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## Brazilian silk production: economic and sustainability aspects

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### Abstract

Brazil is the largest producer of silk cocoons on a commercial scale in the West, and the fifth largest producer of silk yarn in the world. The rearing of silkworm (*Bombyx mori*) is an activity developed mainly in small rural areas, where family work predominates and it represents an important income alternative. The aim of this study is to focus on economical and environmental issues of silk production in Brazil and it presents some uses of silk residues (by-products) in fashion and decoration sectors. Many applications for silk residues are possible, reducing the disposal of raw materials and consequently, the environmental impacts, besides generating employment and income. Thus, sericulture is very important for the Brazilian economy as well as in other developing countries, as it generates income for the country and for rural families, contributing to the settlement of people in these regions, and resulting in a positive correlation between silk production and the reduction of the carbon footprint considering the mitigation provided by mulberry trees.

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## 1. Introduction

Silk is one of the oldest fibers known by humankind. It is a natural protein fiber, which has been used in textile manufacture for at least 5,000 years. About 90% of commercial silk fibers employed in the textile industry come from Lepidopteran silkworms from the Bombycidae family. In the textile industry, it is commonly referred to “mulberry silk” [1] [2].

Nowadays, silk is considered a premier textile material in the world due to its high tensile strength, its shine and ability to bind chemical dyes. Despite of facing keen competition from man-made fibers, silk has maintained its supremacy in the production of luxury apparels and high-quality specialized goods [3].

According to Babu [3], in addition to the cultivation of mulberry trees, the production of silk is divided into the following steps: (i) sericulture; (ii) reeling of the raw silk, and; (iii) processing of silk yarns into fabrics.

Sericulture or silk production is an activity integrated to the agricultural production and industry, covering the cultivation of mulberry (*Morus sp.*) and the rearing of the silkworm (*Bombyx mori*), aiming the production of cocoons, from which silk yarns are obtained [4] [5]. This is an ideal activity for an economy based on abundant agricultural labor [6].

According to the International Sericultural Commission (2016), the main silk producing countries in the world are: China, followed by India, Uzbekistan, Thailand and Brazil. Brazil is the only producer in commercial-scale of silk yarn in the West, producing about 600 metric tons of raw silk yarn per year [7].

Sericulture in Brazil is an activity that is developed mainly in small rural areas, with an average of 2.5 hectares, representing an important alternative to improve the income of rural families. It contributes significantly to the reduction of the rural exodus. In the cities, it provides employment in the industries, being an important activity in the rural and urban economy. In addition to these characteristics, sericulture contributes to the country's sustainable development, due to its relevant social aspect and to constitute a low impact activity for the environment [4] [5] [8] [9].

Currently, the silk production in Brazil is restricted to only one processing company, Bratac S. A. responsible for 100% of raw material processing and reeling of silk yarns [5]. Bratac is a company with 100% Brazilian capital and has more than 2,000 employees in its industries. The company has approximately 2,500 rural families integrated into the cocoon production process and generates indirect jobs for about 20,000 people [10] [11].

In Brazil, “O Casulo Feliz” (“The Happy Cocoon”) is a company that works exclusively with handmade silk yarns. It was founded in 1988 and opted to use raw material of defective cocoons and other wastes from the conventional silk industry. The company buys raw and by-product materials from Bratac and, through handicraft, turns them into yarns for its production. Another differential of this company is the use of natural dyes. Initially, the company was turned to the decoration sector, with products such as rugs and curtains. However, over time, it entered in the fashion world, increasing its production and profitability [12].

In order to support the silk production chain in Parana, the Brazilian state where the largest silk production in Brazil is concentrated, the “Vale da Seda” (“Silk Valley”) Project was launched in 2010. The goal is to establish the geographical origin of silk articles produced in the region of Pirapo River basin, which involves 29 municipalities in the northwest of Parana state and constitutes the silk valley, the region that most produces silkworm cocoons in the West. Besides offering the consumers products that carry the label of “Vale da Seda”, which guarantees the composition, quality, origin and responsibility with a sustainable regional development, the “Vale da Seda” Project also aims to: i) promote the product development; ii) train the businessmen for the production and marketing of silk articles; iii) establish the brand identity, packaging and advertising; iv) carry out marketing and market actions [13].

Keeping the idea to strengthen the collaborative economy and conscious consumption, the joint activities of “O Casulo Feliz”, “Vale da Seda” and the fashion designer Eneas Neto, led them to the top of a nationwide action called “Projeto Estufa” (“Incubator Project”), a platform that, through fashion shows and presentations, meetings and conversations, seeks to provoke dialogues and reflections on the development of sustainable fashion initiatives [14].

This study aimed to report some economic and environmental issues about silk production in Brazil and present some uses of silk residues (by-products) in fashion and decoration sectors.

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