

The Utilization of Silk Fiber Weaving Waste as an Eco-fashion Product (Case Study: Tarogong Silk Center, Garut, West Java)

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Abstract

The impact of various phenomena and issues to the today's environment should cause shifts in the mind-set of the public living in it. One of the efforts to support the environmental conservation movement was to manufacture eco-fashion products, among which are the use of by-products to create textile and fashion products.

This case study discusses the potential of using silk weaving by-product into high value commodities. So far, the utilization of such by-product is only limited to raw material for yarn. However, the remaining volume of the silk fiber is so overwhelming incineration is the only viable solution to clear floor space. The by-product is abundant, especially in the area of Tarogong, Garut, West Java where not many people are keen to use it for fashion goods of high value.

Through creativity and deep exploration of silk weaving by-products and their various characteristics, they can be used as an alternative material for textile products. In the early stage of this study, numerous methods were used to create the good textile products by using the macramé technique.

The method to process the silk fiber weaving by-product as the main ingredient focuses on maximizing the potential and improves the quality as well as its aesthetic value so that it could become alternative high quality textile and fashion products. The process is also expected to be able to be an alternative to reduce waste caused by the weaving industry and fiber manufacturers. Also, it provides opportunities for home industries to become major players that create impact on the economic empowerment of the community at large.

Keywords: *aesthetic value, creativity, eco fashion, silk fibers, utilization, weaving waste*

1. Introduction

The term *eco green* (from *ecosystem* and *green*) has seen increased usage in the last two decades. The term is often found attached to a variety of businesses and products. It is received in numerous aspects of life – socio-economy, culture, and a more encompassing meaning. Such expansion of meaning also sits in the domain of design. Eco green is part of today's lifestyle. Designers and manufacturers are responsible to create products which could invoke a sense of concern through current trends in everyday life. The phenomenon is supported with the public's easy access to information and its daily experiences. The cognizance to participate in the preservation of nature and its resources will then direct to alternative new lifestyles. In this context, eco green becomes a concept that changes the perspectives and develops alongside the environmental crisis faced by human beings.

Design-wise, the phenomenon forms a design mind-set. This affects the activists-cum-designers to launch trends as part of a new lifestyle and as an added value in creating a product. Thus, novel design concepts such as *eco-sustainable design*, *eco-fashion* and *eco-friendly textile* constitute the new rules in designing a product.

2. Methods

2.1 Development of Design by Creating New Designs

Creativity is the ability to create. It is an unending activity and always on the move to form new ideas which is then formulated into design concepts. A motivating work or design ideas are inseparable to creativity. One who is creative is always full of ideas and inspiration, which is then developed into design concepts and drafted into design ideas (Prasetyowibowo in Amanah, 2009).

Creativity is often linked to pushing design innovations and ideas to answer the issues of today and lay the grounds to solve the problems of the future. This is required as current ideas have to be developed towards the better without sacrificing form and function.

Considering the above, this study discusses a method to combine an aspect of the eco fashion concept, itself part of sustainable design concept, with creativity. Hence, alternative designs are created to the effect that it could inspire the general public. Through creativity and dedication one can contribute to the preservation of nature, starting from those near and dear to oneself. Increased utility value leads to a textile product of function, unique, and aesthetic.

2.2 Eco-Sustainable Design

The ever-increasing popularity of environmental issues and its application in design contrives various fusions of terms between the former and the latter. Every principle has similar objectives, believing they could change the way humans see changes to the earth and base their actions on environmentalism. The mindset shifts from economically friendly to ecologically friendly (Alikondra in Larasati, 2008).

Although there is no shortage of variety of eco-friendly products, no one product is purely eco-friendly in its manufacturing process. In this case, eco-friendly tends to be an effort to reduce unwanted effects to the environment.

1.2.1 Eco-fashion

Eco-fashion, also known as sustainable fashion, is where a product is created and produced with consideration to the environment and social impact it may have (Brown, 2009). It is one of the manifestations of eco-living or green living, where the environment is always taken into consideration.

Eco- or sustainable fashion observes especially the life cycle of the product, from the source, processes, and resources used to create the material as well as the end of life of the product in question. The products made take into account the environmental and social impact it may have throughout its total life span, including its “carbon footprint.”

Eco fashion not only emphasizes on environmentalism but also the health of its consumers and workers involved in its manufacture. There are several eco fashion criteria, as follows:

a. *Organic materials;*

Fashion products made from environmentally-friendly fabrics with the least amount of treatment chemicals in its production process. Examples of this material include bamboo, ramie, soy silk, banana fiber, pineapple fiber and organic cotton with zero pesticide.

b. *Vintage*

In eco fashion, old clothing items are reused and modified into new and unique products.

c. *Recycle*

Eco fashion can be made from creative use of rubbish and unused items.

d. *Sustainable*

Eco fashion uses sustainable, renewable materials whose cultivation uses minimum amounts of pesticides and synthetic fertilizers.

e. *Animal free/vegan*

The materials used are not tested on animals or any animal skin tissues such as fur and leather. Leather is often substituted with vegetal leather made from latex.

f. *Craft and custom*

Products of this type are made by hand or combine various handiwork. It is made to order where quality is the top priority.

g. *Donate:*

Eco fashion labels often donate a certain percentage of their profits towards environmental funds.

h. *Ethical Production and Fair Trade*

Fashion products made by fairly treated workers paid respectably in safe working conditions with no underage workers and reasonable working hours. Designers play an important role in their workers' welfare. They should mingle, train and support the workers.

Black (2011) in *Eco Chic: The Fashion Paradox* stated that there are many options to choose from to minimize the negative effects in creating a fashion design and product, such as by considering the suitability of a material for certain designs, cost, and time required to create an eco-fashion product. The options include:

- *Re-thinking design for the entire fashion life cycle:* the design considers its usefulness until the end of its life cycle and asks the question: is it reusable?
- *Reclaim and re-use waste materials:* the design uses waste materials.
- *Recycle:* the design uses recycled materials.

- *Upcycle*: the design uses processed waste to create a product of equal or better quality compared to the original.
- *Repair and remodel*: a current product is optimized for other needs.
- *Recreate*: recreating or redesigning of current design concepts.
- *Reduce*: can be beneficial by minimizing the use of resources such as water and electricity and reducing its waste footprint.
- *Use ecological material*: where environmentally-friendly materials such as fiber or cloth to minimize effects on the environment.
- *Use mono-material*: using a single type of material to ease recycle at the end of the product's life time.
- *Harness new technology*: using technologies capable of reducing energy and material usage and at the same time improve production efficiency.
- *Longer lasting fashion*: fashion products are designed with the highest quality in terms of material and process with high aesthetic value for durability and emotional attachment from its owner.
- *Multifunctional clothes*: one design for many uses.
- *Design for delight*: creating a new product and promoting that such sustainable product is highly valuable and comfortable.

Due to complex reasons, however, eco-fashion designers have yet to follow the strategies proposed above although efforts towards that direction have been made.

Waste as an Alternative Material for Eco Fashion Products

This paper discusses the strategies of *reclaim and re-use waste materials*, *recycle*, *upcycle*, and *recreate* which in this case is using waste as alternative materials in eco-fashion products. It pertains to the concept of *craft and custom* since the products discussed are hand-made and combines numerous techniques with emphasis on quality rather than quantity.

Environmentally friendly products can be produced using recycled materials. Recycling is a process to create a new product using second-hand materials with the objective of reducing waste. In addition, it reduces the need for new materials, energy usage, pollution and environmental damage, and greenhouse gas emissions compared to conventional production processes. This in turn has the potential to open new areas of employment, design concepts and, economically, prospect in creative industries that utilize waste materials. It then, ideally, fulfills the 4P principle: people, planet, prosperity, and project proposed by Larasati (2011). The scheme of the concepts discussed in this paper is as follows:

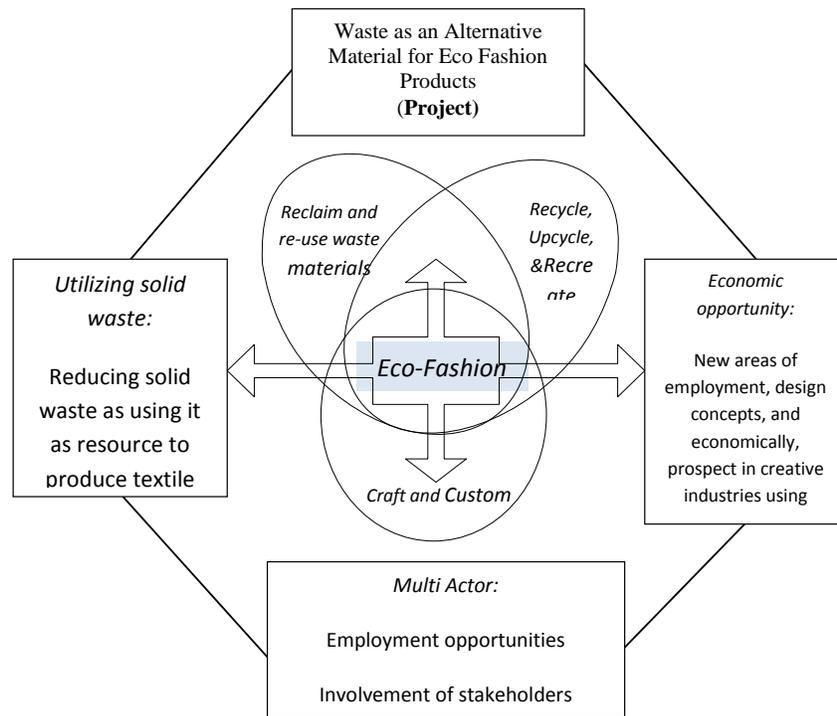


Figure 1 Waste as an Alternative Material for Eco-fashion Products (Widiawati, 2014)

3. Waste

Waste is leftover material from a production process or damaged, imperfect, or unneeded materials used in production or materials rejected in the production of textiles (Webster's Collegiate Dictionary, 2004). Waste can also be understood as discarded materials from either industrial or domestic production which is unwanted due to its lack of economic value.

There are numerous types of waste, among them solid waste from domestic and industrial activities, wherein the former is by-products of household activities, trade, business, agriculture, and the public. Solid waste includes paper, wood, cloth, latex/synthetic leather, plastic, metal, glass, and egg shells (Amanah, 2009).

Design Process of Recycled Products

In principle, the design and production of recycled products are as follows:

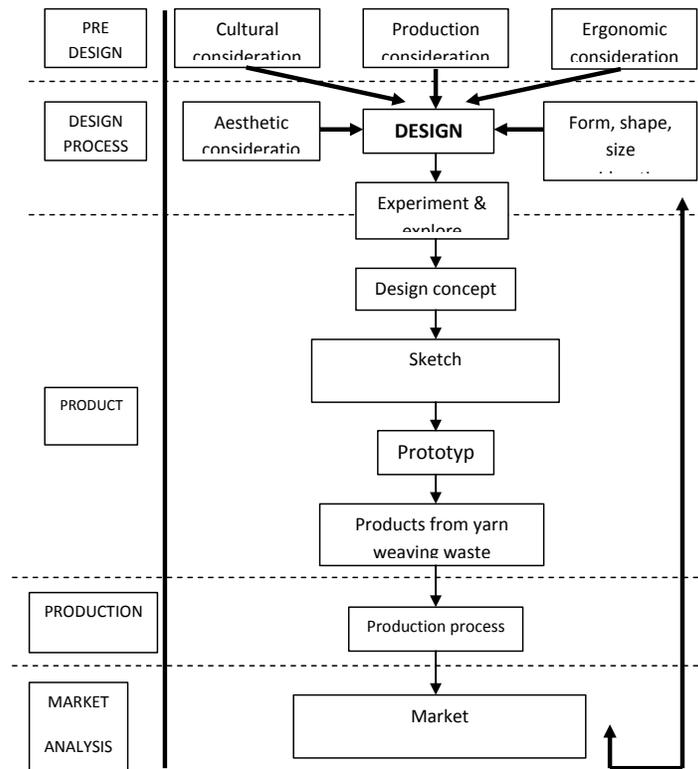


Figure 2. Design Process (Widiawati, 2014)

3.1. Waste from Silk Fiber Weaving

Observation is made at Sentra Sutera Alam Garut owned by Aman Sahuri. The Garut-based privately owned company produces silk threads and silk woven tie dyes. The company was owned by the late Aman Sahuri and is now continued by his sons, A. Makmun, Drs. Usman, and Drs. Soleh. Following his death, the company was split into three, each bearing the names of his sons. In 2012, one of the companies is managed by Soleh's son, Iwan. The company is located on Jalan Otto Iskandardinata No. 279, Tarogong, Garut, West Java.

The company produces three to four thousand meters of silk yarn every month to be shipped to both domestic and international markets. The woven silk later produces waste, in this case silk thread by-products. The by-products are usually hung on the looms to splice disconnected threads. Unused by-products are collected and, if required, sent to Surabaya to be woven into cotton to be rewoven into yarns. In the last seven years, however, the by-products are left unused, later burned to clear floor space.



Figure 3. Silk yarn waste at Sentra Sutera Tarogong, Garut, West Java (Widiawati, 2012)

Thus far, the by-products of the yarn and silk industry are limited to the above usage. There is not much interest to recycle the by-product into products of added value, despite its huge potential. Furthermore, craftsmen have limited knowledge in the characteristics and method to process silk threads into quality products.

Silk weaving by-products can be used to create eco-fashion products – cloths and handicrafts, bearing in mind the potential of underutilized by-products and the ever-popular environmental issues. Such use prevents incarceration of silk weaving waste and develops its utility for those within the Sentra Sutera Tarogong. Seen in such regard, reusing silk weaving waste can be a method to increase its utility value to create textile products of high function and high aesthetic qualities.

a. Creative Process Study

The method particularly used in reusing the silk weaving waste is exploring non-woven process, in this case press and macramé.

Textile production using the press technique using weaving waste is very simple, namely by clamping and pressing the threads to form pieces of cloth. The threads cling to each other, thus forming a unique surface texture and character. Colouring is done using natural dyes from *indigofera tinctoria* to create varying shades of blue.



Figure 4. Utilizing weaving waste using press and Indigofera dye (Riska, 2013)

Macramé is a weaving technique from the Middle East which is yet to be explored to create fashion products. In general, this technique is used to create simple patterns in products and yet to be explored creatively by the Indonesian textile industry. It requires simple tools, which is an advantage in the process of knowledge transfer to the locals. In addition, the relatively dissimilar waste threads are manageable for it to be used optimally. Visually, the shine of silk fibers can be presented using macramé techniques.

Macramé is Arabic for non-loom woven technique, meaning fringe trimming where the ends of each thread are woven into one another. Macramé is one of the oldest techniques first used by the Arabs and throughout Middle East (Birrel, 1973). It is derived from the Arabic *mucharam* (latticework) whereas the term *macramé* is from the Turkish word meaning *fringe* or *migram*, meaning embroidered veil with knots. Thus, macramé can be defined as textile handicraft made using knots from yarn or threads. The knotting techniques in macramé consist of

two basic knots: flat and cordon. In its development, more knots are used in macramé, such as anchor, double flat, pearl, turkish, lock, and wrap knots.

The creative process study is used to produce the desired a textile or fashion product in accordance with its theme, concept, product, and function. Special materials and techniques require special concepts to fashion a product. Silk weaving waste is very delicate yet has varying qualities which requires meticulous attention to detail when using elaborate macramé techniques. Both aspects lay the foundation of the concept to be used. *Enchanting Ivory* is chosen as the general concept, with special attention given to the captivating quality of the colour of ivory. The theme is *La Ballerine* – the ballerina. The theme is proposed to invoke femininity, grace, and elegance of a ballerina. The *La Ballerine* concept is deemed suitable to create ivory white dresses made of fine silk threads using the macramé technique.



Figure 5. *Alluring Ballerina* (Hady, 2012)

2. Results and Discussion

A number of exploration and experimentation have been conducted to see the possibilities of the potential visual characteristics presented. The initial exploration process uses a variety of threads from silk weaving waste. The macramé technique uses the basic knots and later developed knots, such as the flat, cordon, double flat, pearl, and wrap knots. Following the initial exploration, further exploration to limit the possibilities and expound on the use of silk threads are conducted. Further explorations are larger in scope to obtain a wider range of products.



Figure 6. Initial exploration (left) and further exploration (right) of silk weaving waste using various knots: double flat, pearl, wrap (Hady, 2012)

The products made are textile and fashion products. The textile product is in the form of cloth measuring 35 cm by 100 to 150 cm and fashion products are in the form of dresses and accessories in the form of bags and shoes.



Figure 7. Sketches of dresses using silk weaving waste and macramé (Hady, 2012)



Figure 8. Silk weaving using macramé (Hady, 2012)

Following numerous design processes, the products made are cloths, dresses, bags, and shoes.



Figure 9. Dresses (Hady, 2012)



Figure 10. Shoes and bag (Hady, 2012)

3. Conclusion

Firstly, after having conducted numerous processes, the public as both producers and consumers lack the awareness to preserve the environment. Waste management of the textile industry is substandard.

The actively participating general also plays an important role in preserving the environment. Ideally, the effort to materialize eco-fashion is from the mutual effort of the general public. Despite not meeting every aspect of eco-fashion in the products made under such ideals, there are efforts to support environmentalism through better waste management.

Silk by-products can be used to create cloths using press and macramé techniques instead of conventional weaving. The use of macramé in designing silk articles created products distinct from common silk products. Macramé in silk weaving is deemed to be straightforward; challenges arise in mastering materials such as fine silk threads and creating different textures.

Silk weaving waste combined with macramé is capable of producing fashion products from main clothing articles to its accessories. Fashion products made from silk weaving waste and macramé have the feel of exclusivity due to silk's distinct sparkling qualities. In such regard, reusing silk weaving waste can be a method to increase its utility value to create textile products of high function and high aesthetic qualities.

In essence, good waste management as seen in this case study has great potential. Reusing silk weaving waste can be carried out by empowering the locals, especially housewives and younger women. A concrete undertaking would be conducting trainings on the potential of silk waste for making high quality handicrafts based on creative economy. Thus, the public can then be expected to create products capable of supporting its domestic economy and in the long term support the development of Garut.

The exploration conducted in this paper still has further avenues to expand since the by-products of a production process is rich in variety, both in shape and colour. Current use of such waste is yet to reach its full potential.

Acuteness in choosing waste alongside unending dedication and creativity is an important facet. Consequently, it is possible to create unique products that not only are useful but also high value.

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