



International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 12, December 2025



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Jute-Led Industrialization in West Bengal: A Review of Historical Evolution, Labour Relations, Urban Development and Sustainable Transition

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ABSTRACT: Industrialization reshaped Bengal's economy, labour relations, urban geography and environmental conditions. This review explores the historical evolution and impactful legacy of industrialization through jute industries in West Bengal specifically Hooghly industrial belt. Based in historical, economic, labour and heritage scholarship it charts the transition from precolonial fibre production to colonial factory organisation; the establishment of jute-manufacturing Calcutta as an international centre with ramifications for both high culture and mass consumption; and post-independence struggles with partition, competition, labour conflict, technology stagnation and environmental stress. The review argues that jute was not just a commodity sector: it linked rural cultivation, migration, factory discipline, river transport, finance and urban settlement. It also reviews recent scholarship on industrial heritage, sustainability and adaptive reuse. It purports that the sector-wise modernization strategy that is also historically-informed needs to ensure a nexus between employee welfare, circular jute product system, river restoration and conservation of industrial heritage. The study also finds that the jute belt continues to be a strategic repository of industrialisation and is an enabling context for inclusive green development in West Bengal.

KEYWORDS: industrialization, jute industry, West Bengal, Hooghly River, labour history, industrial heritage, sustainability

I. INTRODUCTION

Industrialization is a long historical process through which production moves from dispersed household activity and artisanal work toward mechanized, factory-based and increasingly integrated systems of manufacture. Its impact is felt much further afield than on output and employment. Industrialization reorients access to land and raw materials, introduces new regimes of labour discipline, establishes new transport networks, transforms the spatial form of towns practice and changes relations of state/capital/community. And the jute industry in eastern India Provides one of the most transparent windows on all these changes. It made the link between peasant cultivation in the Ganges-Brahmaputra delta, forcing peasants into wretched livelihood on behalf of mills on the Hooghly River and to markets across the British Empire and beyond (Stewart, 2017).

West Bengal's jute mills were concentrated along the Hooghly corridor, where river transport, access to Calcutta's port and proximity to commercial and financial institutions supported large-scale factory production. It was a major pillar of colonial industrial capitalism. Further, the profits of the industry were fundamentally determined by highly unequal power relations: European managing agencies held vast amounts of power while rural cultivators and migrant workers carried out a large share of both economic risk and social cost (Wearmouth, 2015). This means that the historical record needs a more nuanced perspective, acknowledging the place of jute in industrial development but also scrutinising casualised labour and uneven regional development, as well as epidemiological evidence for environmental degradation.

This paper reviews the history and impact of industrialization with reference to West Bengal's jute industries. Its four aims are to outline the historical growth of the jute industry, examine its economic, social, labour and environmental impacts; synthesise recent scholarship in relation to industrial heritage and sustainability; and identify avenues for research and policy. The review is timely because current debate about jute has come to consider it not only as a



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vanishing traditional industry but also as an eco-friendly and biodegradable material that fits well into cultivatable society of the circular and lower carbon happening (Jarin et al., 2024).

II. REVIEW METHOD AND SCOPE

This is a narrative and thematic review. It synthesizes the literature presented in the source manuscript, comprising peer-reviewed articles, scholarly books, book chapters and a doctoral dissertation published between 2015–2025. The literature was grouped across five connected themes: colonial industrialisation and business organisation; labour migration and working-class formation; post-independence industrial trajectory of West Bengal; environmental implications for the Hooghly corridor and industrial heritage, sustainability and regeneration. The review takes a comparative approach to the main arguments of each source rather than treating them as stand-alone accounts, identifying sources which complement one another and those that theoretical gaps.

The scope is deliberately historical but interdisciplinary. In the historical context, it makes use of industrial history in order to establish chronology, political economy to treat ownership and institutional power, labour history to work with workers and migration and finally environmental and heritage studies for evaluating the materiality left behind by industrialization. It is an appropriate approach, because a jute mill was in equal parts production unit, employer, local lodestar, riverside ecological agent and often heritage building. The goal of the review is not an original statistical estimation; instead it strives for conceptual integration and critical synthesis.

III. HISTORICAL FOUNDATIONS OF JUTE INDUSTRIALIZATION

3.1 From fibre cultivation to factory commodity

Jute had been cultivated, spun and woven in Bengal long before it became a factory commodity. This industrial development in later years was based on the delta's natural benefits: a summer humid climate, a productive alluvial soil and an extensive river system that made agriculture and transport easier. According to Stewart (2017), these conditions provided the region a formidable comparative advantage as a supplier of raw-jute. Mechanical processing of jute in Dundee proved the commercial viability of finished products, while new mills near Calcutta displaced a larger and larger share of manufacturing to the proximity of the source material.

The transition was not a simple technological advance. Embedded in colonial trade arrangements linking Bengal to imperial shipping, finance and military demand. Sacks, hessian cloth, or rope and other jute products have been widely employed in global commodity cycles. This demand led to construction of mills but also connected the region to fluctuating export markets. The distribution of value along the chain was unequal: cultivators experienced price volatility, workers found themselves in precarious jobs and in miserable living conditions and management could exploit finance, procurement and corporate decision-making.

3.2 Calcutta, the Hooghly belt and managing agencies

The Hooghly River corridor became the spatial core of Bengal's industrialization. These mills were situated near waterways and rail connections, with raw jute arriving from producing districts and finished goods shipping through Calcutta's port. Also drawn to the industrial belt were warehouses, engineering workshops and transport services together with a dense working-class population. What emerged was an entire industrial ecosystem rather than just a bunch of factories sitting apart.

Corporate organization was central to this expansion. According to a study on Thomas Duff & Co. by Wearmouth (2015), managing agencies influenced the jute industry's competitive structure. They were not just warriors trained in battle; they were orchestrators, coordinating finance, managerial hierarchy, supply chains and cooperation between firms. This structure helped firms reduce risk and maintain control at the same time that shareholding was becoming more widely diffused. This historical lesson: things like industrial growth celestial was much more a matter of the work of institutions than machines or markets.

IV. ECONOMIC AND SPATIAL IMPACTS OF INDUSTRIALIZATION

The jute industry contributed to the expansion of manufacturing, trade, transport and urban employment in Bengal. The backward linkages consist of production and baling, river transport and trading; the forward linkages encompass



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packaging, shipping and export commerce. The concentration benefited the city-region too as roads, railways and docks developed to serve industrial and commercial interests. This, in consequence to the process of industrialization made this portion of the river Hooghly into a unique riverine urban-industrial zone.

However, industrial development was uneven. The sector's integration into global trade did not automatically create broad-based regional prosperity. All this meant colonial industrialisation favoured export-oriented manufacture and commercial intermediaries local brokers of international trade, but rural producers remained prey to the vagaries of a price-churning global market in which they had little advance negotiation power. Such unevenness also informed subsequent disputes over the development of West Bengal. Chatterjee (2024) identifies partition as a significant shock on the states position, and points to the joint role of central and state policies, resource constraints, urban development and governance as all playing their part in its subsequent relative decline.

Post-independence industrial performance cannot be explained by one cause. According to the articles by Bandyopadhyay and Basu (2019), the industrial licensing, allocation systems, infrastructural shortages, skill constraints and political intervention are responsible for creating a state of economic scarcity. However, as Karak (2017) demonstrates this was accompanied by manufacturing employment and value addition lagging behind other states while production became more spatially disaggregated through small units. For the jute industry, this meant that older mills operated in an evolving industrial environment defined by increasing competition, de-capitalized production capacity, and structural changes in demand. Despite the historical significance of jute, this did not guarantee technological renewal or sustained profit.

Table.1. Major Phases of Jute Industrialization in West Bengal

Period	Main Features	Historical Significance
Pre-factory period	Household cultivation, spinning and weaving; river-based local trade.	Created a durable raw-material and craft base.
c. 1830s-1914	Mechanical production expanded; mills clustered near Calcutta; export demand rose.	Established the Hooghly belt as a major industrial landscape.
1914-1947	War demand, labour mobilization and intensifying management-labour tensions.	Deepened the factory system and working-class formation.
1947-1990s	Partition disruption, policy constraints, competition and uneven modernization.	Reduced relative dominance and exposed structural weaknesses.
2000s-present	Heritage debate, sustainability agenda and renewed interest in biodegradable jute products.	Repositions jute as both an industrial legacy and green-material opportunity.

Note. Synthesized from Stewart (2017), Wearmouth (2015), Chatterjee (2024), Bandyopadhyay and Basu (2019), and Jarin et al. (2024).



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V. LABOUR, MIGRATION AND WORKING-CLASS LIFE

Industrialization created a large and heterogeneous labour force. Mills needed workers to help with every process such as expensive spinning, weaving, batching, maintenance and loading and administration work. Local labour supply was not always sufficient to fill these needs, and employers recruited migrants from elsewhere. Colonial migration, according to Taukeer (2022), was entwined with transformations in the agrarian economy; in this way, the shift of workers into industrial centres is explicable. While migration provided the jute belt with much-needed labour it also led to new culturally mixed and, often congested industrial neighbourhoods.

The formation of a working class involved more than employment at a machine. Sarkar (2021) has made links between the factory workplace and working class neighbourhoods. In addition to wages and hours, the industrial experience of workers was also shaped by housing, public health, kinship networks, language, food and everyday mobility. This is a necessary view for jute history because the riverine industrial corridor engendered mill communities that lasted beyond its gates into bustees, markets, roads and informal service work points.

Labour relations were structured by unequal authority and recurring conflict. Worker mobilization was shaped by colonial factory legislation, wage relations, epidemic disease and nationalist politics (Sarkar, 2021). In a similar way, Chakraborty (2020) finds the emergence of an organized worker within the change in colonial political economy. These stories take issue with truths that have become part of a language around the industrial growth narrative being a neutral or positive thing everyone can benefit from. While the jute industry created jobs, it was also associated with contestation over wages, security and dignity.

Labour institutions remain historically contingent. Miyamura (2016) cautions against the danger of examining institutions solely on formal design. Because workers, employers and the state had different expectations of what labour institutions ought to do, changes in institutional form in Indian industrial settings tended to be accompanied by ruins on conflict. In the context of West Bengal's jute industry, this insight recommends that labour reform must not be seen merely as a deregulation or rewriting of the rules. Indeed, credible enforcement, a voice for workers, skills development and safety protections as well as social mechanisms that reflect the realities of industrial communities are required elements in order to produce genuine reform.

VI. ENVIRONMENTAL CONSEQUENCES AND THE HOOGHLY RIVER

Industrialization along the Hooghly produced benefits of connectivity and employment, but it also intensified pressure on the river system. The concentration of mills, settlements, conveyance and other industrial exercises added to the extent of depletes, strong waste and untreated municipal discharge diving into the estuary. According to Ranjan and Ramanathan (2018), the Hooghly is a river of nationwide socio-economic significance, but has encountered increasing pollution with industrialization and urban expansion. For this reason, environmental stress cannot be treated as an external contemporary issue, but rather part of history at the industrial scale.

The jute industry itself should be separated out from the all industrial pollution in a corridor; various industries, sewage systems, urban growth and hydrological change have combined to make the Hooghly an environmentally sick river. But jute mills have had a legacy role as nodes in the riverine landscape and they need to play an active role in its restoration. Responsible modernisation requires cleaner production, wastewater treatment, energy efficiency and improved waste management & public monitoring. These measures also protect the health of workers and residents whose livelihoods are linked to those industrial neighbourhoods.

The sustainability profile of jute provides a counterpoint to the environmental damage associated with industrial systems. Jarin et al. (2024) reinforces the renewable nature of jute, its biodegradability and therefore, potential environmental benefits over many plastic products. This is not to say that jute products are all automatically sustainable; cultivation, processing, dyes, energy use, transport and disposal continue to have their part to play. Still, the circular-economy potential for the material makes a compelling case for research, product development and life-cycle assessment. West Bengal should be able to leverage the expertise it built over years and around historical strengths without the ecological blind spots of earlier economies.



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VII. INDUSTRIAL HERITAGE, IDENTITY AND REGENERATION

A significant recent development in the literature is the reconceptualization of jute mills as living industrial heritage. Heritage is not just about derelict buildings or rusty equipment behind wire fences. A robust living heritage system is when operational mills, worker settlements, riverfronts and skills complement each other creating a sustainable ecosystem of community memories. Sen (2025a) advocates for the examination of social and economic indicators like employability, local pride, accessibility, willingness to pay and tourism in areas around jute-mills. It acknowledges that where conservation and economically sustainable use is combined with local community input into the planning process, then the two can go hand in hand.

Community participation is especially important because expert and local views may differ. Mukherjee and Banerji (2025), in their exploration of industrial heritage values in West Bengal, highlight the differences between expert and community perspectives. Their results suggest regeneration cannot be organized solely by architectural parameters or technological criteria. Residents and workers may prioritize jobs, public services, safety, education, dwellings and living conditions while experts may prioritize authenticity; aesthetics or formal conservation. Such differences should be made visible and negotiated by inclusive heritage governance instead of privilege one over the other.

The restorative potential of industrial landscapes also merits attention. Sen (2025) highlights various aesthetic and environmental attributes of heritage jute mills that can promote perceived environmental quality as well as the well-being of workers. But the conclusion is not that crumbling industry should be idealised. However, adaptive reuse and landscaped buffers or safer public access and river-edge restoration and some conservation of selected structures can be sufficiently ameliorative. A new jute belt may have an industrial memory that is functional workplaces, cultural spaces, training centres and ecological corridors.

VIII. CRITICAL SYNTHESIS OF THE LITERATURE

The reviewed literature produces five broad insights. Industrialisation in the jute belt was thus first conditioned by geography, empire and corporate organization. It is true that Bengal enjoyed an ecological edge in growing jute, but they also owe the success of its factories to colonial patterns of trade and Calcutta's position as a port city and managing agency. Industrialization, on the other hand, produced new sorts of work and urban existence though this depended on a migratory proletariat and unequal social relations. That is to say that the history of labour, then, is not an addendum to industrial history; it is central to making sense of how the sector worked.

Post-independence decline or stagnation should be treated as a multi-causal process. Partition, policy regimes, infrastructure and labour relations, market structure and technological change all interacted over time. Simple assertions that single out a political or economic cause are not up to the task of explaining the sector's complexity. The environmental costs are infused with the legacy of industrial clustering along Hooghly, third. They need a landscape-scale strategy linking mills, cities, regulators and communities. Fifth, heritage scholarship provides a useful means of escaping the decline narrative through questions about how and why it preserves, repurpose and socially value industrial sites.

There are also gaps. Most historical works use the firm, production and policy as a unit of analysis; few investigate women workers, household economies, health and informal labour intergenerational mobility in jute-mill communities. More site-specific life-cycle evidence, particularly in terms of energy use, wastewater, product durability and end-of-life pathways is required before contemporary sustainability claims about jute are made. Furthermore, comparative studies on shuttered, functioning and repurposed mills could identify which kinds of regeneration yield sustainable local employment as opposed to speculative real-estate results.



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Table.2. Thematic Contributions and Research Gaps

Theme	What the Literature Establishes	Priority Gap
Industrial history	Jute grew through delta ecology, empire, port infrastructure and business networks.	Mill-level comparisons of technology and productivity across periods.
Labour and migration	Migrant labour and neighbourhood life were integral to factory production.	Gender, health, care work and informal work in jute communities.
Political economy	West Bengal's industrial trajectory reflects interacting policy, infrastructure and market factors.	Long-run district-level evidence linking policy changes to mill outcomes.
Environment	The Hooghly corridor faces cumulative pollution from industry and urbanization.	Mill-specific environmental audits and life-cycle assessment of jute goods.
Heritage and renewal	Communities value employment, access and identity alongside conservation.	Participatory models that measure social and economic outcomes of reuse.

Note. Author's synthesis of the reviewed literature.

IX. IMPLICATIONS FOR POLICY AND PRACTICE

A future-oriented jute strategy should combine industrial policy with social and environmental responsibility. The objective should not be to rebuild the colonial industrial order because they do not and cannot stand preserved as stable monuments. First, create a profitable, decent, and sustainable jute economy. That involves government, mill owners and workers' groups, municipalities, as well as researchers and community organizations working together.

- Act responsibly to modernize the production. Skill development is important but targeted investment, for example in machinery, energy efficiency and quality control and design innovation to drive down resource use can drive competitiveness advances.
- Promote decent work. Central indicators of industrial performance should be associated with safety, stable wages, social security provisions, grievance mechanisms, skills upgrading and gender-sensitive facilities.
- Create circular value chains for jute products. Support research for reusable packaging, composites, geotextiles, agro-textiles and other applications with confidence life-cycle assessment as accompanying eco-label.
- Re-create a riverine habitat. The entire Hooghly corridor needs effluent treatment, waste segregation, transparent compliance data and joint municipal-industrial action!
- Have participatory heritage planning. Apply worker and resident priorities to conservation and adaptive reuse plans, i.e. employment, mobility, public space, education & health services.
- Develop culture-based skills and tourism. This is one that could work without displacing the existing community or ignoring between(regionally) active production/ parts clearing areas where selected sites can support archiving, museum/training labs and interpretive trails.

These priorities are mutually reinforcing. Industrial heritage can, for example: provide a space for vocational training; cleaner production can protect local health and enhance the brand association; and better product design generates further demand of a material with robust environmental opportunity. Success is assessed through this common lens of viability, good work, environmental behaviour and community benefit.



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X. CONCLUSION

The jute industries of West Bengal are central to understanding the history of industrialization in eastern India. They show how a region's ecology, colonial trade, urban infrastructure, finance and labour migration coalesce around a factory system. It brought export revenues, industrial jobs and an iconic riverine urban form; it also reinforced unequal power relations, and pushed environmental and social strain. Its post-independence troubles were a result of partition, policy restrictions, institutional clashes, market transition and technology hurdles.

Recent scholarship offers a more constructive interpretation of this legacy. Jute mills can be seen as representations of living industrial heritage; indeed, the jute plant as a renewable source offers an eco-friendly material from which to build a sustainable economy. Neither rejection nor romantic preservation is the answer. This is the regeneration of inclusive approaches: modern production dignified labour, water system restoration where jute plays a role in community-led heritage planning and high-value sustainable jute innovation. This strategy would regard the history of industrialisation not as a past chapter, but as an asset for svarvagya sustainable and Eco-friendly development in West Bengal.

REFERENCES

1. Bandyopadhyay, S., & Basu, P. P. (2019). Industry in West Bengal during the Left Front regime. In West Bengal under the Left (pp. 113-135). Routledge.
2. Chakraborty, A. (2020). Labour movement in India: A historical approach on socio-cultural economy.
3. Chatterjee, S. (2024). West Bengal's economic legacy since independence and future prospects. *Arthaniti: Journal of Economic Theory and Practice*, 23(2), 145-178.
4. Dasgupta, P. (2023). Entrepreneurship in two Bengals: Lost in transition. In *Two Bengals: A comparative development narrative of Bangladesh and West Bengal of India* (pp. 217-273). Springer Nature.
5. Jarin, T. T., Fayshal, M. A., Siddique, I. M., & Ahmed, A. (2024). Investigating the behavior, properties, and environmental implications of jute and plastic products for a sustainable future. *Journal of Scientific and Engineering Research*, 11(3), 16-28.
6. Karak, A. (2017). Pattern of industrial growth in West Bengal during 1980-1991: Structural demand and agriculture-industry relations. *Journal of South Asian Development*, 12(1), 65-88.
7. Miyamura, S. (2016). Rethinking labour market institutions in Indian industry: Forms, functions and socio-historical contexts. *The Journal of Peasant Studies*, 43(6), 1262-1284.
8. Mukherjee, A., & Banerji, H. (2025). Disparities in expert and community perceptions of industrial heritage and implications for urban well-being in West Bengal, India. *npj Heritage Science*, 13(1), Article 44.
9. Ranjan, P., & Ramanathan, A. (2018). Hooghly River. In *The Indian rivers: Scientific and socio-economic aspects* (pp. 251-257). Springer.
10. Sarkar, A. (2021). The emergence of a "modern" urban-industrial workforce in India, 1860-1914. In *Routledge handbook of the history of colonialism in South Asia* (pp. 119-133). Routledge.
11. Sen, A. K. (2025a). Living industrial heritage and socio-economic attributes of jute mill communities in West Bengal. [Study summarized in the source manuscript].
12. Sen, A. K. (2025b). Restorative landscape potential of heritage jute mills: Workers' perceptions of environmental aesthetics. [Study summarized in the source manuscript].
13. Stewart, G. T. (2017). The rise of jute, 1838-1928. In *Jute and empire* (pp. 38-92). Manchester University Press.
14. Taukeer, M. (2022). Trend, pattern and analysis of internal labour migration in colonial India to post-colonial India. *IASSI Quarterly*, 41(1/2), 61-80.
15. Wearmouth, A. (2015). Thomas Duff & Co and the jute industry in Calcutta, 1870-1921: Managing agents and firm strategy (Doctoral dissertation, University of Dundee).



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