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Literature Review

Cotton in the Indo-Pacific: Historical Origins, Linguistic Diffusion, and Socioeconomic Impacts

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Abstract: This study investigates the historical origins, linguistic diffusion, and socioeconomic impacts of cotton (*Gossypium spp.*) in the Indo-Pacific region. By reviewing secondary data from historical texts, linguistic databases, and archaeological reports, the research explores how *Gossypium* species, domesticated in both the Old and New Worlds, spread through complex trade networks and cultural exchanges. The study analyzes the dissemination patterns of cotton-related terminology across various language families and examines the socioeconomic effects of cotton cultivation and trade, including its influence on labor systems, economic structures, and cultural practices. While the findings highlight cotton's significant role in shaping global markets and cultural inter-actions, the study's limitations – such as its reliance on secondary sources, a two-month research duration, and a focus on a specific geographical area – warrant cautious interpretation. These constraints may limit the comprehensiveness and depth of the analysis, suggesting the need for future research to incorporate primary data collection, a broader geographical scope, and an extended study period. Despite these limitations, the study contributes to a nuanced understanding of cotton's historical, economic, and cultural significance, emphasizing the need for sustainable agricultural practices in contemporary cotton production.

Keywords: archaeological; diffusion; terminology; economic; exchanges; linguistic; networks; etymology

1. Introduction

Cotton, a ubiquitous fibre in modern textiles, has a storied history that spans thousands of years and multiple continents. Its journey from wild species to domesticated crops revolutionized agriculture and industry, leaving an indelible mark on human civilization. This study explores cotton's (*Gossypium spp.*) historical origins, linguistic diffusion, and socioeconomic impacts in the Indo-Pacific region. By examining various interdisciplinary evidence, we seek to uncover the intricate processes that facilitated cotton's spread and integration into diverse cultures and economies.

Cotton domestication is a remarkable event in agricultural history, occurring independently in both the Old and New Worlds. In Southwest Asia and the Americas, early cultivators recognized the potential of *Gossypium* species for producing durable and versatile fibres. Archaeological discoveries from Mohenjo-Daro in the Indus Valley and coastal sites in Peru provide compelling evidence of early cotton cultivation and textile production dating back to ancient civilizations. These findings illustrate the ingenuity and adaptability of early agricultural societies in harnessing natural resources to meet their needs.

The spread of cotton from its centres of domestication was facilitated by a complex web of trade routes that connected distant regions. These routes were not merely conduits for goods but also vectors for cultural and technological exchanges. With its strategic geographical position, the Indo-Pacific region played a pivotal role in the dissemination of cotton. Maritime and overland trade routes linked the Indian subcontinent with Southeast Asia, China, the Middle East, and beyond. Along these routes, cotton and cotton-related knowledge were exchanged, influencing agricultural practices and textile production in numerous societies.

Linguistic evidence provides a unique lens through which to trace the diffusion of

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cotton. The analysis of cotton-related terminology across different languages reveals patterns of contact and exchange among various cultures. The work of scholars such as Johnson and Decker (1980) have shown that linguistic diffusion is often intertwined with trade and migration, reflecting the movement of people and ideas. By examining the etymology and distribution of cotton-related words, we can gain insights into the historical pathways of cotton spread and the interactions between different linguistic and cultural groups.

The socioeconomic impacts of cotton cultivation and trade are multi-dimensional. Cotton's desirable properties—absorbency, flammability, and durability – made it a highly sought-after commodity in ancient and medieval markets. Its production and trade catalyzed economic specialization, the growth of urban centres, and the formation of extensive trade networks. The works of Beckert (2017) and Olmstead and Rhode (2018) highlight how cotton became a cornerstone of global commerce, driving economic growth and industrialization. Cotton cultivation and trade brought significant socioeconomic transformations in the Indo-Pacific region, influencing livelihoods, social structures, and cultural practices.

This study adopts a multidisciplinary approach, integrating historical texts, linguistic analyses, archaeological evidence, and ethnographic studies to comprehensively understand cotton's role in the Indo-Pacific. By synthesizing these diverse strands of evidence, we aim to construct a nuanced narrative of cotton's historical significance. This narrative will illustrate how the independent domestication of cotton species and cultural and technological exchanges facilitated its spread and integration into various economic systems. Furthermore, it will highlight the profound socioeconomic impacts of cotton, shaping both local economies and global trade networks.

The objectives of this study are threefold: first, to trace the historical origins and domestication of *Gossypium* species in the Indo-Pacific; second, to explore the linguistic diffusion of cotton-related terminology and its implications for understanding cultural exchanges; and third, to analyze the socioeconomic impacts of cotton cultivation and trade on ancient and modern societies in the region. This study aims to contribute to a deeper understanding of cotton's role in human history and its enduring legacy in the Indo-Pacific by achieving these objectives. Specifically, it seeks to answer the following questions:

1. What are the historical origins and dissemination patterns of *Gossypium* species (cotton)?
2. How do linguistic and cultural exchanges explain the spread of cotton-related terms and technological practices in a socioeconomic context?
3. What socioeconomic impacts did the cultivation and trade of cotton have on economic structures and cultural interactions?

2. Materials and Methods

This study utilized a literature review to investigate cotton's historical origins, linguistic diffusion, and socioeconomic impacts (*Gossypium spp.*) in the Indo-Pacific region. The research was conducted over two months, focusing on primary sources accessed through online databases such as Google Scholar. No direct participants were involved; secondary data from historical texts, linguistic databases, and archaeological reports were used. Historical records provided information on cotton cultivation and trade, while linguistic databases were consulted to analyze cotton-related terminology across various language families, including Austronesian, Austroasiatic, Indo-European, and Amerindian. Additionally, reports from key archaeological sites in India, Peru, and Southeast Asia were reviewed to understand early cotton cultivation practices.

Data collection involved comprehensive searches of online databases for relevant literature and primary historical documents related to cotton. Linguistic analysis focused on the diffusion of cotton-related terms, tracing their spread across different languages. Archaeological findings were examined to provide context on early cotton use and cultivation. The data analysis comprised mapping the chronology of cotton's domestication and spread, comparing cot-ton-related terminology across language families, and assessing the economic and cultural impacts of cotton cultivation and trade. The study aimed to construct a coherent narrative of cotton's significance in shaping ancient and modern societies in the Indo-Pacific region by synthesizing insights from historical, linguistic, and socioeconomic perspectives.

The study has several limitations that should be considered when interpreting the findings. The research was conducted over two months, restricting the depth of exploration and analysis. This constraint may have limited the comprehensive coverage of all relevant sources and data. The study relies exclusively on secondary data sources, including historical

texts, linguistic databases, and archaeological reports. This reliance may introduce biases or gaps in the data, as the analysis depends on the availability and accuracy of existing records. The geographical focus on the Indo-Pacific region, while providing valuable insights, may not fully capture the global context of cotton's historical and cultural impact, potentially limiting the applicability of the findings to other regions. The linguistic analysis of cotton-related terminology across various language families is based on available linguistic databases and may not account for all nuances and variations within and between languages.

Moreover, the complexity of linguistic diffusion, influenced by multiple factors, poses challenges in providing a comprehensive analysis. The interpretation of archaeological data depends on the available evidence and the quality of the reports reviewed, potentially limiting the accuracy and completeness of the historical narrative. Finally, the study did not involve direct fieldwork or collecting new primary data, which may have provided additional insights or corroborated existing findings, thus restricting the ability to verify and expand upon secondary sources.

3. Results and Discussion

This section presents the findings and analysis of the study on cotton (*Gossypium spp.*) within the Indo-Pacific region, focusing on its historical origins, linguistic diffusion, and socioeconomic impacts. The study employed a multidisciplinary approach, integrating historical texts, linguistic databases, and archaeological reports to investigate cotton's spread and integration. We will first examine the historical patterns of cotton domestication and dissemination, then analyze how linguistic and cultural exchanges facilitated the diffusion of cotton-related terminology and practices. Finally, the socioeconomic effects of cotton cultivation and trade on regional and global economic structures will be discussed. This comprehensive analysis aims to provide a detailed understanding of cotton's influence on the economic and cultural development in the Indo-Pacific region.

3.1. Historical Origins and Dissemination of Gossypium Species

The domestication of *Gossypium species* – *G. herbaceum* and *G. arboreum* in Southwest Asia, and *G. hirsutum* and *G. barbadense* in the Americas – marks significant milestones in agricultural history. Archaeological evidence from sites such as Mohenjo-Daro (2300-1750 B.C.) and coastal Peru corroborates early cotton use and cultivation practices (Lee & Fang, 2015). These species' domestication and subsequent spread did not occur in isolation; a complex interplay of cultural exchanges, technological innovations, and economic demands facilitated it. This interplay highlights the interdependence of different regions and cultures in shaping agricultural practices.

The spread of Old World cotton to Africa and the Mediterranean is attributed to Islamic trade networks, while New World cotton species spread to the Pacific Islands, likely through prehistoric trade and migration (Johnson & Decker, 1980). For example, cotton textiles found in Egyptian tombs indicate that *G. herbaceum* had reached Africa by 500 B.C. Similarly, cotton fibres discovered in the Peruvian Andes provide evidence of cotton's significance in pre-Columbian South America. These findings underscore the role of trade networks in the diffusion of cotton cultivation practices, bridging diverse geographical and cultural landscapes.

Furthermore, the historical dissemination of *Gossypium* species underscores the significance of trade routes such as the Silk Road and maritime routes in the Indian Ocean and the South China Sea. These trade routes facilitated the movement of goods and the exchange of agricultural practices and technological innovations. This dissemination process was influenced by the economic incentives provided by cotton's versatile use in textiles and the cultural exchanges between trading partners. Thus, cotton's spread illustrates the dynamic nature of early global trade systems, where economic and cultural factors were deeply intertwined.

The independent domestication of cotton in various regions underscores its adaptability and significance as a crop. Olmstead and Rhode (2018) establish that Old World cotton species like *Gossypium herbaceum* and *Gossypium arboreum* were cultivated in the Indus Valley and other parts of South Asia, while New World species, *Gossypium hirsutum* and *Gossypium barbadense*, originated in Mesoamerica and South America. This information suggests that the practice of cotton cultivation arose independently in several geographically distinct areas, driven by local needs and innovations. Consequently, the parallel evolution of cotton cultivation in different regions reflects a universal recognition of its value and utility.

Johnson and Decker (1980) highlight the complex dissemination patterns of cotton, showing how terms and technological practices related to cotton spread through cultural exchanges and trade routes. For instance, the spread of Old World cotton to Africa and the Mediterranean is attributed to Islamic trade networks, while New World cotton species spread to the Pacific Islands, likely through prehistoric trade and migration. Baumgartner (2012) supports this by documenting early Chinese and Southeast Asian trade connections with the Philippines, particularly Cebu, which became a significant cotton cultivation and trade centre before Spanish colonization. This evidence suggests that the diffusion of cotton resulted from economic factors and cultural exchanges that fostered technological innovations.

Baumgartner (2012) explores the pre-Spanish cotton industry in Cebu, using Ramon Echevarria's work as a critical reference. Baumgartner points to Echevarria to draw the suggestion that southern Cebu was a significant cotton cultivation and weaving centre, attracting Chinese and Siamese traders. Testimonies from Spanish-era writers and governmental documents indicate a robust cotton industry in the Chinese trade during the Spanish conquest. However, Spanish trade restrictions and economic shifts caused the industry's decline. This decline illustrates the vulnerability of local industries to external economic and political forces.

According to Baumgartner (2012), Echevarria's archaeological exploration reveals Cebu's historical trade significance through abundant porcelainware, indicating a diverse and extensive trade network. While Echevarria posits cotton as the primary trade commodity, Fox suggests a broader geographical trade pattern with no significant Philippine entrepôts before the 15th century. Echevarria's analysis of early Chinese accounts offers interpretations of geographic names and trade descriptions, proposing Cebu as a significant pre-colonial trade hub. Despite inherent difficulties in transliterating Chinese ideograms, Echevarria's work opens new avenues for understanding the economic and cultural dynamics of Cebu's pre-colonial past. These insights reflect the complex and interconnected nature of pre-colonial trade networks.

Similarly, Riello (2016a) mentions that by the ninth and tenth centuries, finer Indian cotton cloths had reached the Middle East through Gulf ports, alongside other commodities like Islamic earthenware and Chinese porcelain. This highlights a well-established trade network that facilitated the spread of cotton textiles over vast distances. The mention of Potieh cotton varieties and the special variety of cotton traded to Tang China via the "cotton Road" exemplifies how specific cotton varieties travelled across Asia, indicating a diverse range of cotton products and a sophisticated distribution system. These trade dynamics reveal cotton's extensive reach and influence in early global markets.

Riello (2016a) elaborates on how cotton cultivation began in India and gradually spread to other regions, including China, the Middle East, and Africa, around 1000 CE. This spread created a global system of cotton production and trade, with India at its core due to the high quality of its cotton textiles. Riello's analysis underscores India's dominant role, noting that "India indeed emerged as a core area," and discusses the "First Cotton Revolution," a period when Indian cotton textiles achieved global relevance and dominated international markets (p. 66). This revolution illustrates India's centrality in the early global cotton economy.

Building on this, Riello (2016b) elucidates the extensive trade and popularity of Indian cotton textiles during what is described as "the first global age" (late 15th century to the late 18th century). Indian cotton had already established markets across the Indian Ocean before European traders like the Portuguese, English, Dutch, and French arrived. From the 1500s, Indian cotton began penetrating new markets, particularly in Europe and the Americas, marking a significant shift in consumer habits worldwide. Indian cotton evolved from regional trade to a global commodity, indicating a well-established production and trade system long before European colonization and industrialization. This shift underscores the transformative impact of cotton on global trade patterns and consumer behaviour.

Indian cotton textiles were dominant in international markets well before the Industrial Revolution. Riello (2022) notes that up to three-quarters of what was exported to Europe from Asia was Indian cotton. Indian cotton was also significant in intra-Asian trade. The dissemination patterns of cotton were shaped by the extensive trade networks established by the East India companies, which facilitated the movement of cotton from India to Europe and the Atlantic world. This historical narrative indicates that the origins of cotton cultivation and its global dissemination are deeply rooted in the pre-industrial period, emphasizing the role of Indian cotton in connecting diverse regions.

Furthermore, Riello (2022) tackles the English East India Company's London auction of 1660 as an example of Indian cotton's relevance. The textiles, including various Indian

kinds of cotton, demonstrate their pivotal role. Riello explores how regions like Gujarat, the Malabar coast, the Coromandel coast, and Madras played central roles in producing and exporting textiles such as chintz, calicoes, and baftas. His detailed examination of the English Company's interactions in these areas and the types of textiles acquired illustrates the intricate spread of cotton through colonial trade routes, highlighting its global dissemination.

Moreover, Riello (2022) tackles the transformation of British trade from wool to cotton during the 18th century. Integrating Indian and Atlantic Ocean trade routes was crucial in disseminating cotton. Initially reliant on re-exporting foreign cotton fabrics, Britain gradually transitioned to domestic production by the mid-18th century as its manufacturing capabilities improved. Riello notes the pivotal role of Indian cotton in British trade early on, evolving into European-made textiles as local production flourished. This progression illustrates how cotton, initially sourced from India, became integral to British commerce before domestic manufacturing and mechanization took precedence. This transformation highlights the adaptability of cotton to changing economic conditions and technological advancements.

In a different geographical context, Corbett et al. (2021) trace the origins of cotton in the American South, particularly emphasizing the development of Petit Gulf cotton, a hybrid strain derived from Mexican, Georgian, and Siamese varieties. This strain's adaptability to different soils and climates facilitated its widespread cultivation across the southern states, notably in the Mississippi River Valley and new slave states like Louisiana, Mississippi, Arkansas, and Texas. Eli Whitney's invention of the cotton gin in 1793 revolutionized cotton production, making it less labour-intensive and more efficient, thus significantly boosting its cultivation and dissemination. By 1860, the southern United States had produced two-thirds of the world's cotton, highlighting the rapid and extensive spread of cotton cultivation following the invention of the cotton gin. This innovation demonstrates the profound impact of technological advancements on agricultural productivity and economic expansion.

Lastly, Nagano (1998) examines the Japanese attempt to boost cotton production in the Philippines as part of their war effort and economic strategy. The Japanese introduced new seed varieties incompatible with the Philippine climate, underscoring the difficulties in adapting cotton agriculture to new environments. This period is critical for understanding how geopolitical factors influenced the spread and adaptation of cotton cultivation practices in Southeast Asia. The article details how the Japanese Military Administration (JMA) attempted to introduce and expand cotton cultivation in the Philippines, which was part of a broader strategy to secure raw materials during wartime. This dissemination was characterized by assigning Japanese private firms to oversee local cotton production, highlighting the region's significant cultural and economic exchange period. The production involved selecting various cotton varieties, such as "Batangas White" and "Ilocos White." It introduced types like "Kings Improved" from Korea and "Express" from North China, reflecting an intersection of local and imported agricultural practices. The Japanese plan to expand cotton cultivation from 2,000 to 455,000 hectares highlights a significant effort to reorganize and increase local production under wartime pressures (Nagano, 1998). This effort illustrates how colonial powers used their influence to alter agricultural patterns in their territories.

Cotton has a rich history, with its origins rooted in the domestication of various *Gossypium* species across different regions. Lee and Fang (2015) detail the significance of four domesticated cotton species, tracing their early uses and global dissemination. Archaeological evidence from sites like Mohenjo-Daro in Southwest Asia and coastal Peru suggests early cultivation and use of cotton, indicating its widespread significance. The technological advancements in ginning and spinning, such as Eli Whitney's cotton gin, played a crucial role in transforming cotton into a global commodity, facilitating its spread from its regions of origin to extra-tropical areas. This transformation was pivotal during the Industrial Revolution, where mechanized cotton production reshaped economies globally, highlighting cotton's role in trade and manufacturing from Alexander the Great's era to modern times. This historical overview emphasizes the interconnectedness of technological innovation, economic demand, and cultural exchange in the global dissemination of cotton.

The independent domestication and subsequent dissemination of cotton highlight the crop's vital role in various civilizations. The cotton spread through trade routes facilitated the commodity exchange and the transfer of agricultural practices and technological innovations. This exchange was driven by economic incentives and cultural interactions, shaping the development of textile industries and trade networks across different regions. Through this lens, the story of cotton becomes a testament to the dynamic and interconnected nature of human societies and their agricultural practices.

3.2. Linguistic Connections and Cultural Exchanges in the Socioeconomical Perspective

The exploration of linguistic and cultural exchanges reveals how cotton, as a commodity, traversed various socioeconomic landscapes, fostering both economic activities and cultural transformations. By examining the diffusion of 'cotton' terminology and associated technological practices, we uncover the intricate web of ancient trade networks and cultural interactions that facilitated the spread of cotton cultivation and textile technologies.

Linguistic analysis offers profound insights into the socioeconomic dimensions of cotton's diffusion. Johnson and Decker (1980) documented the diffusion of 'cotton' terminology from Indian and Polynesian languages, reflecting the extensive trade routes that connected diverse regions. The comparative study of semantic similarities between Indo-Aryan and Dravidian languages suggests shared technological practices in cotton cultivation and textile manufacturing, indicating a flow of knowledge essential for economic activities. This integration of cotton-related terminology into various languages highlights the historical intricacies of trade and cultural exchanges.

For instance, the Polynesian term "vavae" for cotton, traced back to Austroasiatic roots, underscores early contact and the spread of cotton cultivation knowledge (Johnson & Decker, 1980). This linguistic diffusion mirrors the socio-political dynamics, where correlations can be attributed to peaceful trade relations and periods of conflict and conquest. The widespread adoption of cotton-related terms illustrates the interconnectedness of ancient civilizations through trade, significantly impacting socioeconomic structures. The table below presents a comparative analysis of cotton-related terms across language families, underscoring the cultural significance of cotton.

Table 1. Comparative analysis of cotton-related terms across language families

Language Family	**Term for 'Cotton'**	**Term for 'Fire'**	**Notable Connections**
Austronesian	kapas	api	Everyday utility in cordage and textile
Austroasiatic	*bas	*ba	Shared roots in fibre and fire terminology
Indo-European	karpasa	*ker	Borrowings related to the textile trade
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Analyzing linguistic forms related to 'cotton', 'fire', and 'fibre' across various language families reveals regular consonant changes and notable semantic distinctions. These findings suggest significant cultural exchanges and technological transfers essential for the socioeconomic development of cotton cultivation and trade regions.

Significant regional adaptations and variations exist despite the broad diffusion of cotton-related terms. Beckert (2017) notes that while "cotton" has common roots in many languages, the technological practices associated with cotton processing and weaving evolved independently. This resulted in distinct regional textile traditions, reflecting diverse socioeconomic contexts. For example, the intricate textiles of the Indus Valley civilization showcase advanced cotton processing technologies, while pre-colonial Cebu's utilitarian fabrics highlight practical uses of cotton in daily life (Baumgartner, 2012).

This technological practice divergence underscores local innovations' role in shaping regional textile industries. Riello (2016b) highlights the categorization and names of different cotton fabrics by European traders and local producers, reflecting a transfer of terminology and knowledge. The Portuguese, for example, distinguished between different qualities of Indian cottons, such as 'semina', 'tafecira', 'salempuri', and 'percalos'. This nomenclature indicates a blend of linguistic influences and the integration of Indian cotton terms into European trade lexicons.

Additionally, the adaptation of cotton production techniques and patterns in various regions shows a significant cultural exchange driven by the economic value of these textiles. Names given to delicate Indian fabrics, such as "rosy cotton" and "morning sunrise clouds," reflect the cultural appreciation and descriptive terminology that emerged around these luxury items. The transfer of terms and practices is also seen in the widespread use of Indian

kalamkari (pen-work) textiles in Southeast Asia, known as ma'a, mawa, or mbesa. These exchanges facilitated the spread of products and the diffusion of cultural practices and terminologies associated with cotton textiles.

The extensive trade in Indian cotton textiles resulted in adopting and adapting various terms across different cultures. Terms such as "chintz" (referring to painted or printed cotton) and "calico" (used broadly for Indian cotton fabrics) became part of the vocabulary in European markets, indicating the integration of Indian textile culture. Moreover, technological practices associated with cotton production, such as dyeing and printing techniques, spread through these trade networks. The reference to "painted calico where dyes and mordants were applied by hand with a brush" (p. 94) illustrates the transfer of specialized knowledge from Indian artisans to European manufacturers. This cultural exchange involved linguistic assimilation and significant technological advancements that influenced the European textile industry and beyond (Riello, 2022).

The cultivation and trade of cotton significantly influenced both the economies of producing regions and the markets where it was consumed, particularly in the Atlantic context. Riello categorizes the Atlantic market into three central regions: West African markets, the West Indies, and the North American colonies. He notes that the European trade in textiles with West Africa was well-established even before British, French, and Dutch traders arrived in the mid-sixteenth century, emphasizing the scale and competitiveness of this trade. Cotton textiles played a pivotal role in the slave trade, with various types of cotton fabrics exchanged for enslaved individuals, thus integrating cotton deeply into the socioeconomic framework of the Atlantic economy (Riello, 2022).

Furthermore, Riello (2022) explores how the demand for cotton textiles in North America and the West Indies spurred economic growth and facilitated cultural exchanges. Riello highlights that consumption of textiles and household goods per capita in America exceeded that in England by threefold, illustrating the significant impact of cotton goods on colonial American society. The trade-in cotton textiles stimulated economic activity and influenced cultural practices and consumer preferences, leading to a transatlantic cultural exchange that reshaped social identities and economic behaviours.

The spread of cotton-related terms and technological practices is linked to the global trade networks established by European powers. European manufacturers, particularly in Britain, initially struggled to compete with Indian cotton and relied on imitations and adaptations. The prohibition of Indian loom-patterned cloth in 1721 encouraged the growth of domestic production, albeit with initial challenges in quality. Linguistic exchanges can be inferred from adopting and adapting terms related to cotton textiles and manufacturing practices. Riello highlights how technological and entrepreneurial challenges were met by innovative solutions such as printing on plain Indian cotton cloth or European-made linen, reflecting the cultural exchanges and adaptations necessary for developing a competitive domestic industry (Riello, 2022).

Turning to the Japanese interlude in the Philippines, the interaction between Japanese firms and local Filipino farmers necessitated a transfer of agricultural knowledge and technology. This exchange was mediated through contractual agreements where local farmers were engaged in cotton cultivation under the supervision of Japanese firms, such as Toyo Menka Co. and Taiwan Takushoku Co. These firms introduced new agricultural techniques and management practices, which inevitably led to the exchange of terminology and practices between the Japanese and Filipino agricultural workers. The involvement of Filipino technical staff and graduates from the University of the Philippines, Los Baños, indicates a significant exchange of knowledge and skills, fostering a shared understanding of cotton cultivation techniques and related linguistic terms. Japan's attempts to import spindles and looms and establish joint ventures with local corporations like the NDC and Daiwa Boseki Co. illustrate a form of technological diffusion (Nagano, 1998).

The spread of cotton cultivation and its associated technologies were deeply intertwined with linguistic and cultural exchanges. For instance, "cotton gin" entered the lexicon following Whitney's invention, illustrating how technological innovations drive language evolution. The phrase "to be sold down the river" emerged in this era, reflecting the forced migration of enslaved people from the upper southern states to the Deep South to cultivate cotton. Such linguistic developments were not just a reflection of new agricultural practices but also of the socioeconomic realities and cultural exchanges in the antebellum South. Additionally, the widespread cultivation and processing of cotton necessitated new agricultural practices and terminologies, further embedding cotton-related terms into the socioeconomic and cultural fabric of the region (Corbett et al., 2021).

The spread of cotton-related terms and technological practices can be traced through linguistic and cultural exchanges. Johnson and Decker (1980) provide a comparative analysis of linguistic forms related to cotton, documenting the spread of cotton-related terminology from an Indian nexus throughout Eurasia and the Indo-Pacific. Their study suggests that Polynesian terms for cotton may derive from Austroasiatic languages, indicating cultural linkages between cotton and fire-making. This linguistic diffusion reflects peaceful trade relations and periods of conflict, showcasing the complex socio-political dynamics. The integration of cotton-related terminology into multiple languages exemplifies the multifaceted nature of historical interactions and the role of cotton in these exchanges. The Meranaw traditional ballad tie-dye technique, as examined by Alauya (2020), further highlights the cultural significance of cotton in Indigenous practices, utilizing natural resources and plant fibres for weaving, which underscores the historical depth of cotton-related traditions.

The linguistic diffusion of cotton-related terms underscores the interconnectedness of ancient civilizations through trade and cultural exchange. By analyzing the commonalities and differences in these terms and considering the diverse technological adaptations, we gain a nuanced understanding of how cotton cultivation and processing spread globally. This synthesis of linguistic and cultural evidence highlights the role of cotton as both a commodity and a medium of cultural interaction, shaping the economic and social landscapes of various regions.

3.3. Socioeconomic Impacts

The cultivation and trade of cotton significantly influenced socioeconomic structures and cultural interactions globally and locally, with profound impacts on economic growth, industrialization, and cultural practices. Johnson and Decker (1980) highlight cotton's properties—absorbent, flammable, and durable—that revolutionized textile production and facilitated economic specialization. Furthermore, Beckert (2017) discusses how cotton drove economic growth and industrialization, particularly in the United States and Britain. The high demand for cotton textiles fueled the expansion of plantations and mills, creating vast economic networks and altering labour systems. Similarly, Olmstead and Rhode (2018) emphasize cotton as a cornerstone of global commerce, driving economic growth and industrialization, notably through the intensification of slavery in the American South.

In the Philippines, Baumgartner (2012) documents the pre-Spanish cotton industry in Cebu, which attracted international traders and facilitated economic exchanges. However, Spanish colonization and trade restrictions led to the decline of the industry. This decline is further evidenced by Amper (2014), who highlights the traditional use of cotton in Santander, Cebu, and its decline due to global and colonial influences. Despite globalization pressures, local practices in Santander have sustained cotton's presence, though production has drastically declined since the late 19th century. The study also underscores the medicinal use of cotton in Santander, where different parts of the plant were used in various remedies. Furthermore, Balisacan (1983) discusses the challenges faced by 20th-century efforts to revive cotton cultivation in the Philippines, including competition from synthetic fibres and policy inefficiencies. Despite these efforts to promote import substitution and increase domestic cotton production, the industry struggled to compete with cheaper synthetic alternatives.

India's dominance in cotton textile production brought economic prosperity and spurred high technological development rates. Riello (2016a) points out that technological advancements in cotton production, such as the spinning machine, allowed Europe to transition from being an importer to a producer of cotton textiles. Consequently, this shift marked the beginning of Europe's industrial dominance and reshaped global economic structures. This transformation was further facilitated by Europe's engagement with global markets and the establishment of cotton plantations in colonies, which provided a steady supply of raw materials for European industries. He emphasizes that the Industrial Revolution in Europe relied heavily on the global trade of cotton, transforming Europe's economic landscape and contributing to the "Great Divergence" between Europe and Asia. Riello (2016a) argues that cotton played a pivotal role in this divergence by transforming Europe's economic landscape, stating, "The story of cotton should be interpreted as one of economic and socio-cultural transformation that was as reliant on factors endogenous to Europe as it was on external stimuli" (p. 64).

Indian cotton textiles also held deep cultural significance and were integral to Southeast Asia's various social and ceremonial practices. These textiles were symbols of social prestige, embedded in rituals and traditions, such as curing diseases, death rites, sanctifying icons, and payment of services and taxes. This cultural significance is highlighted by Riello (2016b), who

contrasts the accessibility of Indian cotton textiles with the exclusivity of Chinese silks, noting that Indian cotton reached all social strata, from Chinese peasants to European housewives and enslaved Africans. This widespread availability marked a shift towards mass consumption and altered traditional consumption patterns by replacing materials like arrowroot and linen. Introducing Indian cotton into global markets also precipitated significant economic changes, fostering new market dynamics and consumer behaviours. For instance, Riello (2016b) notes that Indian cotton is affordable and high in quality, capable of serving both luxury and everyday needs. This duality, like Indian cotton – as both a luxury and an ordinary commodity – helped reshape economic structures by broadening the base of consumers and altering trade practices.

Moreover, integrating the Indian Ocean and Atlantic trade networks facilitated the exchange of raw materials and finished goods, bolstering European industrial growth. Riello (2022) discusses the "diamond-shape trade" system, highlighting the role of the Atlantic slave trade in the cotton economy and the interdependence of regions in the global cotton trade. He notes a decline in the importance of wool and a rise in cotton's prominence within British trade, which laid the groundwork for the Industrial Revolution. According to Riello, from 1675 to 1775, British trade underwent pivotal changes, diversifying exports to encompass metalware and cotton textiles. This transformation revolutionized British manufacturing and had broader economic implications, fostering international trade and reshaping socioeconomic structures. The growing demand for cotton textiles spurred the development of manufacturing hubs such as Manchester, identified by Riello as a pivotal location where an industry emerged producing affordable yet high-quality cloth for both domestic and Atlantic markets.

In the context of the Philippines under Japanese rule, Nagano (1998) examines the socioeconomic impacts of cotton production. The Japanese initiative to make the Philippines a significant cotton producer faced multiple obstacles, including climatic incompatibility, local resistance, and guerrilla activities. This effort disrupted agricultural practices and led to significant economic consequences, such as a severe rice shortage from converting rice lands to cotton cultivation. The introduction of cotton production disrupted existing agricultural practices, as seen in converting upland rice lands, sugarlands, and other crop areas into cotton fields. This shift had profound economic consequences, including a severe rice shortage from converting rice lands to cotton cultivation. The resistance from local landlords and peasants and guerrilla activities highlighted the cultural and political tensions arising from this economic imposition.

Furthermore, the economic relationship between Japanese firms and local farmers, characterized by contract growth, created a new socioeconomic dynamic where Japanese firms provided technical and financial support while local farmers managed the cultivation. This arrangement reflects a blend of economic dependence and collaboration that reshaped local agricultural economies and cultural interactions. Nagano (1998) details the significant strain on the Philippine economy due to Japan's ambitious but unrealistic cotton production goals. The failure to meet production targets led to a severe shortage of raw cotton, impacting the local textile industry and contributing to the scarcity of cotton goods for the Filipino population. The prioritization of cotton goods for the Japanese military over local needs exacerbated the economic hardships faced by the Filipino people, leading to inflated prices and widespread shortages. Additionally, the introduction of rationing systems and the creation of organizations like Primco and Nadisco were attempts to manage these shortages. However, they ultimately fell short due to continued scarcity and black market activities (Nagano, 1998).

The socioeconomic impacts of cotton cultivation were not limited to the Philippines. Cotton became the antebellum South's primary commercial crop in the United States, eclipsing tobacco, rice, and sugar in economic importance by the mid-19th century. Corbett et al. (2021) describe how the cotton boom transformed the Southern economy, making cotton the critical cash crop and leading to the extensive use of enslaved labour for its production. By 1860, 1.8 million out of 3.2 million enslaved people in the slave states were involved in cotton production, demonstrating the crop's central role in the region's economic structure. The economic success of cotton also fueled the Industrial Revolution, both in the United States and Great Britain, by providing raw materials for textile mills. Corbett et al. (2021) note that Southern cotton picked and processed by enslaved labourers was crucial in sustaining the textile industries in both regions. The socioeconomic impact extended to the development of transportation infrastructure, particularly steamboats, which became essential for transporting cotton along the Mississippi River to ports like New Orleans. This transportation revolution further integrated the southern economy into national and global

markets, with New Orleans emerging as a critical hub for cotton export to Europe, especially Great Britain. Moreover, the economic dependence on cotton solidified the institution of slavery in the South, leading to a domestic slave trade that forcibly relocated hundreds of thousands of enslaved people to cotton-growing regions. Corbett et al. (2021) vividly describe how this internal slave migration was one of the most significant forced movements of people in U.S. history, highlighting the profound human cost of cotton's economic success.

Balisacan (1983) also analyzes the Philippine national cotton development program initiated in the early 1970s to promote import substitution and address the significant outflow of $30 million annually for cotton lint imports. The research identified over 530,000 hectares suitable for cotton farming, with 150,000 hectares fitting into existing cropping systems, surpassing the 115,000 hectares needed for self-sufficiency. By 1980-81, cotton cultivation expanded to 17,000 hectares from a mere 194 hectares in 1974-75. The study examines the competitiveness of domestic cotton versus imports and the impact of government policies on domestic production. Balisacan delves into the historical trajectory of the Philippine cotton industry, tracing its roots to the pre-Hispanic era and highlighting significant periods such as the decline during Spanish colonization, revival attempts post-World War II, and the significant developments in the late 1960s and early 1970s. Legislative actions and the establishment of critical institutions like the Philippine Textile Research Institute in 1967 and the Philippine Cotton Corporation in 1973 marked a turning point, leading to increased research and development efforts and the identification of suitable cotton varieties.

The study also analyzes the economic and policy dynamics within the domestic raw cotton scenario. It notes the decline in cotton lint imports despite rising per capita income and population, attributed to competition from synthetic fibres. The introduction of synthetic fibres in the 1950s and the subsequent fluctuations in world cotton prices significantly influenced the local textile industry, leading to a decrease in cotton content in fabrics. However, post-1973, rising synthetic fibre prices led to an increase in cotton content in local fabrics. Balisacan critically examines the structure of incentives within the industry, focusing on nominal and effective protection rates. The study reveals that despite an average nominal protection rate of 28% from 1975 to 1981, domestic cotton production struggled due to the relatively high cost of production and lack of international competitiveness. The analysis suggests that government policies promoting cotton production often resulted in distorted incentives and inefficiencies within the sector.

In conclusion, the socioeconomic impacts of cotton cultivation and trade were multifaceted and profound. Globally, cotton drove economic growth and industrialization, transforming labour systems and trade networks. Locally, it influenced agricultural practices, cultural interactions, and economic structures, with regions like Cebu experiencing significant changes due to colonial policies and global market forces. Integrating global perspectives with regional analyses reveals a comprehensive view of cotton's transformative potential and vulnerability to external influences. Consequently, these historical insights offer valuable lessons for understanding global trade dynamics, economic development, and cultural change while highlighting the need for sustainable agricultural practices considering local contexts and global market trends.

4. Conclusions

Gossypium species (cotton) domestication and dissemination have deep historical roots, with *G. herbaceum* and *G. arboreum* domesticated in Southwest Asia and *G. hirsutum* and *G. barbadense* in the Americas. Archaeological evidence from sites like Mohenjo-Daro and coastal Peru shows early cotton use and cultivation. The spread of cotton was facilitated by complex trade networks, cultural exchanges, and technological innovations, such as Eli Whitney's cotton gin. Old World cotton spread to Africa and the Mediterranean through Islamic trade networks, while New World cotton reached the Pacific Islands. The significance of trade routes like the Silk Road and Indian Ocean maritime routes in disseminating cotton, alongside the independent domestication of cotton in different regions, underscores its adaptability and global economic importance. The role of Indian cotton in global trade, especially before and during the Industrial Revolution, highlights the crop's influence on global markets and economies. Additionally, Japan's efforts to boost cotton production in the Philippines during wartime exemplify the geopolitical impact on cotton agriculture. Cotton's history reflects a rich tapestry of technological innovation, economic demand, and cultural exchange across diverse civilizations.

Linguistic and cultural exchanges were crucial in spreading cotton-related terms and

technological practices across various socioeconomic landscapes. The diffusion of 'cotton' terminology, documented by Johnson and Decker (1980), highlights the extensive trade networks connecting diverse regions. For instance, the Polynesian term "vavae" for cotton, traced to Austroasiatic roots, signifies early contacts and knowledge transfer. Comparative studies of semantic similarities between Indo-Aryan and Dravidian languages suggest shared technological practices in cotton cultivation and textile manufacturing, crucial for economic activities. The adoption of cotton-related terms, such as "chintz" and "calico," into European languages reflects the integration of Indian textile culture into global markets. Technological advancements, like the cotton gin, and the cultural adaptation of production techniques, such as Japanese agricultural practices in the Philippines, further illustrate these exchanges. The linguistic diffusion of cotton-related terms, alongside cultural practices, underscores the interconnectedness of ancient civilizations and their economic and social structures. This linguistic and cultural evidence synthesis reveals how cotton, as both a commodity and a cultural element, was influenced and shaped by different regions' socioeconomic and cultural dynamics.

The cultivation and trade of cotton had profound socioeconomic impacts on economic structures and cultural interactions globally and locally. Cotton's properties, as highlighted by Johnson and Decker (1980), revolutionized textile production and facilitated economic specialization, driving growth and industrialization, especially in the United States and Britain. This demand expanded plantations and mills, transforming labour systems and creating vast economic networks. In the Philippines, the pre-Spanish cotton industry in Cebu attracted international traders but declined under Spanish colonization, with global market forces further challenging local production. India's dominance in cotton textiles spurred technological advancements, significantly contributing to Europe's Industrial Revolution and reshaping global economic structures, as Riello (2016a) describes. Indian cotton textiles also held cultural significance, influencing Southeast Asia's social and ceremonial practices and fostering new market dynamics and consumer behaviours. The integration of global trade networks, including the "diamond-shape trade" system involving the Atlantic slave trade, facilitated economic growth and cultural exchange, as Riello (2022) noted. In the antebellum South, cotton became the primary commercial crop, entrenching the institution of slavery and integrating the region into global markets, a transformation vividly described by Corbett et al. (2021). In the Philippines, Japanese efforts to establish cotton production during occupation faced numerous challenges, impacting local agricultural practices and the economy, as Nagano (1998) detailed. Despite efforts to revive cotton cultivation in the Philippines in the 20th century, as analyzed by Balisacan (1983), the industry struggled against synthetic fibre competition and policy inefficiencies. These complex socioeconomic impacts underscore cotton's role in shaping global trade dynamics, economic development, and cultural interactions, highlighting the need for sustainable agricultural practices considering local and global contexts.

In conclusion, the study sheds light on the historical origins, linguistic diffusion, and socioeconomic impacts of cotton (*Gossypium spp.*) in the Indo-Pacific region. The findings highlight cotton's significant role in shaping economic structures and cultural interactions through widespread cultivation and trade. The analysis of linguistic and cultural exchanges reveals the extensive reach and integration of cotton-related terminology and technological practices across diverse civilizations, underscoring cotton's adaptability and influence in global markets. However, it is essential to acknowledge the study's limitations, such as the reliance on secondary sources, the restricted timeframe of two months, and the focus on a specific geographical region. These constraints influenced the comprehensiveness and depth of the findings, as well as the accuracy of the linguistic analysis. The absence of new primary data collection and the potential biases in historical texts and reports further emphasize the need for cautious interpretation. Given these limitations, future research should consider a broader geographical scope and longer study duration, incorporate primary data collection, and include fieldwork to validate and expand the existing knowledge. By addressing these limitations, future studies can provide a more comprehensive and nuanced understanding of cotton's historical, economic, and cultural significance across different regions and periods.

Future researchers should investigate the regional variations and technological innovations associated with the domestication and dissemination of *Gossypium* species, exploring the distinct agricultural practices and textile technologies that emerged across different cultures. Investigating the role of ancient trade networks, such as the Silk Road and Indian Ocean maritime routes, in the spread of cotton can offer valuable insights into the interconnectedness of ancient economies and cultures. Researchers should also examine the

linguistic diffusion of cotton-related terminology and its implications for understanding cultural exchanges and technological transfers. Additionally, a comparative analysis of the socioeconomic impacts of cotton cultivation across different regions, especially regarding labour systems and economic specialization, could provide a more nuanced understanding of its global influence. Further studies on the geopolitical aspects of cotton agriculture, such as Japan's wartime efforts in the Philippines, can shed light on the interplay between political agendas and agricultural practices. Finally, an interdisciplinary approach that integrates archaeological, linguistic, and historical evidence can offer a comprehensive view of cotton's role in shaping global economic and cultural landscapes, emphasizing the need for sustainable practices in contemporary cotton production.

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