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Reweaving Resilience: Indigenous Cotton Varieties and Sustainable Textile Futures in India, Weaving their Own Fortunes

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ABSTRACT

Kala Cotton is a genetically pure indigenous cotton variety of India. India's textile heritage, rooted in indigenous cotton varieties such as *Gossypium herbaceum* (Kala Cotton) and *G. arboreum* (Wagad Cotton), has faced centuries of disruption due to colonial intervention, industrialization, and the dominance of genetically modified cotton. Native to the arid regions of Gujarat and Rajasthan, it represents a significant link to India's ancient textile heritage dating back to the Indus Valley Civilization. This paper examines the historical trajectory of cotton cultivation in India and highlights the cultural, ecological, and economic significance of Kala Cotton. It emphasizes its sustainability advantages such as low water requirement, natural pest resistance, minimal carbon footprint, and compatibility with traditional handloom practices. The study also discusses revival initiatives led by organizations like Khamir, which have rebuilt localized value chains connecting farmers, spinners, and weavers. The paper argues that Kala Cotton's revival is essential for promoting sustainable textiles, preserving indigenous knowledge, and supporting artisan livelihoods.

Keywords: Indigenous cotton, Wagad cotton, Khamir, Textile, Own fortunes

INTRODUCTION

One of the few genetically pure cotton species still found in India is kala cotton, which is also one of the few pure, old world cotton species still widely grown today. It creates a robust, coarse, stretchy fiber that is frequently utilized in denim. Its use in mainstream markets has drastically decreased over time because to its short staple length, which results in fewer twists per inch of yarn, making it challenging to manufacture excellent quality textiles with it. Amidst this vast tapestry, Kala Cotton stands as a unique and indigenous variant that has garnered recognition as a symbol of sustainability, resilience, and traditional artistry. Originating from the arid regions of Gujarat and Rajasthan, Kala Cotton has established itself as a sustainable and environmentally conscious choice in India's textile landscape. Its voyage has historical significance, it overcame difficulties brought on by modernization before becoming a symbol of rebirth and optimism (Tyagi, 2021; Rahman, 2019; Jha, 2018).

Archeological evidence shows that the date of cotton samples found at Mohenjo Daro sites such as Dholavira can be dated between 3250 and 2750 BCE produced from a cotton plant closely related to *Gossypium Arboreum* type. The indigenous *Arboreum* and *Herbaceum* varieties have been the predominant strains of cotton grown in India (Iyengar, 2021; Tyagi, 2021). Kala cotton is not a recently developed strain of cotton crop but is in fact, an indigenous strain of rain-fed cotton also referred to as 'old world' cotton. It had been a part of India's cotton export trade to Britain during colonial rule in India until in the last sixty years, the cultivation and weaving of Kala cotton almost disappeared. In most

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Indian languages, the word "kala" means "black," which frequently gives rise to the notion that Kala cotton is black, but in reality, it refers to the boll after the cotton fiber has been extracted. Belonging to the *G. Herbaceum* type with seed type usually of V-797 and G. Cot. 21, it can be recognized by its main feature of short to medium staple length of 20- 22 mm. Its boll type is either closed or semi-open which is plucked along with the calyx (Jha, 2018; Tyagi, 2021).

https://india.mongabay.com/2019/07/kutchs-wagad-or-kala-cotton-back-from-the-almost-dead/

Fig. 1 : Picking of kala cotton pods

https://india.mongabay.com/2019/07/kutchs-wagad-or-kala-cotton-back-from-the-almost-dead/

Fig. 2 : Organic kala cotton

Historical Trajectories of Cotton in India:

Pre-Colonial and Ancient Heritage:

Archaeological evidence shows cotton use in the Indus Valley Civilization (3000–2750 BCE), with cotton seeds from Mehrgarh and textile fragments from Mohenjo-Daro. Literary references in the *Rigveda* also mention cotton spinning and weaving. By the medieval period, India was exporting fine muslins and handloom cottons worldwide. European travelers described muslin as "woven air" (Iyengar, 2021; Flachs, 2019).

Colonial Disruption and Decline of Desi Cotton:

During British rule, India's share in global textile exports dropped from 27% in 1800 to 2% by 1900 (Flachs, 2019; Iyengar, 2021). British mills demanded long-staple cotton suited to machines, leading to the decline of *desi* short-staple varieties. The forced cultivation of indigo further displaced cotton farmers, weakening interlinked artisanal systems of farmers, spinners, and weavers (Craftcentres, 2016; Rahman, 2019).

Post-Independence Industrialization:

At independence, *desi* cotton made up 97% of cultivation. By the 1970s, hybrid and American cotton varieties had flipped this ratio, and today Bt cotton dominates 96% of area. Indigenous cotton shrank to <3% of cultivation, largely confined to semi-arid belts like Kutch. This transformation not only undermined biodiversity but also destabilized traditional weaver communities, whose numbers in Kutch fell from ~2000 in the 1990s to fewer than 700 after 2001.

Cultural and Symbolic Dimensions:

- Indigenous cotton is more than an agricultural resource it is a cultural symbol.
- *Khadi as a freedom fabric:* Gandhi promoted Khadi as swadeshi resistance, linking hand-spinning to dignity of labour. Today, Gen Z uses Khadi as an identity marker for sustainable, authentic, and anti-fast-fashion values.
- *Kala Cotton and Wagad as heritage fibres:* They preserve ancient weaving traditions of Kutch such as *ajrakh* and *bhujodi*, integrating local craft with ecological farming.
- *Cultural economy:* Handloom textiles generate 7 million artisan jobs in India and reviving indigenous cotton directly sustains these livelihoods (Iyengar, 2021; Vikalp Sangam, 2021).

Agro-Ecological Sustainability of Kala Cotton:

- Kala cotton offers significant ecological advantages compared to Bt and hybrid cotton.
- *Water efficiency:* Bt cotton requires 1400 litres/kg of irrigated water while Kala Cotton thrives in <300 mm annual rainfall without irrigation.

- *Carbon footprint:* Conventional irrigated cotton in Gujarat produces 0.63% GHG emissions, while Kala Cotton emits just 0.11%.
- *Soil health: Desi* cotton enriches soil biodiversity as it avoids chemical fertilizers. In contrast, pesticide-intensive Bt cotton depletes soil health.
- *Pest resistance:* Kala Cotton's boll structure naturally protects lint from insects, while Bt cotton faces secondary pest outbreaks such as whitefly, requiring additional pesticide sprays.
- In 1987, even during a severe drought in Kutch with 2 mm rainfall, Wagad cotton still yielded 3.5 metric tonnes (SETU Abhiyan data), proving its resilience (Jha, 2018; Rahman, 2019; Gaurav *et al.*, 2018).

Fig. 3 : Sizing of Kala cotton warp

Fig. 4 : Weaving kala cotton

https://india.mongabay.com/2019/07/kutchs-wagad-or-kala-cotton-back-from-the-almost-dead/

Fig. 5 &6 : Kala Cotton On Loom

Challenges Facing:

However, over the years, the dominance of modern cotton farming techniques and hybrid cotton varieties has posed a significant challenge to Kala Cotton (Flachs, 2019; Iyengar, 2021). Farmers moved away from conventional cotton growing methods due to the attraction of larger yields, regardless of the requirement for additional water and chemical inputs (Gaurav *et al.*, 2018; Gutierrez *et al.,* 2015). The survival of Kala Cotton and the traditional knowledge that goes along with it was put in jeopardy by this change (Iyengar, 2021; Tyagi, 2021). One of the primary challenges Kala Cotton encountered was the competition from high-yielding hybrid cotton varieties that dominated the Indian cotton landscape (Flachs, 2019; Press Information Bureau, 2020). These hybrid varieties offered more significant economic benefits but came at the cost of increased water consumption and chemical pesticide use (Gaurav *et al.*, 2018; Gutierrez *et al.*, 2015). This competitive disadvantage led to a decline in Kala Cotton cultivation as farmers turned to commercially more viable alternatives, jeopardising the survival of this unique cotton variety (Jha, 2018; Rahman, 2019). The absence of an established marketing and distribution network specifically tailored for Kala Cotton made it challenging for traditional cotton growers to access markets and sell their products (Craftcentres, 2016; Vikalp Sangam, 2021). The lack of awareness among consumers about the ecological and ethical benefits of Kala Cotton also presented a significant hurdle (Tyagi, 2021; Times of India, 2024). Many consumers remained unaware of the sustainable and environmentally conscious aspects of choosing Kala Cotton products over conventional cotton, further impeding the demand for this unique textile (Iyengar, 2021; Craftcentres, 2016).

Future Focused Initiatives:

Khamir, located at Kukma near Bhuj, is a collaborative initiative of Kachchh Nav Nirman Abhiyan and the Nehru Foundation for Development that works towards the preservation and promotion of traditional handicrafts, cultural practices, community livelihoods, and local ecological systems. In order to investigate the production prospects for Kala Cotton, Khamir started this project in 2007 in collaboration with Satvik, a group of organic farmers in Kachchh. In order to create a method for turning cotton into yarn, Khamir and Satvik first conferred with numerous specialists because the cotton's short staple length makes it challenging to spin and weave. Additionally, local weavers had to be persuaded of the benefits of Kala Cotton, which presents a unique difficulty because weaving it necessitates modifications to the loom setup in addition to varying yields and shafts. In 2010, Khamir started manufacturing its first Kala Cotton products after years of testing and refining both spinning and weaving procedures. The Kala Cotton Initiative now promotes environmentally friendly, sustainable cotton textile manufacturing. By supporting locally farmed species and collaborating with marginalized people, the project seeks to establish a value chain at

several levels. Khamir and Satvik have established a supply chain between the Kala Cotton farmers, ginners, spinners, and weavers to transform the raw cotton into handwoven goods in order to carry out this effort. The Kala Cotton Initiative is intended to eventually become a model for other towns to follow (Craftcentres, 2016; Rahman, 2019; Vikalp Sangam, 2021).

Conclusion:

Indigenous cotton varieties such as Kala and Wagad, along with heritage textiles like Khadi, embody an ecological and cultural resilience that industrial cotton systems lack. Their revival illustrates how grassroots initiatives, designer collaborations, and growing consumer interest in sustainability can collectively reshape India's textile future. However, despite this progress, indigenous cotton remains constrained by structural barriers, including processing challenges associated with short-staple fibres, limited consumer acceptance of coarser yet durable fabrics, labour-intensive handloom supply chains, and persistent policy neglect. While genetically modified cotton continues to receive substantial subsidies and research support, *desi* cotton breeding and infrastructure remain underfunded, despite evidence of their long-term potential. Addressing these challenges through systemic policy backing, technological innovation, market education, and targeted investment is essential to ensure that indigenous cotton moves beyond niche preservation and is positioned at the forefront of ethical and sustainable global fashion.

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