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Investment and Processing of Saw Mill - With Reference to Forest Wood Products

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Abstract

The result concluded from the present study that, the business of saw milling require sizeable amount of capital, particularly the working capital for buying raw wood, payment of labour charges etc., For establishing a saw mill, the major investment was required to be made of land, building and saw machinery. Recovery of final wood after milling was highest fetched in teak i.e. 82.58 per cent followed by Shiven (76.12 per cent), Kinni (75.96 per cent) etc., thus , the finding of the present study that, the forest species ate to be high or low value based on recovery of final wood apart from intrinsic quality of wood forest species posses.

Keywords: Swamilling, Forest wood.

Introduction

A saw mill is a plant with different types of machinery for sawing logs into planks, bulls and scantlings or any desired size. In economic sense sawing of logs is creation of form utility to the logs of wood. Saw milling is the most important forest based industry in Gondia division of Nagpur Forest circle of Maharashtra State. Therefore, an attempt has been made to process and investment of saw milling with following specific aims of the following objectives.

Aim of the Study

1. To workout capital investment in saw milling.
2. To study the existing process of saw mill.
3. To study the distribution and pattern of processing wood in sawmilling.

Review of Literature

Olawuni, Peter Olabiyi 1 & Okunola, Olasunkanmi Habeeb (2014) examined the socioeconomic impacts of sawmill industry on residents in Ile-Ife, Nigeria. The study concluded that sawmilling activities contributes significantly to the economic development of residents in the study area. Chris Brown and German Ortiz (2001) studied seeks to identify key factors that are constraining direct investment in wood processing in New Zealand, and to suggest viable means of removing or reducing these constraints, or otherwise promoting investment in wood processing.Philip H. Steele and Philip A. Araman (1996) estimated that Rustic Wood Products sawmill annual costs increased as a result of the band headrig installation.

Material and Methods

In Nagpur forest circle, there were four forest division. Of these, Gondia division area was selected purposively based on an availability of raw wood to be processed. For this aspect, 24 saw mills were selected randomly representing different types of saws fitted for cutting wood. Out of 24 saw mills, 6 were selected Horizontal type (Group- I) , 10 Vertical type (Group-II) and 8 Vertical & Horizontal type (Group-III were selected for the present study. The data pertains to the year2014-2015 were collected by survey method with the help of specially designed pre- tested scheduled. The data were analyzed by using simple statistical tools such as means, frequency, ration and percentage, etc.

Results and Discussion

Capital Investment Structure

Capital investment in saw mills is presented in Table -1

Table 1
Capital Investment Structure in Saw Mill (Figures in Rs.)

Sr. No.	Item of Investment	Group of saw mill			
		Group-I (N=6)	Group-II (N=10)	Group-III (N=8)	Over all (N=24)
I.	**Land and Building**				
	1. Land	126000 (49.66)	84000 (43.23)	168000 (44.93)	126000 (45.90)
	2. Office building	16738 (6.60)	14880 (7.66)	21560 (5.77)	17726 (6.46)
	3. Store room	28790 (11.35)	22330 (11.49)	33279 (8.90)	28133 (10.25)
	4. Fencing	835 (0.33)	684 (0.35)	1292 (0.35)	937 (0.34)
II	**Machinery**				
	1. Saw mill	52000 (20.49)	44000 (22.64)	96000 (25.68)	64000 (23.31)
	2. Electric motor (15 HP)	20000 (7.88)	18000 (9.26)	38000 (10.16)	25333 (9.23)
	3. Grinder & grinder machine (1 HP)	3800 (1.50)	3690 (1.90)	7490 (2.00)	4993 (1.82)
	4. Saw blade	2046 (0.81)	1890 (0.97)	2984 (0.80)	2307 (0.84)
	5. Trolley	- - - - - - - -	1645 (0.85)	1613 (0.43)	1629 (0.59)
	6. Weighing balance	1230 (0.48)	1075 (0.55)	1210 (0.32)	1172 (0.42)
III	**Other cost**	2300 (0.90)	2133 (1.10)	2450 (0.66)	2294 (0.84)
	Total	**253739 (100.00)**	**194327 (100.00)**	**373878 (100.00)**	**274524 (100.00)**

(Figures in Parentheses Indicate Percentages to Total)

Table -1 revealed that, on an average per mill capital investment for the sample as a whole worked out to be Rs. 2,74,524 in Gondia division of Nagpur forest circle. Groupwise investment into saw mill indicated that, the highest capital was invested in combined vertical and horizontal type of saw mills i.e. group III and it was Rs.3,73,878 per saw mill. The lowest capital investment was observed in vertical type of saw mills (Rs.1,94,327 per mill) i.e. group II. Higher capital investment in saw mills belonged to group III was quite obvious because of bigger machinery size which was costlier and space requirement to accommodate such machinery was more. Thus the cost of horizontal saw mill was more than that of vertical saw mills on account of higher milling capacity. This resulted into higher investment in land acquisition, construction of shed and other buildings, fencing etc. These result confirm the finding of Dwiwedi A.J.(1973).

Capacity Utilization in Terms of Quantity Swan

Capacity utilization in terms of quantity swan is presented in the Table -2

Table 2.
Capacity Utilization of Saw Mill in Terms of Quantity Milled

Sr. No.	Particulars	Group of Saw Mill			
		Group-I	Group-II	Group-III	Over all
1.	**Installed capacity :**				
	(a) Per hours (Cu.Mt.)	1.25	1.06	2.31	1.54
	(b) Per days (Cu. Mt)	10	8.48	18.48	12.32
	(c) Per years (Cu.Mt)	3000	2544	5544	3696
2.	**Capacity Utilization** :				
	(a) Per hours (Cu.Mt.)	1.22	1.03	1.59	1.29
	(b) Per days (Cu. Mt)	9.13	6.16	11.94	9.02
	(c) Per years (Cu.Mt)	2610	1786	3318	2571
	(d) Per cent utilization/year	87.00	70.20	59.85	69.56

It was observed from the Table -2 for the sample as whole an installed capacity was 3696 M^3 while as against this actual milling was 2571 M^3, so the capacity utilization was estimated to be 69.56 per cent. This indicated that 30.44 per cent installed capacity was underutilized.

Similarly, the per hour and per day capacity utilization the saw mills was the highest for the saw mills belonging to group III followed by groups I and II, respectively. However, on a annual basis capacity utilization was found to be the highest in group I followed by groups II and III, respectively. This is an

effect of the total number of working days of the saw mills from respective groups.An installed capacity utilization reflects into distribution of overhead cost fixed cost over final wood to be sawned. The per unit fixed cost of final wood sawned and capacity utilization are inversely related. This implies that, higher the utilization of installed capacity lower is the fixed cost. Because the fixed cost gets spread over larger quantities.Hence, per unit fixed cost gets reduced.

Season-Wise Milling of Wood

Season-wise processing of wood by saw is presented in Table – 3

Table3
Season-Wise Processing of Wood by Saw Mills (Quantity in M^3)

Season	Group of Saw Mill											
	Group-I (n=6)			Group-II (N=10)			Group-I (N=8)			Overall (N=24)		
	T.M.	C.M.	Total	T.M.	C.M.	Total	T.M.	C.M.	Total	T.M.	C.M.	Total
Rainy	541 (20.73)	170 (6.71)	711 (27.24)	367 (20.55)	135 (7.56)	502 (28.11)	593 (17.87)	233 (7.02)	826 (24.89)	500 (19.45)	179 (6.96)	679 (26.41)
Winter	645 (24.71)	235 (9.00)	880 (23.72)	426 (23.85)	168 (9.41)	594 (33.26)	927 (27.94)	267 (8.05)	1194 (35.99)	666 (25.90)	223 (8.67)	889 (34.58)
Summer	775 (29.69)	244 (9.35)	1019 (39.04)	512 (28.67)	178 (9.97)	690 (38.63)	995 (29.99)	303 (9.13)	1298 (39.12)	761 (29.60)	242 (9.41)	1003 (39.01)
Total	1961 (75.13)	649 (24.87)	2610 (100.00)	1305 (73.07)	481 (26.93)	1786 (100.00)	2515 (75.80)	803 (24.20)	3318 (100.00)	1927 (74.95)	644 (25.05)	2571 (100.0)

TM :Trade Milling ,CM: Customer Milling (Figures in Parentheses Indicate Percentages To Total)

The season-wise distribution of milling wood revealed from the Table-3 that, the highest quantities of wood were processed in summer season in all the groups of mills followed by winter and rainy season, respectively. This trend is quite obvious in view of seasonality in construction, as major quantity of sawn wood is being used for preparation of doors, windows etc. required for the buildings. At an overall level the proportion of wood sawn in rainy, winter and summer season estimated to be 26.41, 34.58 and 39.01 per cent, respectively. Breakup of sawn wood for the sample as a whole into trade milling and custom milling revealed that, proportion of trade milling was 74.95 per cent while that of custom milling was 25.05 per cent. This indicated that, the owners of saw mills in the study area were more engaged in sawning wood lots bought by them for reselling after processing rather rendering services for custom milling. This is quite natural also, because former enterprise is higher paying venture as compared to latter one. These conclusion confirm with the finding of Jambhavadekar, S.H. and E.R.Patil (1996).

Distribution of Milled Roundwood

The distribution of roundwood after sawning into final wood, fuel wood and sawdust is given in Table - 4.

The Table -4 shows that, at an overall level after sawning of round wood finalwood obtained thereof was the highest from teak species (82.58 per cent) followed by Shivan (76.12 per cent), Kinni (75.96 per cent). Saja (73.78 per cent), Sal (72.73 per cent), Neem (72.52 per cent),Bija (71.87 per cent), Anjan (71.19 per cent) and other species (66.97 per cent), respectively. Whereas, in case of fuel wood obtained as a by product in sawning of wood, the highest proportion was recorded in other species (32.37) per cent followed by babool (28.71 per cent), anjan (28.41 per cent), neem (26.79 per cent), bija (27.66 per cent), sal (26.83 per cent), Saja (25.74) per cent), Shivan (23.40 per cent), Kinni 23.27 per cent) and teak (17.22 per cent), respectively.

It was also seen from Table-5 that, recovery percentage of final wood obtained was higher in high value forest species of timber and vide versa in case of low value forest species, perhaps consumers may be prepared to offer price high or low by taking in to consideration recovery of final wood to be fetched from round wood which they intend to purchase. These results confirm the findings of Jambhavadekar S.H., et al. (1999). It may be inferred from the findings of the present study that, the forest species are to be ratd as high or low value based or recovery of final wood apart from intrinsic quality of wood forest species posses.

Pattern of Processing Wood

The pattern of processing different types or species is given in Table -5.

It was observed from Table -5 that, at an overall level, the per mill quantity of wood processed was 1927 M^3. Out of the total quantity of wood processed (1927 M^3), the highest quantities of wood processed for the sample as a whole were of teak wood and those were 215.13 M^3 (11.16 per cent), while the lowest quantities of per mill wood processed were of anjan and those were 172.18 M^3 (8.94 per cent). Thus, there was no much difference in species-wise processing of wood in the study area. This implied that, there was judicious felling of trees belonging to different silviculture species. This is to be taken in to consideration in the perspective of species wise cutting of the tree after attaining size of final felling. Probably such type of felling of trees prevailed in the study area due to monopoly of the Government Forest Department which owned the forest, so that the concerned department took right decision of felling the trees. This is why there was no imbalance in felling of different species of silviculture.

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Table 4 Distribution of Milled Roundwood

Sr. No.	Type of wood species	Group of saw mill															
		Group-I				Group-II				Group-III				Overall			
		Raw wood	Final wood	Fuel* wood	Saw* wood	Raw wood	Final wood	Fuel* wood	Saw* wood	Raw wood	Final wood	Fuel* wood	Saw* wood	Raw wood	Final wood	Fuel* wood	Saw* wood
1.	Teak	214.64	173.79 (80.78)	40.76 (18.99)	0.49 (0.23)	150.12	122.99 (81.93)	26.89 (17.91)	0.24 (0.16)	280.64	236.59 (84.30)	43.49 (15.50)	0.56 (0.20)	215.13	177.66 (82.56)	37.04 (17.22)	0.43 (0.20)
2.	Shivan	197.03	146.40 (74.30)	49.55 (25.15)	1.08 (0.55)	132.66	102.06 (76.93)	30.06 (22.66)	0.54 (0.41)	230.25	177.79 (77.22)	51.40 (22.32)	1.06 (0.46)	186.65	142.08 (76.12)	43.68 (23.40)	0.89 (0.48)
3.	Bija	189.33	133.13 (70.32)	55.27 (29.19)	0.93 (0.49)	126.12	90.93 (22.10)	34.55 (27.39)	0.64 (0.51)	245.10	178.77 (72.94)	65.28 (26.63)	1.05 (0.43)	186.85	134.28 (71.87)	51.70 (27.66)	0.87 (0.47)
4.	Saja	193.89	139.11 (71.75)	53.75 (27.72)	1.03 (0.53)	124.87	92.15 (73.80)	32.15 (25.74)	0.57 (0.46)	248.54	187.31 (75.36)	60.11 (24.19)	1.12 (0.45)	189.10	139.52 (73.78)	48.67 (25.74)	0.91 (0.48)
5.	Sal	203.15	146.34 (72.04)	55.89 (27.51)	0.92 (0.45)	125.30	91.06 (72.67)	33.66 (26.86)	0.58 (0.47)	255.98	187.65 (73.31)	67.23 (26.26)	1.10 (0.43)	194.81	141.68 (72.73)	52.26 (26.83)	0.87 (0.44)
6.	Babool	189.92	131.75 (69.37)	56.94 (29.98)	1.23 (0.65)	120.45	85.51 (70.99)	34.06 (28.28)	0.88 (0.73)	225.21	161.31 (71.63)	72.75 (27.86)	1.15 (0.51)	178.53	126.19 (70.68)	51.25 (28.71)	1.09 (0.61)
7.	Kinni	193.44	143.42 (74.14)	48.49 (25.07)	1.53 (0.79)	129.31	99.16 (76.68)	29.14 (22.53)	1.01 (0.79)	258.03	198.61 (76.97)	57.51 (22.29)	1.91 (0.74)	193.59	147.06 (75.96)	45.05 (23.27)	1.48 (0.77)
8.	Neem	188.69	136.26 (72.21)	51.18 (27.12)	1.25 (0.67)	132.69	93.45 (70.43)	38.62 (29.10)	0.62 (0.47)	301.63	222.10 (73.63)	77.11 (25.57)	2.42 (0.80)	207.67	150.60 (72.52)	55.64 (26.79)	1.43 (0.69)
9.	Anjan	179.31	125.39 (69.93)	53.25 (29.70)	0.67 (0.37)	116.14	82.82 (71.31)	32.87 (28.30)	0.45 (0.39)	221.09	159.54 (72.16)	60.64 (27.43)	0.91 (0.41)	172.18	122.58 (71.19)	48.92 (28.41)	0.68 (0.40)
10	other	211.60	138.67 (65.53)	71.39 (33.74)	1.54 (0.73)	147.34	97.52 (66.19)	49.18 (33.38)	0.64 (0.43)	248.53	170.65 (68.66)	76.08 (30.61)	1.80 (0.73)	202.49	135.61 (66.97)	65.55 (32.37)	1.33 (0.66)
	Total	1961.00	1413.86 (72.10)	536.47 (27.36)	10.67 (0.54)	1305.0	957.65 (73.38)	341.18 (26.14)	6.17 (0.47)	2515.0	1880.32 (74.76)	621.60 (24.72)	13.08 (0.52)	1927.0	1417..26 (73.55)	499.76 (25.93)	9.98 (0.52)

(Figures In Parentheses Are Percentage to The Total)

Note = Indicates Conversion of Weight in to Volume 0.400 Metric Ton = 1=M^3

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Table 5
Pattern of Processing Wood

Sr. No.	Type of wood	Group of Saw Mill											
		Group-I (N=6)			Group-II (N=10)			Group-III (N=8)			Overall (N=24)		
		B.M. Qty. M^3	A.M. Qty. M^3	Recovery	B.M. Qty. M^3	A.M. Qty. M^3	Recovery	B.M. Qty. M^3	A.M. Qty. M^3	Recovery	B.M. Qty. M^3	A.M. Qty. M^3	Recovery
1.	**Teak** (Tectona grandis)	214.64 (10.95)	173.39 (12.26)	80.78	150.12 (11.50)	122.99 (12.84)	81.93	280.64 (11.16)	236.59 (12.58)	84.30	215.13 (11.16)	177.66 (12.54)	82.58
2.	**Shivan** (Gmelina arbora)	197.03 (10.05)	146.40 (10.35)	74.30	132.66 (10.17)	102.06 (10.66)	76.93	230.25 (9.16)	177.79 (9.46)	77.22	186.65 (9.69)	142.08 (10.02)	76.12
3.	**Bija** (pterocarp us morsu pium	189.33 (9.65)	133.13 (9.42)	70.32	126.12 (9.66)	90.93 (9.50)	72.10	245.10 (9.75)	178.77 (9.51)	72.94	186.85 (9.70)	134.28 (9.45)	71.87
4.	**Saja** (Terminalia-tomentosa)	193.89 (9.89)	139.11 (9.84)	71.75	124.87 (9.57)	92.15 (9.62)	73.80	248.54 (9.88)	187.31 (9.96)	75.36	189.10 (9.81)	139.52 (9.82)	73.78
5.	**Sal** (Shorea robusta)	203.15 (10.36)	146.34 (10.35)	72.04	125.30 (9.60)	91.06 (9.51)	72.67	255.98 (10.18)	187.65 (9.98)	73.31	194.81 (10.10)	141.68 (10.00)	72.73
6.	**Babool** (Acacia nilotica)	189.92 (9.68)	131.75 (9.32)	69.37	120.45 (9.23)	85.51 (8.93)	70.99	225.21 (8.95)	161.31 (8.58)	71.63	178.53 (9.26)	126.19 (8.90)	70.68
7.	**Kinni** (Albizia procera)	193.44 (9.86)	143.42 (10.14)	74.14	129.31 (9.91)	99.16 (10.35)	76.68	258.03 (10.26)	198.61 (10.56)	76.97	193.59 (10.05)	147.06 (10.38)	75.96
8.	**Neem** (Azadirchta indica)	188.69 (9.62)	136.26 (9.64)	72.21	132.69 (10.17)	93.45 (9.76)	70.43	301.63 (11.99)	222.10 (11.81)	73.63	207.67 (10.78)	150.60 (10.63)	72.52
9.	**Anjan** (Hardwicki abanata)	179.31 (9.14)	125.39 (8.87)	69.93	116.14 (8.90)	82.82 (8.65)	71.31	221.09 (8.79)	159.54 (8.48)	72.16	172.18 (8.94)	122.58 (8.65)	71.19
10.	Other type	211.60 (10.80)	138.67 (9.81)	65.53	147.34 (11.29)	97.52 (10.18)	66.19	248.53 (9.88)	170.65 (9.08)	68.66	202.49 (10.51)	135.61 (9.57)	66.97
	Total	1961.00 (100.00)	1413.86 (100.00)	72.10	1305.00 (100.00)	957.65 (100.00)	73.38	2515.00 (100.00)	1880.32 (100.00)	74.76	1927.00 (100.00)	1417.26 (100.00)	73.35

B.M. = Before milling : A.M. = After milling : (Figures in parentheses are percentages to total)

Regarding recovery of the final wood after milling realized, it was seen that, at an overall level the highest recovery of final wood was fetched in teak after milling and percentage recovery of final wood was 82.58. This recovery seems to be quite high. Recovery of final wood in sawning depends upon the factors such as extent of moisture content, in log of wood at the time of sawing development of cracks in wood to be sawned, portion eaten away by kurf etc. Further, at an overall level, the lowest recovery of final wood was recorded in case of other species/ non descript or local species and it was 66.97 per cent. These results confirm the findings of Jambhavadekar S.H., et al. (1999).

Conclusion

The meaningful conclusion were emerged from the forgoing analysis that, the business of saw milling require sizeable amount of capital, particularly the working capital for buying raw wood, payment of labour charges etc., For establishing a saw mill, the major investment was required to be made of land, building and saw machinery. Similarly, recovery of final wood after milling was highest fetched in teak i.e. 82.58 per cent followed by Shiven (76.12 per cent), Kinni (75.96 per cent) etc., thus , the conclusions of the present study seen that, the forest species ate to be high or low value based on recovery of final wood apart from intrinsic quality of wood forest species posses.

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