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Chaitra KK

MBA (ABM) Scholar, Karnataka State Rural Development and Panchayath Raj University, Gadag, Karnataka, India

Santhosha KM

Assistant Professor, Karnataka State Rural Development and Panchayath Raj University, Gadag, Karnataka, India

CG Yadava

Assistant Professor, Department of Agricultural Economics, University of Horticultural Sciences, Bagalkote, Karnataka, India, India

Gana Shruthy MK

Assistant Professor, MKKP Government First Grade College, Hulsoor, Bidar, Karnataka, India

Gagana MD

Assistant Professor, College of Agriculture, Hassan, University of Agricultural Sciences, Bengaluru, Karnataka, India

Chandan K

Assistant Professor, Department of Post-Harvest Management, University of Horticultural Sciences, Bagalkote, Karnataka, India

Srinivasulu GB

Assistant Professor, Department of Floriculture and Landscape Architecture, University of Horticultural Sciences, Bagalkote, Karnataka, India

Corresponding Author:

Santhosha KM

Assistant Professor, Karnataka State Rural Development and Panchayath Raj University, Gadag, Karnataka, India

Business performance of wood log entrepreneurs in Canara forest circle of Western Ghats hilly zone, Karnataka

Chaitra KK, Santhosha KM, CG Yadava, Gana Shruthy MK, Gagana MD, Chandan K and Srinivasulu GB

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Abstract

The study focused on profitability, value of addition and constraint analysis of wood log entrepreneurs in the Canara forest circle of Uttara Kannada district, Karnataka. Primary data was collected by using structured questionnaires. There were 78 registered wood log entrepreneurs in Canara Forest Circle. All the wood log entrepreneurs were considered to formulate a population study for the mentioned forest circle. The data collected were analysed using descriptive, cost-returns, value-added ratio, and rank-based quotient (RBQ) analysis.

The study revealed that most of the respondents belong to the middle-age (48%), and around 42 per cent of respondents were graduated. The majority of the respondents were male (>88%) and living in nuclear families (71%). Almost half of the wood log entrepreneurs are landless, so they practice wood logging as their main occupation with sole proprietorship (82%). Cost and returns analysis elucidate that the total cost for wood processing for 1000 CFT accounted for Rs. 20.3 lakhs, out of which 97 per cent accounts for variable cost and the remaining accounts for a fixed cost. Around Rs. 35 lakhs were generated as revenue from the main product and by-products, including saw powder and firewood, with the returns per rupee of investment of 1.71 for 1000 CFT.

Among the value additions, sofa sets have the highest value-added product (ratio 0.62), followed by dining tables (0.55), doors (0.52), office tables (0.49), and windows (0.45). The study also identified several constraints wood log entrepreneurs face, such as labour shortages, income tax obligations, government policies of raw material procurement, high transportation costs and scarcity of raw materials.

Keywords: Sawmill, socio-economic, cost and return, value addition, wood logs *etc.*

Introduction

Wood is an important product from forests, which are renewable natural resources. Mankind has used wood for its versatility since time immemorial for housing construction, furniture, transport vehicles, agricultural implements, and fuel for various household needs. The major wood consumption in India is still fuel wood, accounting for 46 per cent in rural areas and 6.5 per cent in urban areas (Anonymous, 2023a) ^[2, 4].

After economic reforms, India has had impressive economic growth recently, as evidenced by the rise in people's income. This growth leads to increased consumption of wood and wood products such as furniture, construction timber, paper, *etc* (Bansal, 2021). Reducing supplies from natural forests and rising demand for wood products have caused large gaps between demand and supply. It has resulted, in turn, in increasing focus on the production of timber and wood in non-forest areas, also known as Tree Outside Forests, under agroforestry and farm forestry systems, as envisaged in the National Forest Policy, 1988. Sizable quantities of timber and other wood products are also being imported, causing a drain on foreign exchange reserves. India also exports wood products like furniture, handicrafts, and wooden toys to niche markets in Europe, the USA, Canada, Australia, and other countries.

Wood is a sustainable resource deeply woven into communities' social, cultural, and economic fabric worldwide, with renewable and biodegradable qualities. Wood's strength, durability, and diverse range of species make it rich in invention and heritage. Whether as a

building block, fine furniture, or for its environmental benefits in carbon sequestration, timber remains a vital component of the past, present and future. Humans have been intertwined with timber since the beginning, representing an essential and everlasting resource that spans time, culture, and industry. Its adaptability, historical significance, and modern sustainability underscore its continued relevance. In the fiscal year 2020, the industrial wood sector within the forest products industry contributed a substantial sum of over 1.2 trillion Indian rupees to the Indian economy. The diverse range of forest products associated with this sector contributed more than 63 per cent to the Gross Value Added (GVA) of forest products in India during the same period (Anonymous, 2021a) [2, 4].

Timber has been mainly classified into hardwood and softwood. Softwood is produced from gymnosperms or coniferous plants with distinctive needle-like leaves like pine and spruce. The majority of these trees are evergreen. Historically, softwoods have been primarily used for structural timbers. Hardwood is produced from a group of angiosperms known as dicotyledons, broad-leaved trees such as oak, beech and ash. The temperature zone hardwoods are generally season-based, while most tropical hardwoods retain their leaves all year round. The major use of hardwoods is in furniture and cabinet manufacture.

The wood industry in India, which includes the production of wood logs, timber and various wood-based products, has traditionally been a source of employment. Employment opportunities are distributed across the forestry sector, logging, transportation, wood processing industries and downstream sectors such as furniture manufacturing and construction. The sector often employs in both rural and urban areas, supporting the livelihoods of a diverse workforce.

The Canara Forest Circle of Uttara Kannada composes more than 80 per cent of its geographical area under forest (Anonymous, 2023c) [3]. This geographical area is also known for its bio-diversity as it is a part of the Western Ghats. It is in a hilly zone and is a major supplier of forest wood logs to the industry (Yadava, 2008; Girish, 2007; Yadava *et al.*, 2022a) [8, 16, 18]. Against this backdrop, the present study on wood log

enterprises focused on the central forest division of Uttara Kannada district. The study aims to understand sawmill owners' socio-economic dynamics, profitability, value addition, and factors that affect this industry for further flourishing.

Objectives of the study

1. To examine the socio-economic characteristics of the wood log entrepreneurs
2. To assess the cost and profitability analysis of sawmill or wood log enterprises
3. To assess the value addition and constraints analysis of sawmill or wood log enterprises

The hypothesis of the study

1. The majority of the wood log entrepreneurs have a lower socio-economic status
2. Wood log enterprise cost and profitability is a financially viable and profitable venture
3. There is a high degree of value addition, and many constraints affect the efficiency of the timber industry.

Materials and Methodology

Canara Forest Circle (Uttara Kannada district) of Karnataka has the highest forest coverage area with abundant natural resources (Yadava *et al.*, 2022b). This district consists of twelve talukas such as Karwar, Ankola, Kumta, Honnavar, Bhatkal, Sirsi, Siddapur, Yellapur, Mundgod, Haliyal, Supa (Joida) and Dandeli. Primary data were collected from the sawmill owners through well-structured and pre-tested schedules to determine the socio-economic characteristics of the sawmill owners, cost and profitability, value addition, and constraints related to the sawmill industry.

The study was conducted under the Central Forest Circle of Uttara Kannada district, and the Sirsi, Yellapura, Honnavar, Karwar, and Haliyal forest divisions were selected. Seventy-eight wood log enterprises (sawmills) were involved, and all the samples were considered for the study (population survey method).

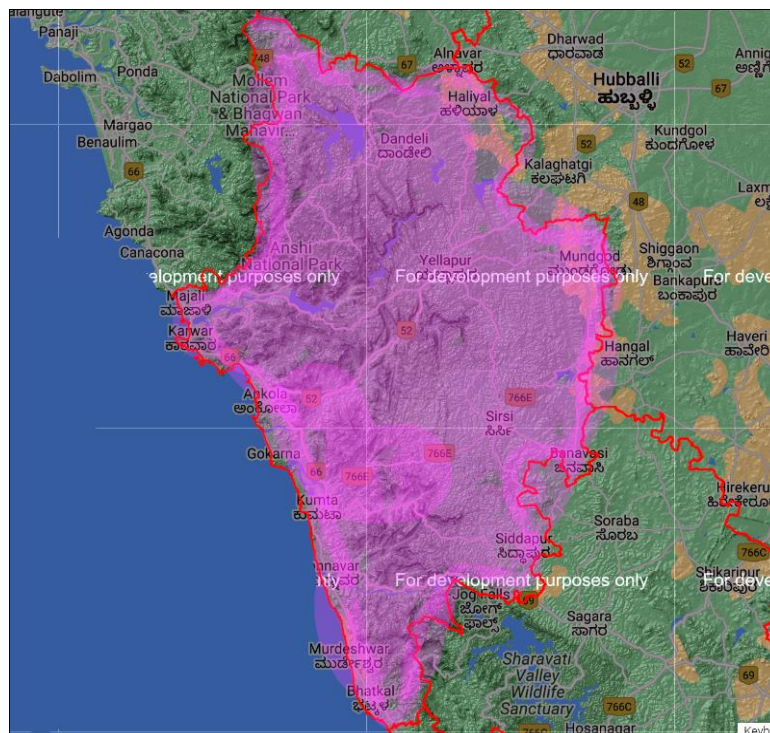


Fig 1: The marked area shows the Canara Forest Circle in Karnataka

The study focused on the Canara Forest Circle in the Uttar Kannada district, specifically the Sirsi, Yellapura, Honnavar, Karwar, and Halliyala forest divisions, as indicated in Table 1. The data was analysed using central tendency and dispersion measures, cost and returns, value-added ratio, and the RBQ technique.

Table 1: Data composition for the study in Canara forest circle of Western Ghats in Karnataka

Sl. No.	Forest divisions	Sample size
1.	Sirsi	13
2.	Yellapura	08
3.	Honnavar	20
4.	Karwar	18
5.	Halliyala	19
	Total	78

Cost-returns analysis

Total Cost (TC) = Total Variable Cost + Total Fixed Cost
Gross return (GR) = Total product or Total quantity × Price of the product

Net return (NR) = Gross Return (GR) - Total Cost (TC)

Returns per rupee of investment = $\frac{\text{Gross returns}}{\text{cost of production}}$

Value added ratio

Value added is computed by deducting all purchases, covering raw materials, supplying energy and services from one business to another, and using the revenue generated through sales. Purchases from other entities within the same wood log

enterprises are considered external transactions. The percentage of value-added concerning sales is subsequently calculated.

$$VA = \frac{100(S - P)}{S}$$

Where; VA= Value Addition: S = Sales and P = Purchase

RBQ analysis

The significance of issues viewed by sawmill owners was examined by applying the Rank-Based Quotient (RBQ) technique as used by Santhosha (2022) [13, 15, 17, 18].

The formula is as given below:

$$RBQ = \frac{\sum f_i (n + 1 - i) \times 100}{N \times n}$$

Where,

f_i = Frequency of farmers/key informants for the i^{th} rank of the problem.

N and n = Number of respondents and a maximum number of ranks given for various problems by sawmill owners.

Result and Discussion

Socio-economic characteristics

Table 2 represents respondents' demographic and socio-economic profiles across the study region. Varying values in key demographic categories characterised each division. Regarding age distribution, most respondents in the study area belong to the "Middle" age group (47 %). The male gender is dominant (88.46 %) in the sawmill industry, with minimal (less than 12%) participation of females.

Table 2: The demographic characteristics of respondents in the study area

Particulars		Sirsi Division	Yellapura Division	Honnavara Division	Karwara Division	Haliyala Division	Overall (CFC)
Age	Young (<=35)	04 (30.76)	-	04 (20)	01 (5.55)	04 (21.05)	13 (16.66)
	Middle (36-50)	03 (23.07)	05 (62.5)	10 (50)	10 (55.55)	09 (47.36)	37 (47.43)
	Old (>=50)	06 (46.15)	03 (37.5)	06 (30)	07 (38.88)	06 (31.57)	28 (35.89)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)
Gender	Male	12 (92.30)	08 (100)	18 (90)	14 (77.77)	17 (89.47)	69 (88.46)
	Female	01 (7.69)	-	02 (10)	04 (22.22)	02 (10.52)	09 (11.53)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)

Note: Figures in the parenthesis indicate per cent of their respective total

Table 3 reveals that most of the respondents in the study area belong to the nuclear family (70%). Yellapura division was found to have the highest nuclear family (87.5%) of wood log entrepreneurs, and all other divisions were more or less on par with the overall average for the forest circle. Small family size (less than four members) dominated (more than 42%), and it was

rare to see large families (less than 20 %) in the study area. A higher level of literacy rate (100%) was found in the forest circle, and 45 per cent of wood log entrepreneurs were at least under graduation. The studies conducted by Jamuna (2021), Pushpa *et al.* (2020) and Pushpa *et al.* (2021) [9, 10, 11] reveal similar findings concerning literacy rate.

Table 3: Household characteristics of respondents in the study area

Particulars		Sirsi Division	Yellapura Division	Honnavar Division	Karwar Division	Haliyal Division	Overall (CFC)
Family type	Nuclear family	09 (69.23)	07 (87.5)	14 (70)	12 (66.66)	13 (68.42)	55 (70.51)
	Joint family	04 (30.76)	01 (12.5)	06 (30)	06 (33.33)	06 (31.57)	23 (29.48)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)
Family size	Small (1-4)	04 (30.76)	03 (37.5)	09 (45)	09 (50)	08 (42.10)	33 (42.30)
	Medium (5-8)	05 (38.46)	04 (50)	06 (30)	09 (50)	06 (31.57)	30 (38.46)
	Large (>9)	04 (30.76)	01 (12.5)	05 (25)	-	05 (26.31)	15 (19.23)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)
Education	Primary school	01 (7.69)	-	05 (25)	06 (33.33)	05 (26.31)	17 (21.79)
	High school	03 (23.07)	03 (37.5)	03 (15)	02 (11.11)	02 (10.52)	13 (16.66)

	Pre-University	-	02 (25)	04 (20)	03 (16.66)	04 (21.05)	13 (16.66)
	Degree	07 (53.84)	03 (37.5)	08 (40)	07 (38.88)	08 (42.10)	33 (42.30)
	Above Degree	02 (15.38)	-	-	-	-	2 (2.56)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)

Note: Figures in the parenthesis indicate per cent of their respective total

In the case of agricultural land holdings, more than 53 per cent of the respondents in the study area were landless. This class was found more in the Sirsi division (almost 70%) (Table 4). It is the main impulsive factor affecting entrepreneurship in the timber industry. Hence, this enterprise forms a major source of family income and is considered the primary occupation to

provide livelihood subsistence for the entrepreneur's families in the wood log industry. Most of the respondents in the study area take up the firm as a sole proprietorship (82%) to avoid misunderstandings in the partnership, as observed by the field investigators and also opined in the study conducted by Raghuvamshi in the year 2023.

Table 4: Nature of land holdings and enterprise type of respondents in the study area

Particulars		Sirsi Division	Yellapura Division	Honnagara Division	Karwara Division	Haliyala Division	Overall (CFC)
Agriculture Landholdings	Landless	09 (69.23)	04 (50)	11 (55)	08 (44.44)	10 (52.63)	42 (53.84)
	Small (<2 acres)	01 (7.69)	01 (12.5)	03 (15)	01 (5.55)	03 (15.78)	09 (11.53)
	Semi Medium (2 -4 acre)	01 (7.69)	02 (25)	03 (15)	06 (33.33)	03 (15.78)	15 (19.23)
	Medium (>4 acre)	02 (15.38)	01 (12.5)	03 (15)	03 (16.66)	03 (15.78)	12 (15.38)
	Total	13 (100)	8 (100)	20 (100)	18 (100)	19 (100)	78 (100)
Type of Enterprise	Sole proprietor	09 (69.23)	07 (87.5)	19 (95)	11 (61.11)	18 (94.73)	64 (82.05)
	Partnership	04 (30.76)	01 (12.5)	01 (5)	07 (38.88)	01 (5.26)	14 (17.95)
	Total	13 (100)	08 (100)	20 (100)	18 (100)	19 (100)	78 (100)

Note: Figures in the parenthesis indicate per cent of their respective total

Cost and profitability of Sawmill enterprise

Table 5 depicts the financial details of wood processing in the study region. The total cost of running a wood log enterprise was around Rs. 20 lakhs per 1000 Cubic Feet (CFT). The variable cost accounted for Rs. 19.87 lakhs per 1000 CFT, which comprises more than ninety-five per cent of the total cost. The main components of variable costs across the forest divisions were raw material procurement, labour, and transportation charges. This study's outcome is supported by the FAO study conducted in 1984.

Further, Table 5 compares the cost and returns of different divisions in the Canara forest circle of the Western Ghats of Karnataka. The raw material cost contributes a major share among variable cost components, and it was found more in the Karwar Division. This factor is attributed to good demand and higher competition by entrepreneurs for better quality timber logs, as indicated in the study conducted by Thakur *et al.* (2020)^[14]. The highest transportation costs were also noticed in the Karwar division. It indicates that this division procures wood

logs from distant places compared to other divisions. However, labor charges were found to be higher in Sirsi, and it was around Rs. 27000 per 1000 CFT. The highest variable cost was recorded in Karwar district, and it was around Rs. 25 lakhs.

Returns of wood log enterprise

Table 5 portrays the returns obtained from the sawmill enterprises. The main product obtained in this industry is sized wood logs. In addition, saw powder and firewood are by-products used as fuel wood and raw materials for other related industries. The returns obtained from selling-sized wood logs accounted for Rs. 34.64 Lakhs, more than 99 per cent of the total returns. Overall, the return per rupee of investment in the wood log enterprises in the central forest circle was 1.71. It indicates favourable financial outcomes and efficiency of the wood processing activities in the study area. Further, the returns per rupee of investment were very low in the Karwar division because of higher wood log costs, transportation costs, and labour charges in the division.

Table 5: Cost and returns of various listed forest divisions in Canara forest circle of Karnataka Per 1000 CFT

Sl. No.	Particulars	Sirsi	Yellapura	Honnagar	Karwar	Haliyal	Overall (CFC)
A.	Variable cost						
1	Raw material procurement	1729092.66	1282978.09	1514031.71	2047676.04	1480330.25	1610821.75
2	Electricity	26978.32	13485.53	19174.81	18026.75	18175.9	19168.262
3	Labour Chargers	273403.41	139416.94	115140.72	194051.26	236638.61	191730.188
4	Transportation Chargers	34765.56	15865.76	37325.83	44658.94	15646.44	29652.506
5	Miscellaneous Chargers	8608.44	4738.13	6571.93	5172.97	5410.48	6100.39
6	Interest on working capital 7 %	145099.39	101953.91	118457.15	161671.02	122934.12	130023.118
	<i>Total variable cost (A)</i>	2217947.78	1558438.36	1810702.15	2471256.98	1879135.8	1987496.21
B.	Fixed Cost						
1	Land revenue	288.08	253.5	261.5	242.5	264.74	262.064
2	Deprecation of Machinery and equipment	6985.17	4596.68	13597.41	6513.95	14834.58	9305.558
3	Depreciation charges on building 5 %	2038.46	2093.75	4025	2069.44	6223.68	3290.066
4	Tax chargers	25675.37	13772.28	19479	45434.63	30556.19	26983.494
5	License fee	847.32	532	935.4	1223.2	983.2	904.224
6	Interest on fixed capital 11%	3941.784	2518.3378	4562.0113	6625.2109	6334.4501	4796.35882
	<i>Total fixed cost (B)</i>	39776.184	25412.3178	46034.8413	66854.4009	63920.3601	48399.6208
	<i>Total cost (A+B)</i>	2256783.44	1581332.36	1852174.98	2531486.17	1936721.71	2031699.73

C.	Returns						
	Main Product (Logs) (1)	37,77,269	28,84,507	31,53,442	40,98,205	34,11,171	34,64,919
By Product (Powder) (2)	5412.47	3756.79	4691.12	5532.67	4699.57	4818.52	
Gross Return (1+2) (C)	37,82,682	28,88,263	31,58,134	41,03,738	34,15,870	34,69,737	
Net return after tax (C – (A+B))	15,25,899	13,06,931	13,05,959	15,72,252	14,79,148	14,38,037	
Returns per Rupee of Investment	1.68	1.83	1.71	1.62	1.76	1.71	

Note: CFC: Canara Forest Circle

Value addition of the timber

Table 6 and Fig 2 represent the financial performance of various value-added wood log products in the Canara Forest Division, examining key metrics such as average purchasing, selling, and value-added ratios. Table 6 shows the value-added sale ratio for the timber industry since the furniture industry added value to the timber industry and the output of sawmill input in the furniture industry. From the table value-added sales ratio of 62 per cent for sofa sets, 59 per cent for office tables, 55 per cent for dining tables, 52 per cent for the doors, 50 per cent for sized wood logs and 45 per cent for the windows.

Table 6: Value addition of the wood logs

Sl. No.	Name of the value-added products	Average purchase price	Average selling price	Value added /sales ratio
1.	Sofa set	422000	1107000	0.62
2.	Office table	14300	34700	0.59
3.	Dining table	103000	230000	0.55
4.	Door	167000	348000	0.52
5.	Sized wood logs	317000	628700	0.50
6.	Window	40000	72600	0.45

This result implies that all the products added value to the timber industries. However, sofa sets with 62 per cent comparatively added more value sales ratio to the timber industry in the study area. In addition, most of the raw product was converted into sized wood logs only, which adds less value than other products like sofas, tables, doors, chairs, etc. (Babatunde *et al.* (2020) [5]).

Constraints in the timber industry

Table 7 and Fig 3 represent the constraints of the wood processing industry in the study area. They were examined based on rank-based quotient (RBQ) values and corresponding ranks.

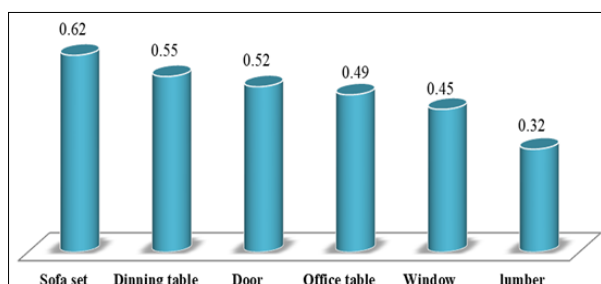


Fig 2: Value addition of the wood logs

The foremost constraint identified was the labour shortage, which had an RBQ Value of 92, indicating its critical impact. This shortage can affect productivity and the overall efficiency of the industry. Addressing this constraint is the top priority for the economy. The constraint of income tax payable to the government holds substantial importance, as reflected in its RBQ value of 56.66. This constraint could impact the financial health of sawmills. The influence of government policies was identified as a significant constraint, with an RBQ value of 51.02. Understanding the specific policies causing challenges

and actively engaging with policymakers to streamline regulations or propose amendments may be necessary, followed by the high cost of transportation. (Santhosha, K.M., and Naik, 2022) [13].

Table 7: Constraints faced by the sawmills

Sl. No.	Constraints of sawmills	RBQ Value	Ranks
1.	Labour shortage	100	I
2.	Income tax payable to the government	56.66	II
3.	Government policy (licensing and procurement of raw material)	51.02	III
4.	High cost of transportation	48.71	IV
5.	Raw material availability	43.58	V

This challenge could impact sawmills' overall cost structure. Exploring options such as bulk transportation agreements, optimising logistical routes, or advocating for infrastructure improvements can help alleviate the financial burden associated with transportation costs. In addition, the availability of raw materials was the least constraint, and ensuring a stable and consistent supply of raw materials is crucial for the wood log industry. Collaborating with forestry departments, implementing sustainable sourcing practices, and exploring alternative raw material sources can contribute to addressing this constraint (Yadava *et al.*).

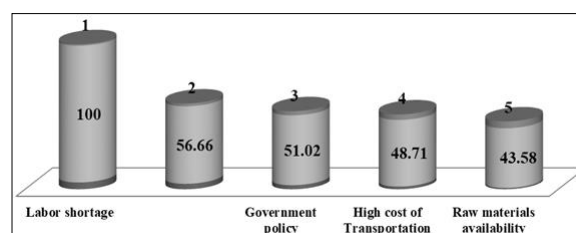


Fig 3: Constraints faced by the sawmill

Conclusion

In the context of the result obtained from this study, the wood log business is an important source of income for many households in the study area. However, it is experiencing major setbacks. The identified constraints to developing the wood log industry must be addressed if the industry moves forward. For instance, the labour shortage problem may be addressed by increasing mechanisation and attracting labour through incentive programmes so that they will come forward, which could help to enhance their business operations.

Based on the findings and conclusions obtained from this study, some recommendations are being made to improve the wood log business in Karnataka. This study also addresses the pivotal role of the wood log sector in the local economy, making substantial contributions to employment and income against the backdrop of a rising global demand for wood products. This information can help businesses make better decisions to run efficiently and stay profitable, especially during market uncertainty. Finally, the government should encourage private tree plantations to make more trees available since the demand for timber is increasing.

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