AATCC Review

08 March 2025: Received
29 April 2025: Revised
06 May 2025: Accepted
09 June 2025: Available Online

https://aatcc.peerjournals.net/

Review Article Open Access

Trends, Challenges, and Opportunities in the Current Landscape of India's Wool Sector: A Review

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ABSTRACT

The wool sector in India plays a vital role in the livelihoods of millions of sheep-rearing households, contributing approximately 1.8% to global wool production. India ranks among the largest wool-producing countries globally, yet its market share remains relatively small compared to leading producers like Australia and China. Wool production in India is predominantly concentrated in the states of Rajasthan, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Gujarat, and Karnataka. The article highlights the substantial growth in sheep population as India ranks the third-largest country in sheep population. It provides a comprehensive analysis of the wool sector in India, detailing the sheep breeds, decadal production trends of wool, wool characteristics, marketing channels, valuation parameters, and trade dynamics with an emphasis on the need for breed improvements and enhanced processing techniques to address ongoing challenges in wool quality and quantity. The paper explores both traditional and modern marketing channels, assessing their impact on wool pricing and distribution. It also examines the challenges faced by the sector, including inefficient wool processing infrastructure, technological inefficiencies, fragmented supply chains, competition from synthetic fibers, limited access to credit, lack of awareness and training and policy-related issues. Despite these challenges, the article identifies significant growth opportunities like India's diverse sheep breeds, increasing wool demand globally over synthetic alternatives for its sustainability, breathability, and biodegradability thereby enhancing the competitiveness of the Indian wool industry, aiming to bolster its global presence and support rural economic development. Focusing on wool valuation parameters, modernizing wool processing infrastructure, and promoting market linkages can help revive the wool sector in India.

Keywords: *Breeds, Challenges, Growth opportunities, Marketing channels, Sheep, Trends, Tribes and communities, Wool production, Wool Trade, Wool Valuation.*

1. An Overview of Wool Production

India's textile sector is one of the oldest and most diverse industries, playing a vital role in the economy. These include natural fibers such as cotton, jute, silk, and wool, as well as synthetic fibers like polyester, viscose, nylon, and acrylic. The wool industry in India has a long history with roots dating back to the Aryans in 5000 B.C.Wool is a remarkable, renewable, eco-friendly, cost-effective, and sustainable natural fiber that is highly valued for its warmth, durability, and versatility and is used in a wide range of products including clothing, blankets, carpets, and upholstery. The handicraft industry is widespread across India and ranks as the second-largest employment provider after agriculture. The art of hand-knotted carpets, locally referred to as "Kal baffi," dates back to the 15th century and has since evolved to achieve remarkable levels of craftsmanship [1].

Wool is unique as a natural fiber derived from animals, mostly sourced from rural areas, making it an important contributor to rural employment. The Indian wool industry is valued at Rs. 12,444.45 crores (2020-21), with about 75-80% of production in the unorganized sector, including hand-knotted carpets, hosiery, and knitting. Wool production provides employment to around 12 lakh people in the organized sector and another 20 lakh in sheep farming and rearing [2]. However, domestic wool production is insufficient to meet demand, particularly for fine-quality wool, leading to significant imports. Key wool-producing states include Uttar Pradesh, Punjab, Rajasthan,

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DOI: https://doi.org/10.21276/AATCCReview.2025.13.03.176

Himachal Pradesh, Jammu & Kashmir, and Uttarakhand. The wool sector also has a strong export focus, sending handmade carpets, woolen yarn, and garments to international markets [1].

2. Sheep Population and Geographical Distribution of Wool in Various States of India

India ranks as the third-largest country in sheep population, with 74.26 million sheep, 6th amongst clean wool producer countries, and 9th among greasy wool producers. Telangana emerged as the state with the largest sheep population, growing from 12.8 million in 2012 to 19.1 million in 2019, marking a substantial increase of 48.51%. Andhra Pradesh, with a population of 17.6 million sheep, follows closely behind, having experienced a growth of 30.00%. Karnataka saw a moderate increase in its sheep population, rising from 9.6 million to 11.1 million [3].

Conversely, some states witnessed a decline in their sheep populations. Rajasthan, for instance, saw a decrease of 12.95% in sheep population. Similarly, Tamil Nadu and Jammu & Kashmir experienced declines of 5.98% and 4.19%, respectively. Notably, Uttar Pradesh recorded the highest percentage decrease, with its sheep population falling by 27.25% from 1.4 million to 1.0 million. Other states like Maharashtra and Gujarat saw modest increases, with Maharashtra's population rising by 3.87% to 2.7 million and Gujarat's by 4.66% to 1.8 million. Odisha's sheep population, however, declined by 19.10%, reducing from 1.6 million to 1.3 million [3].

Figure 1 reveals that in 2022-2023 Rajasthan was the largest wool producer, contributing a staggering 16,128.87 thousand kilograms, far surpassing other states. Jammu and Kashmir follow as the second-largest producer with 7,580.12 thousand kilograms. Together, these two states dominate India's wool sector, accounting for the majority of the country's total wool production. Other states like Gujarat, Maharashtra, Himachal Pradesh, and Uttar Pradesh contribute relatively smaller quantities to wool production, emphasizing the concentration of wool production in these key regions.

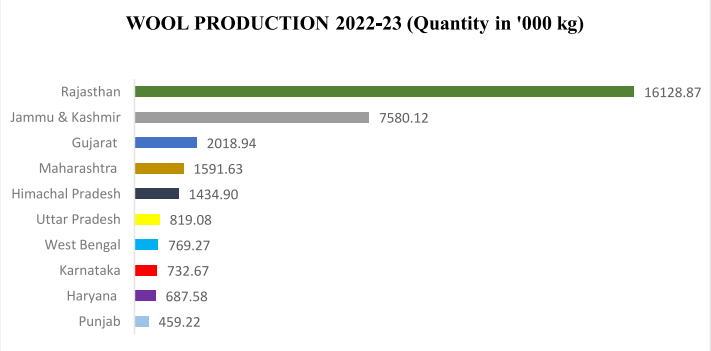

Figure 1: Major Wool Producing States (Source: Ministry of Fisheries, Animal Husbandry & Dairying)

As per Basic Animal Husbandry Statistics (BAHS) 2024, state-wise data on wool production in India shows that Rajasthan contributes mainly in total wool production with a share of 45.94 % followed by Jammu and Kashmir (25.24%), Gujarat (7.08%), Maharashtra (5.42%) and Himachal Pradesh (4.08%). In terms of Annual Average Growth Rate (AGR), the highest AGR has been recorded by Punjab (22.04%) followed by Tamil Nadu (17.19%) and Jharkhand (4.02%).

3. Diversity in Indian Sheep Breeds

The country is home to 45 recognized sheep breeds, though not all are significant wool producers [4]**.** Wool production in India is categorized into four regions based on agro-climatic conditions and sheep breed types [5]. Notably, 14 breeds from the northwest arid and semi-arid regions are the primary contributors to the nation's carpet-quality wool production, which positions Rajasthan as the leading wool-producing state in India. Additionally, 10 breeds from the northern temperate regions yield fine and semi-coarse wool, while 15 sheep breeds from the southern peninsular and 6 from eastern regions are primarily raised for mutton rather than wool production. Table 1 highlights the major wool-producing sheep breeds and their characteristics.

Table 1: Major wool producing sheep breeds and their characteristics (ICAR-NBAGR 2023)

S.No.	Breed	Region	Characteristics
INDIGINEOUS BREEDS			
APPAREL WOOL			
1.	**Karnah**	Kashmir	Well, adapted to the cold and mountainous terrain, making it resilient in harsh climatic conditions.
2.	**Nilgiri**	Tamil Nadu	A national plan has been implemented to save the Nilgiri sheep from extinction by the NBAGR
CARPET WOOL			
3.	**Magra**	Rajasthan	Produces lustrous wool
4.	**Changthangi**	Ladakh	Alpine sheep adapted to high altitudes
5.	**Chokla**	Rajasthan	Also known as the Shekhawati breed, yields fine carpet-quality fleece. It is economically valuable for the local communities
6.	**Patanwadi**	Gujrat	Along with carpet wool, it is also a good milk producer.
7.	**Gaddi**	Himachal Pradesh	Exceptionally resilient, capable of thriving in the cold, rugged, and high-altitude environments of the Himalayas. Average annual yield is 1.13 kg per sheep, clipped thrice a year.
8.	**Bhakarwal**	Jammu and Kashmir	Produces long and durable wool.
MUTTON AND CARPET WOOL-dual purpose breeds			
9.	**Muzaffarnagari**	Uttar Pradesh	Renowned as the best mutton-producing breed
10.	**Marwari**	Rajasthan	Hardy breed capable of long-distance migration. The yield of wool per year is 0.90-1.81 kg per animal.
11.	**Jaisalmeri**	Rajasthan	Hardy and well-suited for migration.
12.	**Sonadi**	Gujarat and Rajasthan	Known for both wool and milk production.
13.	**Bellary**	Karnataka	Also known as **Bandur** or **Banur sheep**alued for mutton production.
	Chhotanagpuri	Jharkhand	Found in Jharkhand, adapted to the hilly terrain and produces coarse wool.
CROSSBRED SHEEP			
14.	**Hissardale**	Haryana and parts of Punjab	Apparel wool breed was synthesized through crossing **Australian Merino rams with Bikaneri (Magra) ewes**

15.	**Avivastra**	Rajasthan,	Apparel wool breed developed by the **CSWRI.** Fine-wool breed, evolved through interbreeding and selection of **Rambouillet x Chokla** (halfbred and 5/8th) base. Wool obtained is 2.3 kg.
16.	**Bharat Merino**	Karnataka and Tamil Nadu	Apparel wool breed Developed by the **CSWRI.** Fine-wool breed, evolved by crosses of indigenous breeds with **Rambouillet and Merino.** Wool obtained is 4.2 kg.
17.	**Avikalin**	Rajasthan,	Superior carpet wool breed, evolved through interbreeding and selection of Rambouillet x Malpurahalfbreds.

4. Sheep Rearing Tribes and Communities in India

Sheep were among the first animals to be domesticated [6], and migratory pastoralism remained practiced among nomadic communities in different parts of India [7]. Traditionally, certain pastoralist groups in the Indian subcontinent specialized in sheep rearing [8]. These include the Dhangars in Maharashtra [9], Kurubas (also known as Kuruma), Gollas and Banjaras in Karnataka, Andhra Pradesh, and Telangana [10], and the Gaddis in Himachal Pradesh [11]. Other prominent groups are the Bakarwalsi.e. high-altitude goat and sheep herders in Jammu and Kashmir [12], and Konar and Pallar communities in Tamil Nadu rear sheep for meat purposes [13]. Rebaries, Raika, Gujars, and Bharwad of Gujarat and Rajasthan have adopted small ruminant rearing as an alternative venture [14]. Communities like theBhotias of Gharwal region in Uttarakhand, Kanets, Kaulis, and Kinnauras in Himachal Pradesh [15], and Todas in Tamil Nadu [16] also continue this pastoral tradition. Figure 2 reveals the traditionally sheep-rearing tribes and communities across various states and union territories in India.

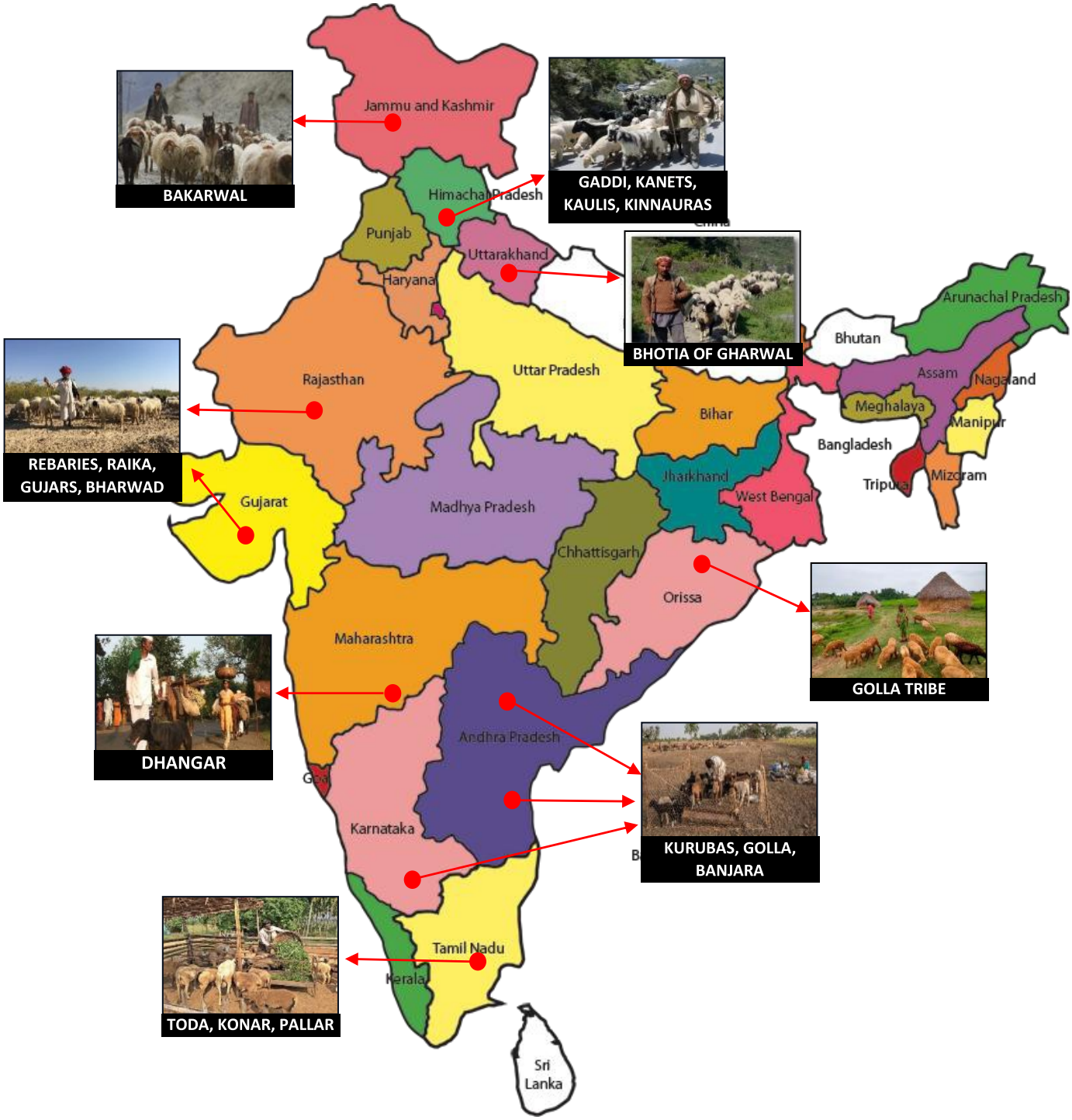

Figure 2 Map showing sheep rearing tribes and communities in India

5. Wool Production Decadal Trends in India

Figure 3 reveals the indigenous /raw wool production data over several years from 2016-17 to 2023-24. Each bar represents the total wool production in millions of kilograms for the respective year**.** The decline in wool production from 2018-19 to 2023-24, which saw a drop from 40.42 million kg to 33.69 million kg, can be attributed to climate change, disease outbreaks, such as those affecting sheep, have further contributed to decreased production and other economic factors, including market volatility and lower wool prices offered to the producer.

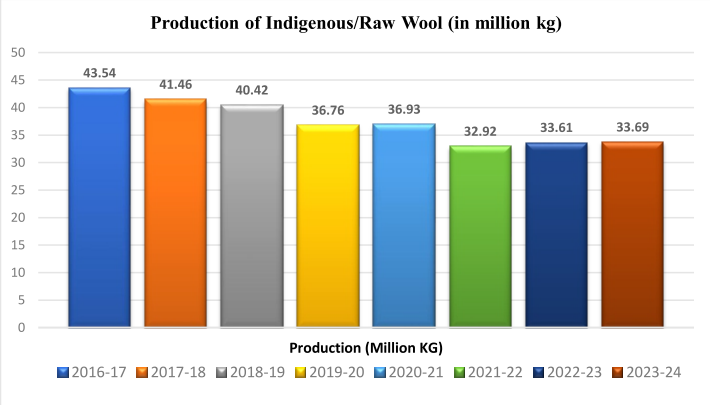

Figure 3: Indigenous / Raw wool production in India

Figure 4 depictsthe percentage change and fluctuating trends in the production of wool from 2012-13 to 2023-24. Wool production showed a moderate increase of 3.13% in 2012-13, followed by a slight rise in the following years, but experienced a sharp decline of -9.36% in 2015-16. In the years from 2016-17 to 2020-21, wool production remained negative, with the steepest drop of -10.87% in 2021-22. The total wool production seems to have registered a negative growth of 16.84% over the past 7 years since 2016-17. By 2022-23, wool production showed positive changes by 2.12%, marking a recovery for wool after several years of negative growth [17]. A slight growth of 0.22% is seen in year 2023-24 [18].

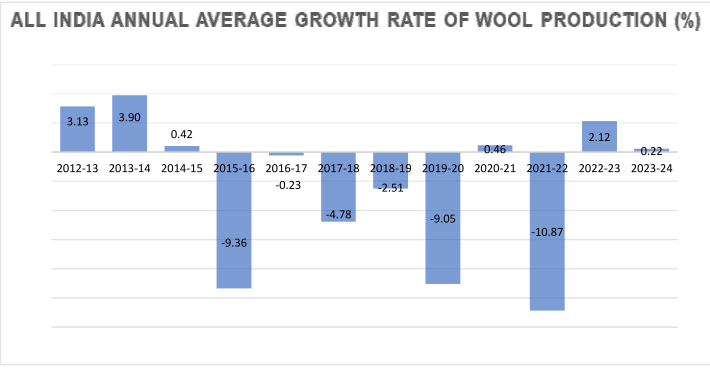

Figure 4: Percent change in annual wool production from 2012-13 to 2023-24

6. Wool Marketing Channels in India

The wool marketing practices in India have evolved over the years, based on socio-economic conditions, market demands, and advancements in the wool processing industry. Majorly three marketing channels were chosen by sheep-rearing farmers in India [19].

- Producer- Traders- Market-Processor-Retailer-Consumer,
- Producer- Processors-Retailers-Consumer
- Producer- Market-Processor -Retailers-Consumer.

Traditional wool marketing in India has relied heavily on local markets and informal channels, where shepherds and small-scale farmers sell wool to traders or processors through rural markets or middlemen.

This system often limits producers' bargaining power, resulting in lower prices due to a lack of organized marketing infrastructure [20].To address these challenges, cooperative societies and wool boards have been established to aggregate wool, ensure quality control, and facilitate bulk sales, which often yield higher prices [21]. Organizations like the Wool and Woolens Export Promotion Council (WWEPC) and state wool boards promote Indian wool in domestic and international markets [22].

Government initiatives such as the Pashmina Wool Development Scheme under the Integrated Wool Development Programme (IWDP) aim to improve wool quality, train shepherds, and enhance marketing linkages. These efforts also include infrastructure development, such as dehairing plants, processing units, and auction centers [23]. India exports high-quality wool to countries like China, Italy, and Germany. Exporters often source wool directly from cooperative societies or large-scale processors to ensure consistency and quality for the international market [24].

7. Wool Valuation Parameters in Indian Markets

Wool valuation in Indian markets involves several parameters to assess the quality and value of the wool. These parameters determine the price and usability of wool for different purposes, including textile manufacturing, carpets, and other woolen products. The mandis (agricultural markets) play a crucial role in determining the prices of wool through auction systems and direct sales. Understanding the price structure in these mandis provides insights into the economics of wool production and marketing. Regional Context also decides the wool valuation in Indian markets. For example, fine wool from high-altitude regions of Himachal Pradesh, Jammu & Kashmir and Uttarakhand, obtained from Changthangi and Gaddi sheep, is priced higher due to its relative fineness. Coarse wool from breeds like Marwari and Patanwadi, from stats of Rajasthan, Gujarat, and Uttar Pradesh are used mainly in carpet production, and is valued lower than fine wool but has a steady demand for rugs and other bulkier textiles[25].

Factors affecting wool prices include several critical parameters related to quality, market dynamics, and policy interventions. Key quality determinants like fiber diameter, length, strength, and cleanliness significantly influence pricing, with finer and longer fibers preferred for high-quality textiles commanding higher prices [26]. Additionally, white wool is valued higher for its dyeing versatility compared to colored or stained wool, while wool from premium breeds like Merino fetches higher prices than coarser wool from local Indian breeds [27]. Regional branding and perceived quality further impact pricing, reflecting variations in demand for wool from specific regions.

Seasonality also plays a vital role, as wool produced during favorable climate conditions and improved sheep nutrition tends to be of higher quality, leading to price variations [28]. Processing levels directly affect prices, with cleaner, scoured wool valued higher than raw, contaminated wool [29]. The mandi auction system facilitates price determination through competitive bidding influenced by quality, demand, and market trends, although regional disparities and lack of standardization may affect outcomes [30]. Middlemen providing transportation and storage services also impact pricing, often reducing returns for producers [31].

Government interventions such as Minimum Support Prices (MSP) and subsidies aim to stabilize wool prices and protect producers from market volatility.

These measures include enhancing infrastructure for grading, storage, and auctions to improve market efficiency [32]. Historical data and price trend analyses reveal the influence of seasonality, global pricing, and domestic policies, enabling stakeholders to make informed decisions [33].

8. Wool Trade Flows: EXIM Trends in India

Wool was the first commodity to be traded internationally and is the product, the public most commonly associates with sheep. India, despite being a significant producer of wool, imports a substantial amount of wool to meet its domestic demand, particularly for high-quality and specialized wool products. The import of wool is driven by the need to supplement local production with varieties that are not produced in sufficient quantities or quality within the country.

Table 2 shows the wool trade relationships between various countries, detailing their exports and imports of different types of wool and wool products. This highlights the global interconnectedness of the wool industry, where each country specializes in specific products and maintains reciprocal trading relationships.

Table 2: Top global importers and exporters of wool and wool products

Country	Exporting to (Type of Wool/Product)	Importing from (Type of Wool/Product)
Australia	China, India, Italy and Czechia *(Fine Merino Wool, Raw Wool, Scoured Wool)*	New Zealand, China, UK, South Africa *(Coarse and carpet wool, woolen garments)*
New Zealand	China, India, European Union, United Kingdom *(Specialty wool)*	Australia and UK (*Coarse Wool, Carpet Wool, Scoured Wool)*
South Africa	China, India, Italy, Germany *(Fine Wool, luxury garments)*	Australia and New Zealand *(Raw wool, Wool processing techniques)*
United Kingdom	China, Italy, Germany *(yarn, woolen garments and fabrics)*	New Zealand, Australia, and Turkey (*Woolen fabrics and Specialty wool products and yarn)*
India	US, EU, UAE *(Carpets, Shawls)*	Australia, NZ, South Africa *(Raw Wool, Woolen Fabrics)*
Italy	EU, US, Japan *(Woolen Fabrics, Yarn)*	*Australia, South Africa (Raw Wool)*
Turkey	EU, US, India and Serbia *(Carpets)*	Greece, UK and Romania (*Wool Tops, Woolen Fabrics*)

The global wool industry ranked as the 663rd most traded product in 2022, operating through a network of major exporters and importers. Trade dynamics are influenced by wool production capacity, demand for textiles, and processing capabilities. Key players include Australia, China, Italy, and India. Value of Export/Import report of OEC, 2022 highlights that Australia leads exports with $2.24 billion (18.9%), followed closely by China at $2.23 billion (18.8%) and Italy at $2.03 billion (17.1%). China is the largest importer, accounting for 25.1% of imports valued at $2.97 billion. Despite having the third-largest sheep population, India exported only $174 million (1.47%), highlighting a gap between potential and performance [34] . Australia dominates fine Merino wool exports, supplying China, India, and Italy [35]. China imports raw wool and exports finished products like fabrics and garments [36]. India imports raw wool for its textile industry and exports woolen goods such as carpets and shawls [37]. Italy and Germany import raw wool, with Italy excelling in high-quality woolen fabrics and yarn production. New Zealand specializes in coarse wool for carpets, exporting to China, India, and the UK [38].

9. Reasons for Import of Wool by India

India imports wool primarily due to the limited availability of fine and soft varieties, such as Merino wool, which are essential for producing high-quality fabrics for the expanding textile industry [39]. The domestic production of coarse wool, mostly suited for carpets and rough textiles, does not meet the growing demand for finer fibers, creating a supply-demand gap that imports help bridge [40]. Specialized fibers like superfine Merino, cashmere, and mohair, essential for niche markets, are either not produced locally or are available in limited quantities, further driving imports [41].

The import of wool is regulated by the Directorate General of Foreign Trade (DGFT), which ensures compliance with health, safety, and quality standards [42].

Wool imports support the Indian textile industry by providing raw materials for producing high-value woolen goods for both domestic consumption and export markets [43]. However, the industry's reliance on imports makes it vulnerable to global price fluctuations and supply chain disruptions. Efforts are ongoing to enhance domestic wool production and reduce dependency on imports, with innovations in processing and value addition potentially improving the competitiveness of Indian wool in the global market [44].

10. Major Challenges Faced by the Wool Sector in India

The wool industry in India, despite its rich heritage and potential, faces several challenges that hinder its growth and development. These are some of the challenges faced by the Indian wool industry. Poor nutrition and inadequate healthcare for sheep adversely affect wool quality and yield. The lack of access to quality feed and veterinary services, particularly in remote and rural areas, is a major constraint [45]. The wool market in India is highly fragmented, with numerous small-scale producers and traders. This fragmentation leads to inefficiencies in marketing, lower bargaining power for producers, and price volatility [46]. Many wool producers, particularly those in remote areas, have limited access to markets. Poor infrastructure, including inadequate transportation and storage facilities, exacerbates this problem, resulting in lower returns for producers [20]. Synthetic fibers, such as polyester and acrylic, are often cheaper than wool, making them more attractive to consumers and manufacturers. This price competitiveness poses a significant challenge to the wool industry [47]. Changing consumer preferences towards synthetic and blended fibers due to their durability and ease of maintenance have led to a decline in demand for woolen products. Efforts to promote the benefits of wool, such as its sustainability and natural properties, are needed [48]. Inconsistent government policies and a lack of coordinated efforts between central and state governments often result in

fragmented support for the wool industry. Clear, consistent, and supportive policies are crucial for the industry's development [22]. Limited access to financial resources and credit facilities for wool producers and processors hampers the growth of the industry. Financial support through subsidies, grants, and loans can help in upgrading technology and improving production practices [49]. The wool supply chain in India is highly fragmented, with numerous small and unorganized players. This fragmentation leads to inefficiencies in production, processing, and marketing. Coordination among different stakeholders is often lacking, resulting in delays and increased costs [20]. The absence of standardized grading and classification systems for wool affects quality assurance and pricing. Without consistent standards, it is challenging to ensure uniformity in wool quality, which hampers marketability and export potential [50]. The adoption of modern breeding, shearing, and wool processing techniques is limited due to the lack of awareness and financial constraints. Advanced technologies can enhance productivity and quality, but their limited use remains a significant barrier [51]. Wool producers and processors often face difficulties in accessing credit and financial services. Banks and financial institutions are hesitant to lend to the wool industry due to perceived risks and lack of collateral, hindering investments in quality improvement and modernization [52]. The cost of production, including feed, veterinary care, and labor, is relatively high compared to the returns from wool sales. This economic imbalance discourages investment in wool production and reduces profitability for farmers [47]. Overgrazing and land degradation have reduced the availability of quality grazing lands for sheep. This impacts sheep health and wool yield, necessitating efforts for sustainable land management practices [53]. Wool processing requires significant amounts of water, and water scarcity in many wool-producing regions poses a challenge. Sustainable water management and alternative processing techniques are needed to address this issue [54]. Many wool producers lack awareness of best practices in sheep rearing and wool production. Training and capacity-building programs are essential to improve skills and knowledge, but their reach and effectiveness are currently limited [55]. Women play a crucial role in sheep rearing and wool processing, yet they often face gender-based barriers in accessing resources, training, and market opportunities. Empowering women through targeted interventions can enhance the productivity and sustainability of the wool industry [22]. The wool industry faces stiff competition from synthetic fibers, which are cheaper and easier to produce. Synthetic fibers often replace wool in various applications, reducing the demand for natural wool [56]. Indian wool competes with high-quality wool from countries like Australia and New Zealand. The superior quality and established reputation of wool from these countries make it challenging for Indian wool to compete in international markets [57]. Existing government support programs for the wool industry are often inadequate or poorly implemented. There is a need for more comprehensive and effectively managed programs to support wool producers and processors [29]. Complex regulatory requirements and bureaucratic processes can impede the growth of the wool industry. Simplifying regulations and providing clear guidelines can help in fostering a more conducive environment for wool production and trade [31].

11. Government Interventions to Promote Wool Sector in India

The wool sector in India has significant growth potential, driven by a large sheep and goat population and increasing demand for quality wool in both domestic and international markets. However, India's global market share remains small due to the predominance of coarse wool, with fine wool used in apparel mostly imported. In 2021-22, India produced 32.09 million kg of wool, primarily for the carpet and coarse wool industries, while finer wool continued to be largely imported [58]. Despite its potential as a major source of employment, the sector remains underdeveloped.

Several government schemes aim to enhance wool production, such as the Integrated Wool Development Programme (IWDP), which includes initiatives like the Wool Marketing Scheme (WMS), Wool Processing Scheme (WPS), and Sheep & Wool Improvement Scheme (SWIS) to improve wool quality and infrastructure [59]. The Pashmina Promotion Programme and National Livestock Mission (NLM) also support the sector's growth [60]. States like Jammu and Kashmir, Rajasthan, Himachal Pradesh, and Uttarakhand implement schemes to promote sheep farming and wool production.

To further develop the sector, both government and private investment in technology, R&D, value-added products, and infrastructure is essential. Expanding processing facilities, improving logistics, and promoting scientific rearing practices will enhance wool yield and market accessibility [61,62].

12. Growth Opportunities of India's Wool Sector

The wool sector in India holds significant growth potential due to several factors, including increasing global demand for natural fibers, the rise of sustainable fashion, and the unique qualities of Indian wool. As consumers globally shift towards environmentally conscious choices, wool is increasingly favored over synthetic alternatives for its sustainability, breathability, and biodegradability. This trend is driving higher demand for wool products, creating opportunities for India to expand its presence in international markets [63, 64]. India's diverse sheep breeds contribute to this opportunity, offering wool of varying quality. Breeds like Merino and Rampur Bushair produce fine wool suitable for garments, while coarser wool from other breeds is used for carpets and rugs, allowing India to cater to different market segments and enhancing its competitiveness globally [65].

Government support also plays a critical role in the sector's development. Various initiatives, including the Wool Development Scheme, provide subsidies and training to sheep farmers, focusing on improving breeding practices, enhancing wool quality, and promoting value-added products [66, 67]. These programs aim to create a more robust framework for growth by addressing key challenges in the sector. Additionally, the investment in modern processing technologies such as scouring, carding, and spinning is essential for improving wool quality and productivity. Collaborative efforts between government and private sectors in developing this infrastructure are expected to strengthen India's position in international wool markets [68]. Sustainability remains a core focus in the global wool market, and India has an advantage in this regard. Traditional sheep-rearing practices, which often involve extensive grazing systems, are inherently more sustainable compared to intensive farming methods. By promoting these environmentally friendly practices, India can appeal to global markets that prioritize sustainability and

ethical production [69]. With the rise of sustainable fashion, India has a unique opportunity to leverage its traditional methods and diverse wool quality to capture a larger share of the global wool market.

13. Conclusion

The wool sector in India holds immense potential due to its rich diversity of sheep breeds and traditional rearing practices but is currently hindered by challenges like low-quality production, inefficient processing, and a fragmented supply chain. Additionally, competition from synthetic fibers, international markets, and inconsistent policies complicate growth. However, there are significant opportunities to revitalize the sector through strategic interventions in breeding, nutrition, and healthcare, along with modernizing processing techniques and improving market access via cooperative societies. Government initiatives, addressing environmental challenges, promoting technology adoption, and overcoming social barriers such as gender inequality are vital for sustainable development. By streamlining the supply chain, enhancing wool valuation, fostering innovation, and improving global market access, India can strengthen its wool industry, boost exports, and contribute to rural socio-economic upliftment, aligning wool-based products with evolving fashion trends.

14. Acknowledgement

The authors gratefully acknowledge the support under the project entitled as "Promotion of wool and pelt for effective processing and marketing" of Holistic Agriculture Development Program (HADP), initiated by UT of Jammu and Kashmir, India

15. Conflict of Interest

The authors declared no potential conflict of interest with respect to the publication of this article.

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