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Research Paper

Volume of Timber Consumption in Sawmill Industries of Valley Districts of Manipur State, India: Its Determinants and Implications

Hanjabam Isworchandra Sharma* and Lynda Thoudam

Department of Economics, Manipur University, Imphal, Manipur, India

*Corresponding author: isworhanja@gmail.com (**ORCID ID:** 0000-0002-8537-9843)

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ABSTRACT

The present paper seeks to determine the volume and species of timber consumption in sawmill industries of Valley districts of Manipur State, India. The study finds a high growth rate of prices for all timber species. Species-wise data shows that about 60 percent of total inputs consumed by sawmill units are for furniture use and the rest for housing and construction. The study employs a log-linear multiple regression model to determine input consumption's determinants. The regression analysis shows that units are not fully utilizing their installed capacity, as shown by the negative relationship between installed capacity and input consumption. Other factors like the area of the unit, capital investment, and perennial operation are factors that have positive impacts on the input consumption of the sawmill units.

HIGHLIGHTS

- Sixty percent of timber consumed as input by sawmill industries is for furniture purposes and the rest is for housing and construction.
- The installed capacity of sawmill is negatively related to input consumption which is in contrast to the general relationship between higher capacity and higher input consumption.
- The uncontrolled growth of illegal units has shrunk the markets of permit holders, discouraging them from investing and having the specialized unit.
- It is high time stakeholder departments must start pondering over the source of timber outside the forest.

Keywords: Timber species, Illegal units, Furniture, Log-Linear regression, Determinants

The majority of people in the globe, cutting across income classes, continue to use timber products and still consider it an essential material despite the remarkable development of new generation materials and products. The advantage of timber is that its sustainable supply can be maintained with less effort than other non-renewable substitutes like iron, steel, plastic, glass, etc. Energy consumption is less in the manufacturing of wood products than similar products and structures made of other non-wood materials (Adhikari and Ozarska, 2018). Sustainable production of timber comes with a huge positive environmental impact and socio-economic security. Products of timber are regarded as products obtained from renewable and sustainable environmental resources (Klein *et al.* 2016). The economy of Manipur[1] is proliferating, and the needs of its population are increasing and diversifying. Manipur, in recent times, is witnessing an economic transformation in the form of urbanization[2] which increases the demand for several household consumer goods. The increasing income of a total population has pushed up the timber demand significantly (Haripriya and Parikh, 1998; Brack, 2018). The demand for wood at the household level has also transformed from fuel needs to life-style based needs, including construction and furniture needs. Timber has been an indispensable part of

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the life of Manipur's people since time immemorial. Across all income groups and all sections of people, timber products are used for various purposes. The Indian Wood Sector Market Study conducted by American Hardwood Export Council (2016) emphasized the importance of forest-based industries as the future's key driver of economic growth. In Manipur, timber-based furniture is in high demand, and its social acceptance is also high. Timber furniture has a strong presence in the social and cultural life of the Manipuri people. Sawn wood usage is influenced by local resources and customs (Pandey and Rangaranjan, 2008). Apart from the furniture used, sawn wood is predominantly used for housing in semi-urban, town, and rural areas. On the supply side, there seems to be an insignificant response as the supply of wood is still coming from traditional sources, namely forests and imports from neighboring Myanmar; and other modern sources like plantations and agroforestry are in a primitive stage. These have resulted in massive deforestation, a huge threat to the physical and social environment. The region is witnessing a degenerating environmental growth and is itching towards unsustainable growth and development. Sustainable maintenance of wood-based products becomes critical and crucial for environmentally friendly growth as it comes with less effort and cost vis-à-vis other non-wood products like steel, plastic, etc. The most rational option is to plant more trees and produce and procure an increased volume of wood because of the highly favorable and positive impact on socioeconomic security and environmental stability (Parthiban *et al.* 2014).

Manipur is one of the significant users of timber products in the North East region. The state had, till recently, the privilege of having a relatively abundant quantity of wood[3] from its land as 90 percent of lands are under hill region. Taking into consideration of the demand-supply gap, overexploitation of timber products, and haphazard urbanization that is taking place in the region, there is an urgent need to understand the industries related to timber. In the context of Manipur, the sawmill industry is a primary timber-based industry, and its output forms the major chunk of inputs for furniture enterprise and housing materials. The most critical phases of the wood supply chain are represented by sawmilling operations because they link the conversion flow of raw materials into finite products (Borz *et al.* 2021). Sawmill industries are the only industry that uses timber as direct input. In other words, it is solely based on timber logs as raw materials. Other wood-based industries like furniture, woodwork and household materials depend on the output of the sawmill industry and some are met through imports from Myanmar. The present paper studies of the entire sawmills unit of Manipur Valley districts, namely, Imphal East, Imphal West, Bishenpur, and Thoubal.

Objectives of the Study

The study seeks to address the following objectives:

1. To find the volume of timber consumed in sawmill industries of Manipur valley
2. To find the nature and species of timber consumed in sawmills
3. To find out the determinants of timber consumption in sawmills

Data Source and Methods

The study is undertaken with the help of a field-based survey. The entire sawmill industries of the valley districts are surveyed. The survey method is used to collect necessary information regarding the structure of sawmill units, input use, and price of inputs. Sawmill units in the state are operated both legally and illegally. In other words, sawmills can be classified based on government recognition, i.e., permit holders and non-permit holders. The survey covers both the permit and non-permit holders as it reflects the real picture of timber consumption. As the operation of sawmills required several formal processes and procedures, many units try to evade these, taking chances on the institutional loopholes. Several units operate illegally or without permits. The reason for conducting the study in the valley district of the state is that most of the established sawmill units are located in the valley region, and most of the timber-based industries are confined to these four districts of the state. The survey has been carried out in all the valley districts. The data were collected from 79 sawmill units, including both permit and non-permit holders spread across the four districts for 2017-18. The units in each district are Imphal East district - 14 units, Imphal West district – 24 units, Thoubal district – 20 units, and

Bishenpur district – 21 units. The study does not go for a separate analysis of permit, and non-permit holders as both operate smoothly. None of the non-permit holders do not want to identify themselves as non-permit holders. A log-linear regression model is applied to identify the determinants of timber consumption in sawmill units.

RESULTS AND DISCUSSION

The timber species available in Manipur are tropical hardwood tree species. The quality of timber in Manipur has excellent potential for construction and furniture making. The list of timber species along with their common name, local name, and scientific name of the state are given in Table 1. Apart from the species, timbers are also classified based on their quality and nature of use. The accepted timber class being followed in the state is Special Class, Class A, B, and C (Government of Manipur, 1971). Within A class, there are A1, A2, and A3 Classes. The rates of royalty are different for each class; the higher the class higher the royalty. To evade this royalty, traders and millers underestimate the timber class. But at the ground level and among the class of people involved in the timber business, there is a conventionally accepted classification that does not necessarily strictly following the Forest Department rules. So amongst themselves, there are three classes, i.e., A, B, and C class. A Class is for furniture making, B class is for furniture making and construction, and C class is for construction only. A Class species are the top-rated quality timber species used in the furniture-making industry. Class B species are those that can be used for furniture as well as in construction and housing purposes. Class C species are low-rated quality timber species and are used for construction & housing purposes only. This is a rule of thumb in the timber market of the state. Timber species, along with their primary purpose of use, will be covered in the latter part of the paper. The sawmill units measured the volume of logs in terms of KB. KB is used as the unit for measuring the volume of wood.

$$KB = Length \times breadth \times height$$

$$1\ KB = 3\ inch \times 4\ inches \times 12\ feet$$

Input consumption are converted from KB to m^3 ($1m^3 = 35$ KB)

Table 1: List of Timber Species used in sawmills

Sl. No.	Common name	Local name	Scientific name
1	Teak	Chingsu	*Tectona grandis*
2	Bonsum	Uningthou	*Phoebe hainesiana*
3	Burmese lacquer	Khe-u	*Melanorrhoea usitata*
4	Champa	Leihao	*Michaelia champaca*
5	Gamhar	Wang	*Gmelina arborea*
6	Lampati	Tal	*Duabanga grandiflora*
7	Hollok	Tolhao	*Terminalia myriocarpa*
8	Gurjan	Khangra	*Dipterocarpus tuberculatus*
9	Dawasam	Cham	*Artocarpus chaplasha*
10	Amari	U-ngang	*Amoora wallichii*
11	Toona	Tairel	*Cedrela toona*
12	Chitagong wood	Taimareng	*Chukrasia tabularis*
13		U-ningthoumanbi	*Machilus spp.*
14	Pine	Uchan	*Pinus khasia*
15	Akhrot	Heijugak	*Juglans regia*
16		Khe-u Manbi*	
17		Safu**	
18		Ucham***	

Khe-u manbi is a species mainly used for furniture and its meaning: Similar to that of Melanorrhoeausilata; and the name is commonly used among people involved in the timber business and its scientific name and common name cannot be found; **Safu is a inferior class of timber used mainly for construction and the name commonly use among people involved in the timber business, and its scientific name and common name cannot be found; * Ucham is the common name given to the inferior class of timber; U means tree and cham means ordinary. The survey tries to find out the details of the species/varieties as far as possible; those inferior varieties whose species cannot be furnished by respondents are clubbed as Ucham.*

District wise consumption

District-wise consumption data shows huge variation as all the districts have different numbers of units. The total consumption of timber logs in all the districts stands at 15574.31 m^3, and the per-unit consumption stands at 197.14 m^3. Among the four districts, Imphal West has the highest per-unit consumption with 244.03 m^3, and Bishenpur has the lowest with 125.98 m^3. The high input consumption in the Imphal West district might be because of high population density and urbanization. It is the most urbanized district, and Imphal city, the capital city of Manipur, is located in Imphal West district.

Table 2: Input Consumption in all Units, District wise (in m^3)

Sl. No.	Districts	No. of Units	2017-18	Per unit consumption
1	Imphal East	14	3363.14	240.22
2	Imphal West	24	5856.9	244.03
3	Bishenpur	21	2645.69	125.98
4	Thoubal	20	3708.58	185.43
	Total	79	15574.31	197.14

Source: *Field Survey.*

Species Wise Input Consumption

The study also tries to capture the species-wise data of the input consumption. The scientific name and common name are already mentioned in Table 1. The study looks into the different types of species and the purpose of using them. In Manipur, as mentioned earlier, timber is used for furniture, housing, and construction purposes. The study tries to capture the details of the species of the inputs. It manages to capture 17 species, as listed in table 2. As mentioned already, *Ucham* is an umbrella term for inferior quality variety i.e., Class C. The detailed species within *Ucham* is also captured, and those inferior species which are not able to capture are listed and incorporated as *Ucham*. The following table 3 shows the species of timber along with the main purpose of use.

Table 3: Species of Timber and Main Purpose of Use

Sl. No.	Species (In Local Name/ Common Name)	Main Purpose of Use
1	*Chingsu* (Teak)	Furniture
2	Khe-u (*Burmese lacquer*)	Furniture
3	Leihao (*Champa*)	Furniture
4	Uningthou (*Bonsum*)	Furniture
5	Uningthoumanbi	Furniture
6	Wang (*Gamhar*)	Furniture
7	Khangra (*Gurjan*)	Plywood
8	Tan (*Lampati*)	Furniture
9	Tolhao (*Hollok*)	Furniture
10	Uchan (*Pine*)	Furniture & Construction
11	Kheu-Manbi	Furniture
12	Cham (*Dawasam*)	Boat making
13	Ucham	Housing & Construction
14	Tairel (*Toona*)	Housing & Construction
15	U-Ngang (*Amari*)	Housing & Construction
16	Heijugak (*Akhrot*)	Housing & Construction
17	Safu	Housing & Construction
18	Taimaren (*Chitagong*) *wood*)	Housing/Construction

Table 4: Species-wise Input Consumption in all Valley Units (in m^3)

Sl. No.	Species	2017-18	Percent
1	*Chingsu* (Teak)	294.28	1.89
2	Uningthou (*Bonsum*)	2161.38	13.88
3	Tairel (*Toona*)	410	2.63
4	Khe-u (*Burmese lacquer*)	133.14	0.85
5	Leihao (*Champa*)	2049.95	13.16
6	Uningthoumanbi	100	0.64
7	Wang (*Gamhar*)	535.72	3.44
8	Khangra (*Gurjan*)	465.71	2.99
9	Tan (*Lampati*)	1687.11	10.83
10	Tolhao (*Hollok*)	1511.42	9.70
11	Uchan (*Pine*)	3502.82	22.49
12	Cham (*Dawasam*)	28.57	0.18
13	U-Ngang (*Amari*)	28.57	0.18
14	Heijugak (*Akhrot*)	0	0.00
15	Safu	34.29	0.22
16	Taimaren (*Chitagong*)	42.86	0.28
17	Khe-u Manbi	42.86	0.28
18	Ucham	2545.63	16.35
	Total	15574.31	100.00

Source: *Field Survey.*

It is observed from Table 4 that *Uchan* (Pine) has the highest consumption with 22.49 percent, followed by *Uningthou* (Bonsum) at 13.88 percent, *Leihao* (Champa) at 13.16 percent, *Tan* (Lampati), at 10.83 percent, and *Tolhao* (Hollok) with 9.70 percent. These species are used for furniture making except pine which is used for furniture and construction. Pine is grown in many parts of the hill region and is readily available. *Ucham* shows a high input consumption, cannot be taken as a single species. As already mentioned, it is an umbrella term for inferior species mainly used for housing and construction. *Uchan* is a species used mainly for construction and also for furniture. *Uningthou*, *Leihao*, *Tolhao*, and *Tan* are used mainly for furniture. *Ucham* is used for construction and housing. So, it is safe to conclude that about 60 percent of input consumption is being used for furniture purposes and the rest are for housing and construction. *Uningthou* (Bonsum) in the Manipuri language, The King of Tree (*U*-Tree, *Ningthou* – King) is the most sought species of tree in the state for furniture. During the fieldwork, some of the units have informed the authors that their sources are depleting which is a cause of concern. Teak, another species whose furniture is demanded by

high-income groups, accounts for about 2 percent. They are mainly imported from Myanmar.

The study observes that the price of timber logs for any species or variety is increasing every year, but there is a difference in degree across the districts and species. For instance, the price of the highly demanded species *Uningthou* (Bonsum) was highest in Imphal West with ₹ 17062.5 per m^3 and lowest in Bishenpur district with ₹ 13606.25 per m^3 in 2012-13. And its price was ₹ 21875 per m^3 and ₹ 17383.33 perm^3 respectively. One very important observation can be made from these trends. The demand for timber both for the two primary purposes - furniture and housing & construction is increasing due to urbanization, population increase, construction works, etc. At the same time, the substitute or the perfect substitute for timber products like iron and steel-made furniture, or processed wood-based furniture, even though it is available, is limited to a few sections of society due to both social and economic reasons. The economic reason may be the high price compared to locally available timber furniture, and at the same time, the social acceptability is also low. In the construction sector, there has been a remarkable change in housing and construction for offices and houses for high-income groups. They can afford substitutes for timber-based housing with modern inputs like glass, steel, iron, etc. Those classes who are breaking the barrier of poverty or other emerging income-earning classes, even if in the low-income group, are heavily dependent on timber for their housing. So there is an increased demand for timber and it is here to stay for some time. That is why higher demand compared with limited supply leads to a higher price. In other words, timber's demand and supply gap is on the rise, pushing up the prices of timber logs.

Determinant of Input Consumption: A Log-Linear Regression Model

The study collects all necessary and relevant information regarding the sawmill units wherever possible. The study, with the available information collected through the schedule, goes for an econometric exercise to determine the factors driving the input consumption. The model is going to be based on cross-section data from 2017-18. So, all the data will be for 2017-18. The dependent variable Y is the input consumption in m^3. The model will be a log-linear multiple regression with an independent dummy variable model. As some independent variable takes the dummy variable and most of the variables have different data set, a log-linear model is adopted to normalize the dataset.

The explanatory or independent variables selected for the model and related hypotheses are:

- X_1 – *Capacity*: It is measured in HP (Horsepower). It is likely to have a positive impact on input consumption, the higher the capacity higher the input consumption. But a word of caution, in the course of the study, it was found that units do not generally consider the capacity.
- X_2 – *Area*: It is measured in acres. It is the operational area of the units. It is likely to positively impact input consumption as a higher operational area means more areas for input storage like a pond, godowns, etc. It will facilitate higher input consumption.
- X_3 – *Employment*: It is given in numbers. It is the number of employees in the unit. It is likely to have a positive impact. The more employment, the more input consumption.
- X_4 – *Capital Investment*: It is given in rupees. It is the amount of money invested in the capital of the units like building for machines, building for output storage, pond, log yard, etc. It is likely to have a positive impact.
- X_5 – *Mode of Operation*: It pertains to the seasonality of the unit. It takes the dummy or categorical variables as Seasonal & Perennial. Perennially operated units are likely to have higher input consumption.
- X_6 – *Location*: It is the unit's location, whether they are located in a government-notified industrial cluster or not. It takes the dummy or categorical variables of yes or no. Units which are not located in a cluster are likely to have high consumption as most of the units want to operate in isolation as the timber business involves multiple layers of clandestine affairs.
- X_7 – *Integrated*: It implies whether the units are integrated with its main allied activity, furniture house. It also takes the dummy or categorical variables of yes or no. An integrated unit is likely to have lesser input consumption

as it will be particular about the input and will solely deal with furniture-related timber.

- X_8 – *Ownership*: It implies whether the unit operates in a rented premise or an owned one. It also takes the dummy or categorical variables of yes or no. An owned one is likely to have a positive impact on input consumption.

The following Table 5 summarises the descriptions of the variables and their expected outcomes.

The log-linear regression equation is given as:

$$Log\ Y_i = \alpha + \beta_1 logX_{1i} + \beta_2 logX_{2i} + \beta_3 logX_{3i} + \beta_4 logX_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \mu$$

The log-linear multiple regression is calculated in Stata License Version 15.1 of the Department of Economics, Manipur University, and the results are highlighted in Tables 6 (a) & (b).

Table 5: Description of Variables

Sl. No.	Independent variables	Description	Unit of measurement	Expected outcome/ sign
1	X_1	Capacity	Horsepower (Numbers)	+
2	X_2	Area	Acres (Number)	+
3	X_3	Employment	Number	+
4	X_4	Capital Investment	Rupees	+
5	X_5	Mode of Operation	Dummy variable (Seasonal - reference and Perennial)	+
6	X_6	Location	Dummy variable (No for outside cluster – reference & Yes for inside cluster)	+
7	X_7	Integrated	Dummy variable (No – not integrated with other wood based industry, reference & Yes, integrated with other wood-based industry)	-
8	X_8	Ownership	Dummy (No, if the unit is in a rented premise, reference & Yes for otherwise)	+

Table 6 (a): Results of Log-Linear Multiple Regression

Variables	Coef.	St.Err.	t-value	p-value	95% Conf	Interval	Sig
Capacity (X_1)	-0.342	0.15	-2.28	0.026	-0.642	-0.043	**
Area (X_2)	0.257	0.124	2.07	0.042	0.009	0.506	**
Employment (X_3)	**0.025**	**0.214**	**0.12**	**0.909**	**-0.402**	**0.451**	
Capital Investment (X_4)	0.283	0.099	2.85	0.006	0.085	0.481	***
Mode of Operation (X_5)							
Seasonal (Reference)							
Perennial	0.783	0.161	4.86	0	0.462	1.104	***
Location (X_6)							
No (Reference)							
Yes	**-0.264**	**0.207**	**-1.28**	**0.206**	**-0.677**	**0.149**	
Integrated (X_7)							
No (Reference)							
Yes	-0.303	0.174	-1.75	0.085	-0.65	0.043	*
Ownership (X_8)							
No (Reference)							
Yes	**-0.091**	**0.228**	**-0.4**	**0.691**	**-0.546**	**0.364**	
Constant	3.119	1.165	2.68	0.009	0.796	5.442	***

Mean dependent var	**5.168**	**SD dependent var**	**0.722**
R-squared	0.422	Number of obs	79
F-test	6.382	Prob> F	0
Akaike crit. (AIC)	146.387	Bayesian crit. (BIC)	167.712
Adjusted R-Squared	0.356		

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6 (b): Variance Inflation Factor

Variables	VIF	1/VIF
Capacity (X_1)	1.132	0.884
Area (X_2)	1.364	0.733
Employment (X_3)	1.193	0.838
Capital Investment (X_4)	1.478	0.676
Mode of Operation (X_5), Perennial	1.156	0.865
Location (X_6), Cluster	1.389	0.72
Integrated (X_7), Yes	1.251	0.8
Ownership (X_8), Owned	1.115	0.897
Mean VIF	1.26	—

The regression result shows that out of the eight independent variables, five variables are significant, they are capacity (X_1), area (X_2), capital investment (X_4), mode of operation (X_5), and integrated (X_7). It is interesting to note that capacity is negatively impacting input consumption which is in contrast to the general relationship between higher capacity and higher input consumption. It is observed from the fieldwork that units do not necessarily take into account the capacity of their machines. Moreover, their machine capacity is never fully utilized. In India, there are about 23000 sawmills in the country; about 98 percent of these are small with an annual log intake of approximately 3000 m^3. The total production capacity is estimated at 27.12 million m^3 per annum. However, their capacity utilization is below 50 percent (Manoharan n.d.). So the findings reflect the underutilization of their machine capacity. Other significant variables like area (X_2), capital investment (X_4), mode of operation (X_5) and integrated (X_7) have the expected relationship (sign) with input consumption. The R-value, which stands at 42.2 percent, is fairly good for cross-section data, and it implies that these independent variables cause 42.2 percent variation in the dependent variable. Other values of the results are also supporting the feasibility and viability of the model. The issue of multicollinearity does not arise as shown by Table 6 (b) where the variance inflation factor (VIF) of all the independent variables is in the permissible range.

Implications

The study has covered all the units covering, both legal and illegal units. But the study cannot segregate on that basis as it is almost impossible. If we had insisted on collecting the information regarding the legality, we might not have gotten the necessary data. As some of the units are established illegally, they are not concerned with the fundamentals of a sawmill unit. That is why there is lots of mismatch between input consumption and installed capacity. The regression model has also already found a clear picture of the underutilization of the installed capacity. The mushrooming of illegal units if not checked in time, has specific long-term implications for the sawmill industrial scenario of the state. The unchecked growth of illegal units has a far-reaching effect on the fundamental structure of the sawmill industries. There are new guidelines for giving permits to new units as led down by the Resolution of 22 September 2016 by the Ministry of Environment, Forest and Climate Change, Survey and Utilization Division, Government of India (Government of India, 2016). The permit holder will only sustain and survive if illegal units are checked. The uncontrolled growth of illegal units has shrunk the markets of permit holders, discouraging them from investing and having a specialized unit. Even though the overall demand is increasing and at the same time units are also increasing, which results in the genuine units' lack of incentive to invest. During the survey, some units that identified themselves as legal units were operating on a low scale in a low investment scenario as, according to them, have less incentive to invest.

CONCLUSION

The study finds that there is a huge gap between the demand and supply of timber as reflected by the high growth of prices. The gap has serious repercussions, and the rate of timber extraction is going at a pace of high-risk environmental consequences. The demand for furniture is going to be here for some time. Many substitutes are being imported for housing and furniture. Despite all these, locally-made furniture is still preferred, and social acceptance is high because of both socio-economic factors. It is high time stakeholder departments must start pondering over the source of timber outside the forest i.e., the tree outside the forest which mainly comprises farm forestry, agroforestry, and private estates. It is easier said than done due to the complex land system in the hill districts. There should be a consensual approach in addressing these complex issues of exploring the hill as a rich source of timber. There are several

legal prohibitions relating to timber extraction from the forest. Despite all these prohibitions, illegal logging is going uninterrupted, where the timber mafia goes in hand with non-state actors. The Forest department plays a key role in maintaining the ecological balance with initiatives like afforestation, artificial plantation, and social forestry. The department, in coordination with other concerned departments, should work in coordination to check and neutralize the illegal growth of sawmill units. Until and unless this is not done, the reckless, unsustainable, and uncontrolled extraction of timber will continue.

Limitation of the study

The study is not far from limitations. The study is purely based on the supply side, and could not incorporate the demand side in the form of income of consumers, the elasticity of demand for timber products, and substitutes due to the non-availability of data at the district level. So the estimation and forecasting of future input consumption are primarily hampered by these factors. However, the findings of the present study will help in issues relating to raw material requirements, control of illegal units, the requirement of timber and timber products in the domestic market, and species of timber.

END NOTES

[1] Manipur a state located in North East India bordering Myanmar on the eastern side, is physio-graphically, divided into hills and valleys with hills accounting for about 90 percent of the total geographical area. The state has 9 districts; out of which 5 are hill districts – Tamenglong, Senapati, Churachandpur, Ukhrul & Chandel, all of which are inhabited by tribal and 4 valley districts namely Imphal East, Imphal West, Thoubal, and Bishenpur, mainly inhabited by non-tribal Meitei community. In addition to these, there are 7 seven new districts that have been carved out from Imphal East, Thoubal, Ukhrul, Churachandpur, Tamenglong, Chandel, and Senapati. These districts are yet to have their full-fledged administrative setup. The present study will be referring to the previous nine districts.

[2] According to the 2011 Population Census, the percentage of the urban population is 30 percent. From the 2001 to 2011 census urban population's annual growth rate stands at 4.48 as compared to 1.77 percent of the rural. Even though the rural population accounts for 70 percent of the total, Manipur being a small state, the effect of urbanization is spreading fast.

[3] The state is home to diverse forest resources including a variety of flora and fauna. As per the Champion & Seth Classification of Forests Types 1968, the forests in Manipur belong to five Forest Type Groups which are further divided into 11 Forest Types. Out of 126 species of bamboos reported in India, 53 species are found in Manipur. Among the trees, Teak, Pine, Oak, Uningthou (*Phoebe* spp.), and Leihao (*Michelia* spp.) are the major species. The recorded forest area of the state is 17418 km^2 which constitutes around 78 percent of the total geographical area of the state. Reserved Forests constitute 8.4 percent, protected forests with 24 percent, and un-classed forests with 67.6 percent of the recorded forest area. In terms of forest canopy density classes, the State has 905.27 sq km under Very Dense Forest (VDF), 6,386.29 sq. km under Moderately Dense Forest (MDF), and 9,555.34 sq km under Open Forest (OF) (Government of India, 2019).

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