Chapter 4
Cruelty-Free Silk and Guilt-Free Fashion

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Abstract To enable a stable coexistence of people and ecosystems, an intelligent and sustainable economy of ecosystems and biodiversity is crucial. The article describes how socially and environmentally responsible entrepreneurship can make silk production sustainable and at the same time create employment opportunities in one of the poorest areas of India. Non-violent silk is now expanding the range of sustainable natural-based fashion fibres alongside organic cotton or hemp.

Keywords Natural Fibre · Non-violent silk · Sustainable fashion · Cocoon · India

4.1 Introduction

The fast fashion industry has put the earth's biodiversity at great risk. The rise of mass production of fashion is a major cause of the destruction of the earth's biodiversity. The excessive use of chemicals has destroyed or threatened the existence of many species of herbs, plants, birds, animals and insects (Sukhdev et al. 2014). Improper use and non-compliance with regulations and the immense use of water lead to more frequent unexpected environmental disasters and droughts in the world's textile regions. Biodiversity plays an important role in our ecosystem, as the different plant and animal species are interdependent. Different species provide a natural balance in habitats. Healthy biodiversity can recover naturally if appropriate environmental conditions are created. So, smart and sustainable economics of ecosystems and biodiversity are crucial to enable a stable coexistence of men and ecosystems. Silk is one raw material among others. Social entrepreneurship can help to transformed silk

A practitioner's perspective.

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industry into an organic silk industry over time. The way the world perceives sustainable fashion and carries the term non-violent silk around the world has changed." This unique business model has also created abundant employment opportunities in one of the poorest areas of India. Non-violent silk is now expanding the range of sustainable fashion fibres, alongside organic cotton or hemp. The Indo-German company Cocccon (Cocccon 2019) is based on a social responsibility platform in which the sustainable use of labour and natural resources is one of the most important tasks.

4.2 Non-violent Silk—Guilt-Free Fashion

The Cocccon project is a modern form of rural cooperation with decentralized production. It enables silk farmers, spinners and weavers to work directly from their own homes. All these different units are well connected to the headquarters where cocoons, yarns and finished textiles are stored. Sericulture or silk farming is the breeding of silkworms for the production of silk. It is carried out mainly in the wild and in some cases also indoors. The leaves of the mulberry tree are normally used to feed the silkworms. The Arjun tree, which occurs naturally in India, is better adapted to the climatic conditions prevailing there and provides the necessary food for the silkworms, as shown in Fig. 4.1.

Fig. 4.1 Silkworm on a tree (*picture source* André Matthes)

Fig. 4.2 Cocoons on a Arjun tree, semi finished left, finished right (*picture source* André Matthes)

With a view to a sustainable environment, health and development, certain innovative technologies have been developed to control pests and fungi for the host plant Arjun. For the cultivation of the tree stands, the use of any kind of conventional pesticides, i.e. spraying over leaves or trees, is prohibited. However, a natural alternative in liquid form has been developed by mixing plants with medicinal properties such as Guizotia abyssinica (Ramtilla), Azadirachta indica (Neem) and Brassica juncea (India mustard). This unique blend provides 90% similar results to chemical fungicides and pesticides, but without toxic side effects to the ecosystem. Additionally, the host tree is covered with a large net to improve protection against potential predators (Yadav 2011).

The biggest benefit of using non-toxic chemicals over the past five years has been the enormous growth of grass on the ground, which is now used as animal feed. The unique blend is also effective in curing root rot diseases of host trees. Additionally, Arjun leaves and silkworm litter or faucal matter are utilized as high-class organic manure for farming (Madan et al. 1989). The villagers take care of the silkworms while they feed on the trees. The villagers must ensure that the silkworms always find enough leaves and, if necessary, move the worms to other trees until the silkworms start spinning the cocoons, as shown in Fig. 4.2.

As soon as the cocoons are finished, the villagers "harvest" them from the trees and place them indoor. In the case of tussar silk, the cocoons are hung vertically from the ceiling with jute cords. After about a week, the silk butterflies (moths) hatch out of the cocoons themselves, or in some cases, they are pierced by well-trained personnel to help the animals hatch. Only after checking each empty cocoon, they go to the degumming department. Therefore, this silk can be called Peace Silk or non-violent silk. In conventional silk production, the cocoons with the living animals inside are placed in hot water or steam to degum the cocoons and all moths get killed (Gulrajani 1992).

The procedure for eliminating "gum (sericin)" and impurities from raw silk is known as the removal of silk slime. This is done by adding natural organic soap to the hot, boiling water. Occasionally hydrogen peroxide is used to make different shades of silk yarn uniform. This is environmentally friendly and a process approved

by REACH & GOTS. In conventional silk production, toxic metals are used during the degumming process to make silk yarns heavier through the so-called ´silk-weighting´ and thus increase weight-related sales revenues. The addition of the typical additives such as chromium, barium, lead, iron or sodium magnesium is prohibited in Cocccon's silk production (Miller et al. 1989; Hacke 2008).

The toughest part of the project is a sustainable way of wining luxury silk fibre from broken cocoons. This requires a lot of time, patience and investments into new spinning machines. First fine count yarn was achieved in 16 months after multiple failures. Spinning of the silk yarns is done in a complex combination of manual technique and mechanical finishing. The process is under patent. Once the patent process is done, it can be explained elaborately. The project has also upgraded four out of twenty weaving looms currently in use with solar-powered motors. This means that 70% of our spinning and weaving operations are carried out without a CO_2 footprint. The packaging and storage of the products is mainly done with jute sacks or recycled cartons. The transport of cocoons or finished yarns to weavers in various areas of Jharkhand is carried out by public transport via state roads or the Indian railway. The water consumption in the production process is minimized by the recovery of used water. By filtering the old process water, the residues from the cocoon degumming can be reused as compost for agriculture.

4.3 GOTS-Certified Environmentally Friendly, Gentle Digital Printing

Digital printing machines are used in our factory to process the non-violent silk fabrics. The printing system is GOTS-certified and has little effect on nature or human skin. This system uses very little ink, electricity and water. The printing floor is equipped with a zero-waste system. Wastewater from the print is recycled and reused for further use by the own Bio-Effluent Treatment Process.

4.4 A Silk Project Changes Its Ecological and Social Environment

The Cocccon project took over a conventional silk farm in India in 2011. At the time, the soil was completely infertile due to the excessive and unnecessary use of chemicals. Microorganisms were also removed from the area. As a result, the Cocccon project stopped and banned the use of all these so-called high-percentage sericulture sprays. Since then, a natural compost has been used as a substitute for chemical fertilizers and the entire sericulture has been rebuilt using pre-industrial methods. In the interests of sustainable development, a number of innovative methods have been developed to control pests and fungi from the host tree.

This has led to the restoration of the lost biodiversity of nature in the region. In 2015, the first new grass appeared from the dead soil. Microorganisms came back to life. The rebirth of various wild grasses in the soil, which was also observed in 2015, is now used as animal feed. In addition, the silkworm litter is used as high-quality organic fertilizer for our agriculture. An excellent positive result was achieved in 2017 with rice cultivation after four years of testing. The first rice harvest was successful in the 2017–2018 cultivation period. The local farmers regarded it as a rebirth of local agriculture, and the village community achieved food self-sufficiency. In 2019, the villagers are already expecting overproduction of their rice crops. The Cocccon project promotes local villagers as entrepreneurs by establishing their own brand of organic rice for the mainstream market.

4.5 Conclusion

The project, which is now in its sixth year of operation, established an international standard for sustainable fashion made of silk. The workers have a pleasant lifestyle, and their children attend schools in the local area. The women in the villages are able to contribute new professional skills. The social and economic independence of the village communities is strengthened. Since Cocccon does not use chemical substances on the host tree for silkworms, there are opportunities for double plant production. For example, the cultivation of rice and potatoes in combination with the host trees of the caterpillars was successfully implemented. From an ecological point of view, the entire region appears much greener than before. The Cocccon project shows how fashion can be in harmony with ecology. Fashion that respects biodiversity is the only way to keep our planet safe and the fashion industry alive.

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