



Wood-Based Industries of Jammu and Kashmir: A Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Wood-based industries fall under secondary economic activity. The industrial process involves changing the form of goods to enhance their value. To undertake the manufacturing of goods, inputs in the form of capital, labor, power, and raw materials are required. The output is a finished product that can either be used again as a raw material for another manufactured or consumed in its present form. The location of an industry, thus, largely depends on the availability of raw materials, power, capital, labor, infrastructure, and managerial skill. The establishment of the wood industry is also influenced by the general climatic conditions, weather, industrial inertia, historical accident, and government policy. The Kashmiris have an age-old tradition in the manufacturing of, paper machines, willow-wicker, cricket bat and toys making are some of the important industries which provide full or part-time employment to the people.

Keywords: Wood products; climatic conditions; Kashmiris; economic activity.

1. INTRODUCTION

1.1 Physical Geography

Jammu and Kashmir, a hilly state situated in the extreme north of India in Himalayan ranges and located between 32°15' to 37°05' latitude north and 72°35' to 80°20' longitude east, has a geographical area of 222,236 km² (SFR, 2011). The state, constituting about 6.93% of India's total geographical area, is a veritable showcase of the floristic and faunal richness of the north-western Himalayan ranges (Fig. 1). It is bounded by China in the north and east, by Afghanistan in the north-west, and by Pakistan in the west. Punjab and the Himachal Pradesh States border it in the south. This rich biological diversity is enshrined in its different agro-climatic zones and vegetation types that are found along its vast altitudinal gradient ranging from about 350 m along the plains to more than 8700 m above the sea level along with the inner Himalayan ranges.

Geographically, the state can be divided into four zones. These four zones being (i) Sub-mountain and semi-mountain plain known as Kandi or dry belt, (ii) The Shivalik ranges, (iii) The high mountain zone constituting the Kashmir Valley, Pir Panchal range and its off-shoots including Doda, Poonch, and Rajouri districts and part of Kathua and Udhampur districts, and (iv) The middle run of the Indus river comprising Leh and Kargil.

Physiographically, the state can be divided into seven zones closely associated with the structural components of the western Himalayas. These include: (i) The plains of the Jammu region, (ii) The Foothills, (iii) The Lesser Himalayas, (iv) The Greater Himalayas, (v) Valley of Kashmir (vi) The Upper Indus Valley, and (vii) The Karakoram Range. The state is drained by five major river systems i.e. Indus, Jehlum, Chenab, Ravi, and Tawi, each major river system forming distinct valleys, adding an important dimension to the cultural and biological diversity in the state (Table 1).

The extreme altitudinal variation in the state causes great variation in the climatic conditions varying from sub-tropical in the southern tracts to cold, alpine, and glacial in the higher mountain ranges [1,2]. The average minimum and maximum temperature range between sub-zero and 27°C with distinct winter, spring, summer, and autumn seasons. The mean monthly temperature is lowest in January and highest in July except in Jammu where the highest temperature is experienced in June. Mean monthly temperature in January varies from – 17°C at Drass to 14°C at Jammu. The state receives precipitation in the form of rainfall during monsoons and in the form of rainfall in lower areas and snowfall at higher reaches during winters due to western disturbances. The annual rainfall also varies from region to region with 92.6 mm in Leh, 650.5 mm in Srinagar, and 1115.9 mm in Jammu.

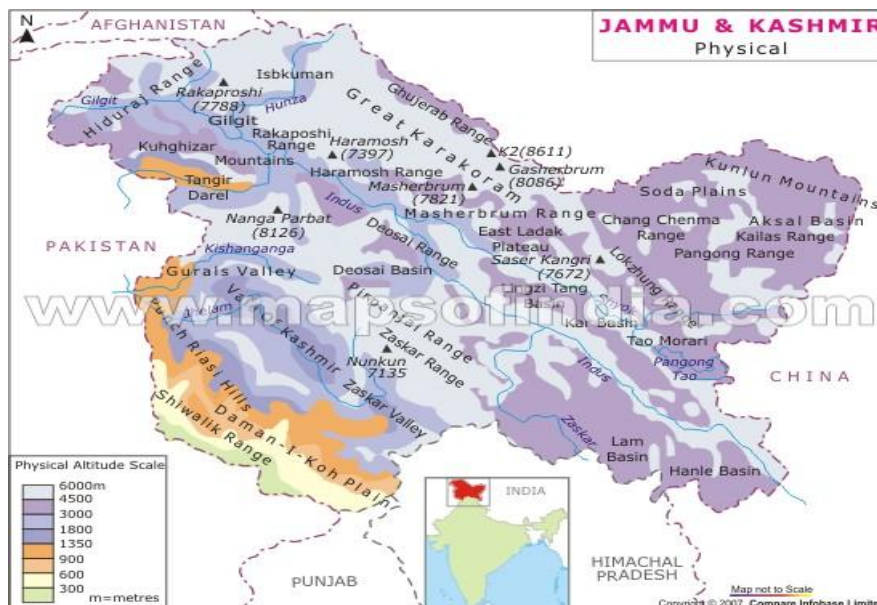


Fig. 1. Map showing the study location

Table 1. Important demographic features of Jammu and Kashmir

S. No	Indicator	Unit	Magnitude
1	Geographical area	km ²	2,22,236
2	No. of Districts	No.	22
3	No. of Tehsils	No.	82
4	No. of Blocks	No.	143
5	No. of Urban Towns	No.	86
6	Total No. of Villages	No.	6551
7	Total Population	Persons	12548926
		a. Males	6665561
		b. Females	5883365
8	Decadal Population Growth (2001-2011)	Persons	2405226
		Percentage	23.71
9	Population density	Per km ²	124
10	Sex ratio	Females per 1000 males	883
11	Literacy rate	Percentage	
	Total		68.74
	a. Males		78.26
	b. Females		58.01

(Source: Regional Census Office, Jammu, and Kashmir)(2011)

Table 2. Land use pattern in Jammu and Kashmir

Land use	Area (000 ha)	% age
Total geographical area	22,224	
Reported area for Land utilization*	3,781	100
Forests	2,023	53.50
Not available for cultivation	585	15.47
Permanent pastures and other grazing lands	128	3.39
Land under miscellaneous tree crops and groves	67	1.77
Arable wasteland	150	3.97
Current fallows	65	1.72
Fallow lands other than current fallows	23	0.61
Net sown area	739	19.55

*Excludes area under the occupation of China and Pakistan

(Source: State of Forest Report, FSI, 2011)

1.2 Means of Livelihood

Jammu and Kashmir primarily have an agrarian economy with the majority of the state's population relying on agriculture for livelihood. Forest-based products have always played a role in life support systems such as energy requirements, firewood, food, forage, shelter, clothing, and medicines [3]. The physiographic location imposes a number of constraints, particularly in agriculture and allied sectors. It is more necessary than ever to understand and document the socioeconomic services nature provides to human beings [4]. The initial land-use pattern in the state was purely agriculture. It has changed over a period of time from agri-

horticultural to Silvi-pastoral. Table 2 reflects the land use pattern in the state.

Agriculture in Jammu and Kashmir not only supports the needs of the local population but is also exported to different countries and other states of India. Export of agricultural produce generates huge revenues for Jammu and Kashmir and contributes a significant portion to the gross domestic product of the state. The Kashmir valley is also known for its sericulture and cold-water fisheries. Kashmiri saffron is also very famous and brings the state a handsome amount of foreign exchange. Agricultural exports from Jammu and Kashmir include barley, corn, millet, rice, saffron, sorghum, vegetables, and wheat.

Horticulture plays a vital role in the economic development of the state. With an annual turnover of over Rs. 300 crore, apart from foreign exchange of over Rs. 80 crore, this sector is the next biggest source of income in the state's economy. The region of Kashmir is known for its horticulture industry and is the wealthiest region in the state. Horticultural produce from the state includes apples, apricots, cherries, pears, plums, almonds, and walnuts [5].

Forests are one of the most important resources of Jammu and Kashmir, providing employment and mean of livelihood to a vast array of the population particularly those living on the fringes of forests. Spread over 22,539 km² of the demarcated area, forests account for 10.14% of the total geographical area of the state. The forests are a major support base for a large number of commercial activities like chemicals, oils, woodcrafts, and handicrafts *vis a vis* providing timber, fuelwood, edible products, medicinal herbs, etc. for local consumption and for generating cash income [6]. Local populations are very much dependent on the NTFP resources for their day-to-day needs [7].

2. IMPORTANT INDUSTRIES OF THE STATE INCLUDE WOOD-BASED

- Poplar wood available in the Valley of Kashmir is mainly used by the match industry.
- The wood of poplar and willow trees is used for making cricket bats and morus wood is used for making hockey sticks.
- Walnut trees are grown in abundance in Kashmir. Walnut wood is suitable for woodcarving. The carved goods are exported to foreign countries also. Baramulla also manufactures walnut wood rifle-butts.
- At Pampore (Kashmir) and Bari Brahmana (Jammu) plywood, hardboard, and chipboard manufacturing factories have been established. Pulp required for the manufacture of hand-made paper, strawboard, and cardboard is also obtained from the forests (State forest Report, 2011)

In recent years, the Manufacturing and Service Sector has also shown tremendous growth in India, especially in the Jammu region of the state. According to an estimate, the total annual

consumption of wood for this purpose was around 4 million tonnes and there were 54,975 woodworking units in the small-scale sector [8]. Many small and large companies producing manufacturing goods have established their manufacturing units in Jammu and Kashmir. In association with ASSOCHAM, the State Government of Jammu and Kashmir and the Union Government of India are framing plans to set up a few SEOs (special economic zones) and Industrial Parks in the state to provide a further boost to the growing manufacturing and service sector in the state. In the fiscal year 2005–06, exports from the state amounted to Rs. 1,150 crore. However, industrial development in the state faces several major constraints including extreme mountainous landscape and power shortage.

Historically, Jammu and Kashmir have been a hotspot of tourism in India and the state has become one of the top tourist destinations of India. The tourism industry has played an important role in the development of the economy of the state as a whole. The economic activities are generated in the primary, secondary, and tertiary sectors of the state. Hence tourism generated employment may be classified into three major heads one is direct employment that sells goods and services directly e.g. hotels, restaurants, shops, etc. The second one is indirect employment, which generally supplies goods, services to the tourism business, and the third is investment-related employment in construction and other capital goods industries. Total employment generation in 2012 was 19.15 lakhs for a tourist inflow of 127.08 lakhs.

Kashmiris have won a great reputation as artisans. In Kashmir, with its severe winter when climate conditions are semi-arctic, craftsmen utilize their leisure as well as creative intelligence in creating artifacts of exquisite beauty. Princely patronage encouraged these handicrafts from early times till these products, light in weight and rich in art, found a big market in India and abroad. The State Government has set up many training centers for coaching young boys and girls in traditional arts and crafts. As a result, there has been a wide dispersal of handicrafts throughout the State. The chief center of Kashmiri craft industries is of course Srinagar, but other localities are famous for their special crafts. Kulgam is famous for its lacquered woodwork and Bijbehara has a reputation for woodcarving. The basket industry is also

important and most villages have artisans who make baskets for agricultural purposes. The other industries that have developed from the rural crafts include handloom weaving of local silk, cotton, carpet weaving, and woodcarving. Such industries together with silver and copper work got impetus in the past by the presence of the royal court and later by the tourist trade; they also owe something to the important position achieved by Srinagar in the west Himalayan trade. Handicraft manufacture is also important in Ladakh, particularly the production of pashmina shawls, carpets, and blankets.

3. WOOD-BASED INDUSTRIES AND LIVELIHOOD STRATEGIES

Wood-based industries have a tremendous potential to create large-scale employment opportunities, thereby reducing poverty and leading to empowerment of the forest dwellers, tribal communities, and some artisans who have wood carving as their profession. The quantity or amount of produce varies significantly from year to year depending on the availability and price.

Despite the high dependence on wood among forest users, there are still many barriers inhibiting the generation of greater benefits from these resources. In Jammu and Kashmir, such barriers include differential availability of timber, issues of tenure security, lack of processing skills, and limited market access. Over time, these wood-based industries acquire commercial value resulting from huge trade transactions and income levels due to rising demand. Trade-in wood products act as an incentive for forest conservation by providing a source of income from resources that might otherwise appear to have little financial value.

The rich diversity of locally available wood products is intimately linked to and plays a very important role in the day-to-day life of the people in the state, especially the large proportion of the state's population living in remote rural areas. The dependence of local communities on wood products varies from self-use in day-to-day life to form a substantial part of their annual cash income. Whereas the contribution of wood-based products towards cash income is the usual parameter on which their role towards livelihood is measured, it is their extensive use for bonafide self-use purposes, taken for granted but seldom included in the household's economics, which exercises large impact on the routine life of people in the state. The dependence of local

communities on wood products needs, therefore, to be worked out in view of both these parameters.

4. FOR BONAFIDE HOUSEHOLD USE

The range of wood products collected and consumed by the people of the state for their day-to-day household needs includes the locally collected firewood that forms the major source of fuel for cooking, heating water, and keeping the houses warm during winters. The small wood obtained from many miscellaneous tree species is used to make farm implements [9]. People derive many other benefits like making walking sticks, baskets, ropes, thatches for roofs, and even decoration articles from the locally available wood species.

5. FOR TRADE TO GENERATE CASH INCOMES

In addition to the self-use-based dependence of local communities on wood products to meet their day-to-day requirements, many people are also engaged in the manufacture of wood products and derive a substantial part of their annual income from this activity. The major component of the wood products that are traded from the state is cricket bats and articles made out of withies from *Indigofera*, *Cotoneaster*, *Parrotia*, and *Salix* spp. Kangri (firepot) is the most important article made out of osiers of these species. Baskets and other decorative items made out of osiers of *Salix* spp. are not only traded in the valley but also have national as well as international markets.

6. WOOD-BASED INDUSTRIES

The state of Jammu and Kashmir has about one-third of its total area under forest. Wood is considered nature's commodities to man as an energy source, in construction and in agricultural tool formation [10]. Most of the forest species in the higher altitudes belong to the conifers, while in the lower altitudes pine and deciduous broad-leaves trees are more prominent. These forests provide raw material to a number of forest-based industries. Paper, pulp, match, delicate boxes, sports goods (cricket bats), furniture, joinery, toys, artifacts, and decoration pieces are some of the agro-based industries well developed in the Valley of Kashmir. Although a number of joinery mills have been established in Srinagar, especially along the Srinagar-Baramulla Road, Pampore, and Jammu, sports goods are being

manufactured at Miran-Sahib (Jammu) and in the villages of Anantnag District. There is an urgent need to develop forest-based industries in the state on a scientific basis.

The willow, mulberry, and walnut trees can provide raw materials required for the development of sports goods, furniture, and wood artifacts. Nearly 5,000 workers earn their livelihood from the forest-based industries and their annual production amounts to more than Rs. 5 crores (Rs. 50 million) [11].

Forests also provide turpentine and a variety of resins, used in several chemical industries. Resin is collected from the pine trees of the Jammu and Kashmir Division. It has diversified properties. Lac obtained from the forests can be utilized for the manufacture of polish, gramophone-records, adhesive, printing ink, etc. The resin processing and manufacturing centers are situated at Miran Sahib, Sunderbani, and Rajauri. These three factories employ about 450 workers and produce resin worth Rs. 10 lakh. [12].

The carpenters of the villages are extremely adroit and do excellent work. Some of the lattice-work and carving of the shrines is very beautiful and argues a strong artistic instinct. The skill of the carpenter is the more to be admired when one considers the primitive and indigenous tools with which he works.

With a kind of small hammer, half adze (Tur), and chisel (Turats), the rural carpenter executes any work which his client may require. Allied to the carpenter are the axemen and sawyers. The Kashmiri prefer ax-cut timber both for houses and boats, and a boat made of ax-cut timber fetches more than one made of sawn timber.

The basket industry is also of importance. Most of the villages have their artisans who make the necessary basket, and baskets for agricultural purposes, and the Kiltas used for the transport of apples and for rough village work.

The Kashmiri carvers are well-known for their skill in woodwork. The skilled carpenters prepare beautiful ceilings with perfect designs which are cheap and effective as well. This type of ceiling is known as Khatamband. The shrine of Naqshbandi and that of the tourist's reception center are some excellent examples of Kashmiri woodwork.

The boating industry of Kashmir is also of great importance. The Hanz or Hanji, as the boatmen are called, are the boat-dwellers in the various water bodies. The boating industry is quite old in Kashmir. Now forest conservancy and reduction in forests area have made good quality Deodar wood very expensive which is coming in way of development of boat industry.

7. CONCLUSION

It is concluded that the rich diversity of locally available wood products is inextricably linked to and plays an important role in the day-to-day lives of the people in the state, particularly the large proportion of the state's population who live in remote rural areas. Woods are one of Jammu and Kashmir's most valuable resources, giving work and a source of income to a large number of people, particularly those who live on the outskirts of forests.

8. OPPORTUNITIES AND EMERGING ISSUES IN THE WOOD INDUSTRIES SECTOR

8.1 Opportunities

- ⊕ Access existing and increasing market demand for wood products
- ⊕ Seek job creation related to wood-based industries.
- ⊕ Establish a market network for wood industries.
- ⊕ Create sustainable value chains for wood-based products.
- ⊕ Promote export of wood products to other countries.
- ⊕ Encourage the use of local products processed from wood.
- ⊕ Increase capacity of villagers for the market, especially in the export of finished products.
- ⊕ Raise awareness of local communities on the use and processing of wood products.
- ⊕ Reinforce quality standards.
- ⊕ Use community forestry as a base for wood industry development.
- ⊕ Create trademarks for products coming from indigenous communities.

8.2 Emerging Issues

- ⊕ There are no appropriate techniques to estimate the productivity of wood products.

- ⊕ Lack of access to market information on wood-based products.
- ⊕ Quality issues such as adulteration.
- ⊕ Forest clearance to make farmland or collect fuelwood leads to the loss of natural forest and loss or decline of important wood species [13].
- ⊕ Forest destruction and land grabbing.
- ⊕ Improper or unsustainable harvesting techniques.
- ⊕ Lack of cooperation from local authorities.
- ⊕ Difficult transport to markets due to informal taxation and middlemen who exploit local people.
- ⊕ Low selling costs.
- ⊕ Lack of linkage between buyers and sellers in the community.
- ⊕ Resource security for communities.

8.3 Future Research Needs

- ⊕ Research is recommended in the following areas:
 - Wood technology and species richness.
 - Sustainable harvest levels.
 - Impact of wood-based industries on local livelihoods.
 - Market research both domestically and overseas
 - Regeneration of important timber species

9. RECOMMENDATIONS

- ⊕ Train the community about natural resource management and collection.
- ⊕ Organize study tours to learn best practices.
- ⊕ Organize workshops and short training to develop skills and knowledge of wood industries.
- ⊕ Initiate research on wood to determine sustainable population harvest levels.
- ⊕ Investigate market potential and production techniques of wood products in the private sector.
- ⊕ Inventory species on key list to identify populations and evaluate harvest areas.
- ⊕ Identify barriers to the sustainable production of wood on state and private land.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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