the preliminary initiative be the commissioning of a study on textile waste in Tirupur.

Introduction

Waste has been defined as any product or substance that has no further use or value for the person or organization that owns it, and which is, or will be, discarded. However, what may be discarded by one party may have value to another. Thus, the definition for 'waste' should be redefined to consider this waste as a potential reusable resource for others. The amount of waste we generate, and its actual or potential negative effects on the environment, are matters of concern to governments, industry and the community. Tirupur has been described as being a high producer of waste when compared to other developed economies. There is a wide variety of wastes and waste streams, each with

different environmental impacts. This paper is an introduction to the issue of textile waste in Tirupur. The aim is to open discussion on the issue, to provide a framework upon which to develop policies and programs to assist management of the issue and to quantify & qualify the waste discarded by Tirupur industry. In producing this paper, it became evident that the limited and inadequate data available in Tirupur is an impediment to intelligent and effective recovery and/or regeneration of textile waste. This paper therefore advocates that an initial study be commissioned on textile waste in Tirupur. In advance of this study, each section documents a number of practical initiatives that became obvious in researching for this paper. No doubt further initiatives will be come apparent as this project progresses.

Waste is a problem

Waste is perceived to be a problem for many reasons, but the three reasons most often cited are that: waste disposal can harm the environment and human health; space for landfills is claimed to be becoming scarce as councils strive for zero waste targets; costs are increasing to use existing and replace landfills and waste is the end of a products life cycle that causes costly environmental impacts and depletes valuable resources. Some people also take an essentially moral view of waste generation, arguing that it is symptomatic of wasteful and undesirable over consumption. The main method of waste disposal in Tirupur is landfill. Textile waste in landfill contributes to the formation of leachate as it decomposes, which has the potential to contaminate groundwater. Another product of decomposition in landfill is methane gas, which is a major cause of greenhouse gases, significantly contributing to global warming, although it can be utilized if collected. The decomposition of organic fibres and yarn such as wool produces large amounts of ammonia as well as methane. Ammonia is highly toxic in both terrestrial and aquatic environments, and can be toxic in gaseous form. Cellulose-based synthetics decay at a faster rate than chemical-based synthetics. Synthetic chemical fibres can prolong the adverse effects of both leachate and gas production due to the length of time it takes for them to decay. In the past textile waste has been incinerated in large quantities, emitting organic substances such as dioxins, heavy

metals, acidic gases and dust particles, which are all potentially harmful to both humans and the environment.

What is “textile waste”?

Like all wastes, textile waste originates from the community via a number of streams including the fibre, textile and clothing manufacturing industry, consumers, the commercial and service industries. These are defined as pre-consumer, post-consumer and industrial textile waste.



Pre-consumer textile waste

Pre-consumer textile waste is manufacturing waste that is generated by processing fibres, (be they natural or synthetic fibres) and the production of finished yarns and textiles, technical textiles, non-woven, garments and footwear, including off-cuts, selvages, shearings, rejected materials and/or B-grade garments. Whilst “cabbage” (over estimated fabric meters and off-cuts of saleable size) has for many years, been resold into markets or made-up into smaller items, most pre consumer textile waste in Tirupur is simply sent to landfill. Pre-consumer textile waste is usually “clean waste”. Firms either arrange their own waste disposal services or use council managed services and pay landfill fees according to how much is dumped.



Post-consumer textile waste

Post-consumer textile waste consists of any type of garments or household textile (such as sheets or towels) that the consumer no longer needs and decides to discard, either because they are worn out,



damaged, outgrown, or have gone out of fashion. This category has typically been of reasonable to good quality garment that can be recovered and subsequently recycled by another user as second-hand clothing, much of which is sold to third-world nations. Clothing that is unlikely to be worn again is potentially functional as it may be shredded into fibre to be used in products similar in nature to those manufactured from pre-consumer textile waste.

Industrial textile waste

Industrial textile waste is generated from commercial and industrial textile applications including commercial waste from properties such as carpets and curtains, hospital refuse in addition to industrial applications such as filtration, conveyor belting, etc. Industrial textile waste is usually “dirty waste”. Collection and chemical contamination issues render this category as the least likely to be recovered in Tirupur. A substantial proportion of these end-of-life goods are consigned to landfill. However, there is research currently being undertaken by a number of industries, including the carpet industry, to utilize this resource.



Recovery of textile waste

The organized recovery of textile waste can be traced back as far as the old clothiers, many of whom were farmers involved in the cottage industries in all stages of textile production. The practice of recovering waste is as old as the art of spinning and weaving. Shoddy and mungo were invented when old clothes were ground back into a fibrous state that could be re-spun into yarn. The shoddy industry, which was centered on West Yorkshire in the UK and Prato in Italy, concentrated on the recovery of wool from rags. The importance of the industry is gauged by the fact that even in 1860 the town of Batley was producing over 7000 tones of shoddy. At the time there were 80 firms employing a total of 550 people sorting the rags. These were sold to shoddy

manufacturers of which there were about 130 in West Riding. Since these early days most countries have operated waste textiles industries, Prato in Italy being a prime example. Today, recovering textile waste is a multi-billion dollar global industry that performs a vital social and environmental function and provides employment for millions of people all around the world. An internet search on “textile waste” will elicit more than 2,664 products or listings, including headings such as hosiery cuttings and clips, polyester tow, cotton shoddy, used clothing wiping rags, denim/jean clippings, 100% cotton yarn waste, silk fibre waste, etc. Collection is mostly of second hand clothing (post-consumer waste) by means of community donations deposited into charity bins, thousands of which are located across Tirupur, and/or drop-offs directly to charity shops.

Textile waste recovery options

The vision of every organization and municipality is to recycle all of its waste into usable products, thereby closing the life-cycle loop. Science teaches us that matter and energy are not destroyed, they merely change state. Waste contains significant amounts of valuable resources that were once used as a raw material. Those products have lived their useful lives and have become waste, but they still contain the same matter and energy that went into their making. Logic suggests that by recovering textiles, the demand for virgin resources is reduced. Material washing and energy consumption still occur in the recycling processes, but they are considerably less resource intensive and polluting than the processes involved in manufacturing textiles from virgin fibre. Importantly, the virgin fibre processing industry in Tirupur has downsized to a few firms with significant volume imported annually. The potential re-invigoration of the fibre industry driven by sustainable regenerated fibre exists. There is very little evidence of organized recovery of pre-consumer or industrial textile waste specifically for reprocessing, in Tirupur. However, with investment in appropriate technology, there are a number of ways by which textile waste can be recovered.

Recycle/reuse

The multi-billion dollar worldwide recycling industry performs a vital social and environmental function. The industry has no peer in terms of conserving the world's resources while the various stages of the recycling process provide significant employment around the world. As mentioned previously, garments or household textile (such as sheets or towels) can effectively be recycled by sale or gift to another user. The UK based



Recycling Association, estimates that up to 95% of the textiles that are land filled each year could be recycled. Of the textile waste recovered by the charities, 60% is items of clothing that can be reworn or reused and 15% can be torn into industrial wiper cloths. Disturbingly, 25% is unusable and sent to landfill.

Regenerating Textiles

All textile waste streams (those detailed previously) are often unrealized sources of valuable raw materials that can be repurposed or regenerated into saleable and usable products by intelligent collection, sorting, reengineering and reprocessing. In essence, the liability of “waste” is turned into an asset often based on intellectual property (IP) which has been specifically developed. Processing machinery is also



likely to be engineered to produce a specific product ...and thus the investment in developing regenerating capabilities is often large-scale. Products made by regenerating textile waste include acoustic textiles used for soundproof blocks, insulation, roofing felt, bank stabilization, and as pollution control filters.

Barriers to recovering textile waste

There are numerous political, economic, social, technological, environmental, legal and institutional barriers to the improvement of resource recovery in Tirupur. Following are some evident barriers.

Knowledge

In order to manage an environmental issue, it must first be measured and quantified. The limited and inadequate data available in Tirupur regarding the amounts and types of textile waste is an impediment to intelligent and effective recovery and/or regeneration of textile waste.

Financial

The recycling industry's contribution to protecting the environment would not be possible without its significant expenditure on often highly sophisticated plant, machinery and equipment. Indeed, it has been calculated that the industry - which comprises a large proportion of privately-owned enterprises - invests around US\$ 20 billion each year on new equipment and research & development. To that end, government policy is the instrument that will encourage investment in an industry that will regenerate textile waste.

Research and development

The examples outlined in the previous section are the results of both investment and technologies that have been specifically developed to solve textile regeneration issues. Research, development and innovation have long been pillars of the Tirupur fibre, textile and clothing industry and can be accredited with much of the industry's advancement.

Community awareness

Recovery of post-consumer textile waste is dependent on donations from the public. Tirupur attitudes toward waste issues are complex and constitute a barrier to improved resource recovery. The increased use of recycled materials in products and the increased recovery of material for recycling can be achieved with an educated public.

Facts and figures

Until recently there were no formal study/studies on textile waste conducted in Tirupur, facts and figures tended to be anecdotal and reasoned from overseas studies. However, there are no definitive figures for the volume pre-consumer textile waste from fibre, textile and garment manufacturing operations, and industrial textile waste generated from commercial and industrial usage, most of which is consigned to landfill.

In May & June 2010, the Garment Industry of Tirupur completed a study of resource flows for the garment sector in 2010 with the intention of developing industry plans to improve resource utilization efficiencies across the lifecycle of garment from manufacture to the end of life. Particular emphasis was placed on garment wastes as these are a prominent source of construction and demolition waste as well as commercial wastes sent to landfill.

A number of waste composition studies in Tirupur indicate that unrecovered textile waste accounts for approximately 4 percent of the content of our landfills. These statistics are an aggregate of all sectors in the garment industry (i.e. pre-consumer, post-consumer and industrial waste). Data on the Tirupur Environmental Protection Agency noting that:

- An estimated 10.8 million tons of textiles were generated in 2010.
- The textile recycling industry annually prevents 1.5 billion pounds of post consumer textile product waste for Textile Recycling.

- This 1.5 billion pounds of post consumer textile waste represents 5 pounds for every person in the Tirupur.
- Approximately 400 million pounds of textiles collected are used by the collecting agency, with the balance sold to textile recyclers, including used clothing dealers and exporters, wiping rag graders, and fiber recyclers.

Conclusion

Textile waste recycling will become ever more important. Bearing in mind the availability of fossil raw materials to make synthetic fibres is limited. All these tendencies will inspire engineers to innovative economical recycling processes which, no doubt, will include the field of textiles. In recognition that investment in systematic, investigative and experimental activities that involve research, development and innovation for the purpose of acquiring new knowledge or creating new or improved materials, products, devices, processes or services to regenerate textiles will positively serve the Tirupur environment. There is the opportunity to develop knowledge networks to develop pre-consumer waste and resulting products.

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