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# WOOD PRODUCTION AND CONSUMPTION IN INDIA DURING 2019-20



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## Foreword

Wood is a versatile renewable material with low carbon footprint, obtained from trees within and outside forests. It is best suited for meeting a broad range of human needs, including housing, construction, furnishing and interiors, transport, handicrafts, paper and packaging, agricultural implements and many other industrial uses. The demand for timber and wood products is showing an increasing trend and is likely to continue as the economy grows.

Wood based industries are sourcing the wood raw material largely from the trees raised by the farmers and partly from forests and imported timber. The wood used for manufacturing products for exports and even for domestic consumption should ideally come from the certified forests/ trees outside forests in view of the rising concerns about sustainability and legality of wood.

India is a leading producer and consumer of wood and wood products. At national and state levels several initiatives are being taken to reduce the timber demand-supply gap. Evaluation of actual impact of these initiatives gets limited due to non-availability of reliable data on production and consumption of Industrial Round Wood (IRW) at national and sub-national levels.

Mr. Arun Kumar Bansal, a veteran professional forester, in his well-researched paper “Wood Production and Consumption in India during 2019-20”, has analysed the current status of availability of IRW from domestic sources i.e., forests and non-forest areas as well as through imports. Through extensive stakeholders survey, he has attempted a realistic assessment of the availability of IRW from different sources and its consumption in key wood based economic activities during 2019-20.

I am grateful to Mr. Arun Kumar Bansal for his great efforts in developing this paper and allowing NCCF to publish the paper and hosting it on website. The paper will certainly help in dissemination of knowledge on “wood and wood products production-consumption systems” to the stakeholders with the larger objective of promoting sustained growth of forests/ trees outside forests and the wood-based industries.



A.K. Srivastava  
Director General  
Network for Certification and Conservation of Forests  
5<sup>th</sup> September 2022

## Acknowledgements

The research derives from my association with “wood production and consumption system” in India as a professional forester being in Indian Forest Service with the Government of Odisha, and the Government of India for more than 37 years from 1975 to 2012. As Director IPIRTI, Bangalore from 1997 to 2003 I got an opportunity to look at this system from the point of view of Industry’s point of view. As Additional Director General of Forests, Ministry of Environment and Forests (now MOEF&CC), Government of India from 201-2012 I had a chance to analyse various aspects keeping in mind the perceptions and expectations of the key stakeholders, particularly while heading a committee to look into regulatory regime regarding felling and transit regulations for tree species grown on private lands.

Consequent to my superannuation from Government service, I got fresh opportunity to interact with wood-based industry as FSC-FM lead Auditor, and also in the course of my association with the Network for Certification and Conservation of Forest (NCCF). As the Chairperson, NCCF-PCA-Working Group I am more closely associated with the wood and wood products sector, including exports and imports.

I place on record my thanks to all colleagues at NCCF, and professionals for their inputs and in enhancing my insight into this very complex and important sector of development, that has assumed greater significance due to its role in mitigation the adverse impacts of climate change while meeting the needs of the growing Indian economy. I am specially thankful to Mr Avani Varma, IFS Former PCCF-Hoff Karnataka and Working Chairman NCCF, Dr Devendra Pandey, IFS Former Director General, Forest Survey of India, for going through the draft and making critical comments for its improvement.

I am extremely grateful to Mr Ashish K Srivastava, IFS Director General NCCF for agreeing to write a foreword, and also for agreeing to publish the report as NCCF Policy Paper.



Arun K Bansal, IFS (retd.)  
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## Abbreviations

cum	Cubic meter
CSE	Center for Science and Environment
DGCIS	Directorate General of Commercial Intelligence and Statistics
FAO	Food and Agriculture Organization
FIPPI	Federation of Indian Plywood and Panel Industry
FSI	Forest Survey of India
GOI	Government of India
GS	Growing Stock
HLEG	High Level Expert Group
HS	Harmonized System
	Harmonized Commodity Description and Coding System
ICFRE	Indian Council of Forestry Research and Education
IFS	Indian Forest Service
IRW	Industrial Round Wood
ISFR	India State Forest Report
ITTO	International Tropical Timber Organization
KG	Kilogram
LCA	Life Cycle Analysis
MDF	Medium Dense Forest
Mha	Million hectare
MFP	Minor Forest Produce
MOAFW	Ministry of Agriculture and Farmers Welfare
MOCI	Ministry of Commerce and Industries
MOEFCC	Ministry of Environment Forest and Climate Change
NA	Not Available
NFP	National Forest Policy
NTFP	Non-Timber Forest Product
NWFP	Non-Wood Forest Product
OF	Open Forest
RCF	Recycled Cellulose Fibre
RFA	Recorded Forest Area
RWA	Round Wood Equivalent
SCALE	Steering Committee for Advancing Local Value Add and Exports
SDG	Sustainable Development Goals
ToF	Trees Outside Forests
TVLI	Total Volume of Log Import
UT	Union Territory
VDF	Very Dense Forest

## 1. Introduction

Wood is an important produce of “forest”, a renewable natural resource. Mankind has used wood since time immemorial due to its versatility for housing construction, furniture, agricultural implements, transport vehicle, and above all to meet energy needs of rural and peri-urban households. Most wood produced undergoes industrial processing except fuel wood, and other round wood used as small timber for housing/construction, agricultural implements, in local toy making etc. in areas in the vicinity of forests or in rural/semi urban areas. Wood processing industries fall in three categories (i) Sawn wood industries or Mechanical-wood Industries, (ii) Engineered wood products or Wood-composites/panels, and (iii) Paper & paper products. The wood-based industries, except paper industry, are largely in “unorganized” sector.

Post industrial revolution several other materials including metals and plastics, are being used as wood alternates<sup>1</sup>. However, wood products and wood substitutes<sup>2</sup> are more environment friendly than wood alternates which are made from non-renewable materials, have high embedded energy, and huge carbon footprint, and the subsequent combustion leads to the formation of greenhouse gas products. Wood and wood substitutes are “carbon negative” in terms of cradle-to-grave life cycle analysis (LCA) comprising production, processing, use, recycling, and disposal at the end of service life. Widespread use of wood and wood substitutes enhances demand for production of wood, helps in carbon sequestration, addressing climate change, and meeting sustainable development goals (SDGs). Wood and wood substitutes are increasingly being preferred by the environmentally conscious and responsible consumers.

National Forest Policy (NFP), 1988, brought a policy-shift towards managing forest primarily for eco system services. NFP envisages the forest-based industries to raise the required wood raw material preferably by establishment of direct relationship between the factory and the individuals, and to encourage farmers to grow tree species required by industries. This policy shift resulted in enhanced focus on trees outside forests (ToF), particularly agroforestry, to accelerate production of wood. Gap between demand and supply is bridged through imports.

Long term wood demand and supply situation has been analysed, including making projections for the year 2020, under a “Study on Forest Industry” by Chemprojects Design and Engg. Pvt. Ltd. for the Ministry of Environment and Forests (now Ministry of Environment, Forest, and Climate Change, MOEFCC) way back in 1998 (GoI, 1999). According to this demand for wood (Round Wood Equivalent RWE) in 2020 was

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<sup>1</sup> Wood alternates are materials used for the same purposes as wood made from non-wood materials not obtained from the biosphere and not biodegradable. They are mostly synthetic, derived from abiotic sources or are by-products of the remains of biotic forms. These include cement, metal, plastics which were being used instead of wood due to a shortage in supply of the same.

<sup>2</sup> Wood substitutes are building products made from materials that are not graded as lumber including wood from fast growing plantation trees, bamboo, wood residues, and residues of agriculture crops e.g., rice, wheat, hemp. These include engineered wood products or wood composites.

projected to be 153 million cum (comprising pulp wood based industry – 45.86 m cum, Panel based industry – 38.13 m cum, durable wood based industry - 69.01 m cum; and having average annual increase of 8.5%, slightly more than expected growth of GDP). Against this, domestic supply was expected to be 60 million cum under work as usual scenario, and 110 million cum if the approach of accelerated harvest from natural forests coupled with technology based plantations on degraded forest and non-forest lands is adopted. Studying the alternates for meeting the demand of raw material by wood based industries, Parvez (2005)<sup>3</sup> depended largely upon secondary data with some primary data collected from WBI in Yamunanagar, Haryana projected the wood demand in RWE in 2020 to be 87.7 M cum of short rotation species and 65.1 M cum of long rotation species. Sector wise demand was estimated to be 30% - paper, 20% for plywood and panels, and rest 50% as solid wood (construction 32%, Furniture 5%, Misc. 13%). Various options and alternates to meet the demand of raw material by WBIs have also been described.

In India wood is generally understood as either fuel wood (use as fuel for cooking in households, local restaurants in rural/semi urban areas, etc.) or timber used in construction, builders' joinery, furniture, or manufacturing wood based panels, paper etc.

In FAO's Statistics on Forest Products all wood obtained from felling or otherwise harvested from trees called round wood and comprises of wood fuel; saw logs and veneer logs; pulpwood, round and split; and other industrial round wood. In the trade statistics, round wood represents the sum of industrial round wood and wood fuel in cubic meter under bark. Other Industrial round wood is industrial round wood other than saw logs, veneer logs and/or pulpwood and includes round wood used for poles, piling, posts, fencing, pitprops etc. Wood fuel is the part of round wood that will be used as fuel for purposes such as cooking, heating or power production. It includes wood harvested from main stems, branches and other parts of trees (where these are harvested for fuel), round or split, and wood that will be used for the production of charcoal (e.g., in pit kilns and portable ovens), wood pellets and other agglomerates.

In India wood extracted from forest or felling of trees is recognized in two categories fuelwood and timber. Lower diameter limit of the round wood for industrial processing depends upon uses. Generally, for pulping logs of diameter more than 5 cm and up to 30 cm are used. With the development and use of spindle less lathes for veneering lower diameter limit of logs are around 10 cm. For sawing purposes log diameter limit depends upon the species and end use. In the case of species like teak even 5 cm diameter round wood can be sawn to get 2.5 cm sawn sizes beads in wooden furniture and joinery.

India is a leading producer and consumer of wood and wood products. Demand for various wood products continue to have an increasing trend due to growing population, urbanization and rapid economic growth. To meet the growing demand the wood based industries are also attempting to adopt improved processing technologies and upgrade infrastructure *albeit* at a slow pace since the WBIs continue to be largely unorganised

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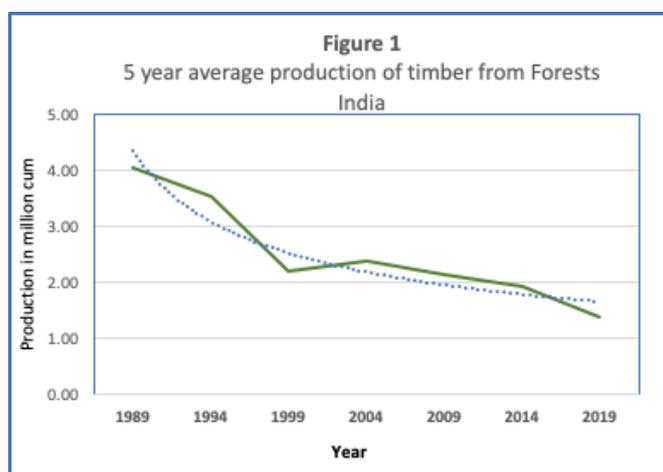
<sup>3</sup> The study was conducted by the Author while working as Deputy Inspector General of Forests, Forest Policy Division, Ministry of Environment and Forest.

except paper sector. At national and state levels several initiatives are being taken to reduce the timber demand-supply gap. Evaluation of actual impact of these initiatives gets limited due to non-availability of reliable data on production and consumption of Industrial Round Wood (IRW) at national and sub-national levels. This paper analyses the current status of availability of IRW from domestic sources i.e. forests and non-forest areas as well as through imports and consumption in key economic activities and attempts realistic assessment of availability of IRW from different sources and its consumption during 2019-20.

## 2. Timber production from Forests

Till the 1980s forests continued to be the main source of timber and management of forests continued to be timber centric. However, the 1988 National Forest Policy became a game changer. Due to better understanding about the role of forests in ensuring environmental stability and maintenance of ecological balance including atmospheric equilibrium that are vital for sustenance of all life on the Earth, since the nineteen eighties there has been a policy shift towards conservation of forests and their management for maintaining ecological balance and eco system services and meeting livelihood needs of the local communities<sup>4</sup>. Consequently, the production of timber from forests got reduced to around 4 million cum in 1990s from about 10 million cum in 1970s. Moreover, the Apex Court's 1996 order suspended the felling of trees in all forests except in accordance with the Working Plans of the States approved by the central government. This resulted in further reduction in production of timber from forests. FSI conducted a study during Sept 2018 to June 2019 to assess the dependence of people living in the proximity of forests on forest produce using a two-stage sampling – forest fringe villages as the first stage sampling unit and households in

sample village as second stage sampling unit. Through this study it was estimated that people living in Forest Fringe Villages remove annually 5.85 million cum of small timber from recorded forest in addition to fuelwood, fodder, bamboo etc. (IFSR, 2019). In addition, there are unauthorised/illegal removals part of which are seized by the enforcement authorities and subsequently sold. The trend (dotted) line in Figure 1 - graph depicting



reported quantities of timber produced from forest excluding removal of small timber by the local communities – suggests that under business-as-usual situation, annual production of forest timber is flattening around 1.75 million cum, excluding removal of small timber by communities in the forest fringe areas and illegal/unauthorised harvests.

It is important to note that there is no central agency in the country that maintains data on production of timber and other produces from forests except “Forestry Statistics” published by ICFRE which is a periodic compilation of figures of production of timber and other products from forests as furnished by States/UT with many NAs (report not available), latest being “Forestry Statistics, 2021 (ICFRE, 2022). Additionally, ICFRE has also brought out two Forest Sector Reports (ICFRE, 2011, ICFRE 2019 which include data related to production of timber production and imports of wood and wood products. Also

<sup>4</sup> India has adopted the principles of Doctrine of Public Trust and kept the forest resource being gift of nature under the trusteeship of Government, so that they should be made freely available to everyone and the policy makers right from 1894 to 1988 have no intension to convert forest ownership into private ownership (Upadhyay, 2011).

there is no estimation of unauthorised removals of timber which seriously impacts the forest structure.

The Growing Stock (GS) in forests is being estimated by FSI since 2003 (Table 1). The variations in GS estimates in different cycles are within the range of Standard Errors. It indicates that conservation-oriented management have not resulted in significant improvement in the GS over the years. This may be partly due to diversion of forest areas to non-forestry purposes<sup>5</sup>, and the severe biotic pressure as the people living in the vicinity continue to depend on forests for fuel wood, grazing, almost unregulated removal of NWFPs etc. Continuance of shifting cultivation in several states may be another contributory factor. Despite these, the estimates of forest GS do raise a concern about the efficacy of the

Sl. No	Reference	Growing Stock Million cum
1	ISFR 2003	4781.34
2	ISFR 2005	4602.04
3	ISFR 2009	4498.66
4	ISFR 2011	4498.73
5	ISFR 2013	4173.36
6	ISFR 2015	4195.05
7	ISFR 2017	4218.38
8	ISFR 2019	4273.47
9	ISFR 2021	4338.15

ISFR – India State of Forests Report brought out biennially by Forest Survey of India, Dehradun

current forest management system which is largely based on the principles of maximum sustained yield of forest products (mostly timber) and the forestry personnel at all levels are trained accordingly. Despite the ecological, cultural and economic importance of numerous services, ecosystems and the biodiversity that underpins them forests are still getting degraded, due to insufficient resources for their management. One of the reasons for inadequate investment in forests sector is the incomplete estimation of their contribution in national resource accounting which includes only tangible benefits, and the ecosystem services are totally ignored. It is a matter of serious concern that although the forest resources are increasing being managed for ecosystem services there has been no serious attempt either to quantify the ecosystem services or their monetary valuation at national level. In the National Accounts Statistics the contribution of Forests is grossly underestimated as it comprises of Industrial Wood from Forests, Firewood, and Non-Timber Forest Products (MFPs and Fodder from Forests) only. (Annexure 1 – A note on Eco System Services and National Resource Accounting).

The preparation of Working Plans in conformance with the National Working Plan Code 2014 and their implementation require all-inclusive (involving all stakeholders) review and corrective actions to ensure sustainability of forest resources. (Annexure 2 – a short note recent recommendation of the committee appointed by the Apex Court in 2018 to supervise green felling in Himachal Pradesh). It would be worthwhile to adopt available internationally recognised and independent Sustainability Forest Certification Schemes, which is also envisaged in the Draft National Forest Policy, 2018/2021, to assess their sustainability and take appropriate measures to achieve it.

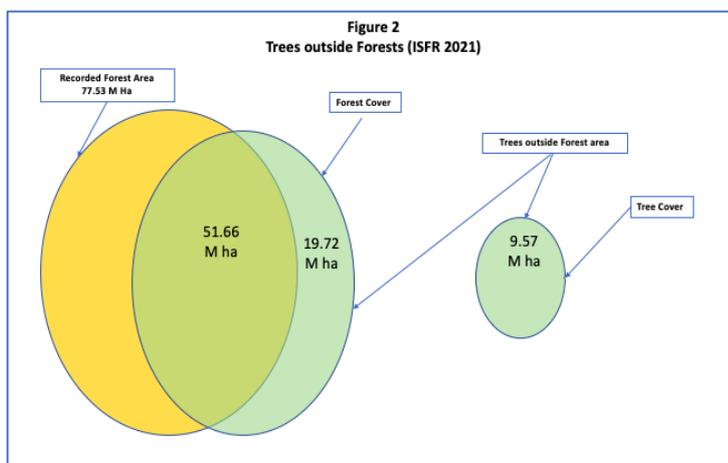
Another important aspect that requires urgent attention emanates from the fact that sizable lands inside the RFAs are devoid of forest cover. As per ISFR 2021, out of the 77.53 M ha RFA "forest cover" of varying crown densities (VDF, MDF, and OF) exists only over 51.63 M ha and roughly one third of the RFA is devoid of "forest cover". Although, this

<sup>5</sup> At present average diversion of forest areas for non-forestry purposes with prior approval of the central Government is app. 25000 ha per annum.

may include rocky/river beds, areas above tree line, Grass lands and other forest eco systems that do not get included in the FSI's definition of Forest cover or isolated trees (since assessment of tree-cover under FSI's National Forest Inventory extends to the lands outside of RFAs), there is a need to undertake a rapid assessment of extent of RFA that is presently devoid of "forest" cover but may be suitable for interventions aiming at their ecological restoration to be able to tap their potential in national development.

### 3. Timber Production from Non-Forest Tree Resources:

ToF resources, assessed by FSI, comprise of two types of areas (a) viz. forest patches outside the recorded forest areas on areas equal to or more than one ha., and (b) tree cover - patches of tree as well as isolated trees outside RFAs on areas less than one ha. Agroforestry - cultivation of tree of species of local value on boundaries of cultivated lands, and also along with agricultural crops, has been a traditional practice in India.



With gradually declining production of timber from forests, there has been an increasing attention on agroforestry, farm forestry, and growing trees in other non-forest areas for production of IRW as an economic activity. This has now become the major source of wood required by the wood-based industries.

Growing trees in non-forest areas is being promoted by the national and state Governments through various initiatives, including exempting tree species largely grown by farmers from regulatory regime and financial incentives. A committee constituted by MOEF in 2011 to study the regulatory regime regarding felling and transit regulations for tree species grown on private land in its report of November 2012 recommended for (i) exemption of Tree and bamboo species preferred by farmers and not naturally available in neighbouring forests from the transit permit and felling regulations, (ii) limited provisions for felling and transit (in respect of species in areas where they are found in the natural forests and authorizing the local Gram Sabha to regulate felling and transit), (iii) simplifying the procedure for granting permission for felling and transit, through a transparent and time bound process, of restricted species which are grown by farmers and others on their land, (iv) facilitating interstate movement of timber derived from agroforestry plantations for benefitting tree growers to get best market prices, (v) to work out a transparent and simple methodology through use of information technology for maintenance of records of tree plantation on private lands for maintaining a dynamic resource inventory and also eventually de-centralizing issuing of transit permits and cutting permissions to village level. (MOEFCC, 2012). Subsequently, after examination of the above report, and comments received, and consultation with the stakeholders MOEFCC issued guidelines to all States/UTs for simplification of Felling and Transit Regulations for tree species grown on non-forest/Private land in November 2014.<sup>6</sup>

India's National Agroforestry Policy (NAfP), 2014, first ever such policy enunciated in the world, provides for inclusion of the relevant recommendations of the above committee in the implementation guidelines for the NAfP. A Sub Mission on Agroforestry under the National Mission on Sustainable Agriculture was implemented in large part of the country from 2015-16 to 2021-22 by the Ministry of Agriculture and Farmers' Welfare, the nodal Ministry of the GOI on Agroforestry. It is seen that the fast-growing tree species generally

<sup>6</sup> Vide MOEFCC F. No. 8-14/2004-FP (Vol. 2) dated 18<sup>th</sup> November 2014.

preferred by farmers and tree growers including Poplar, Eucalyptus, Casuarina, Bamboos<sup>7</sup> are free from any transit regulations across the country, along with several other tree species in different states. Annexure 3 is a state-wise list of trees species free from felling and transit regulations growing on non-forest area/private lands. Gradually, the procedure for obtaining transit permits for non-exempted tree species are also being simplified in most states. However, more initiatives are necessary to promote cultivation of medium/long rotation tree species in private lands.

It is surprising that although bulk of IRW is produced from non-forest areas and their contribution in the overall prosperity of the nation including agro-ecology, environmental amelioration, socio-economic and cultural functions, there is no national or state level mechanism for accounting of wood produced under agroforestry, farm forestry, other ToF areas except the biennial estimation of ToF growing stock by FSI based on national forest inventory data (Table 2). The FSI also estimated the availability of industrial wood from ToF, for the first time in IFSR 2011, to be 42.774 million cum. The computation was made from estimates of GS of timber yielding species, and taking the average rotation period as 10, 15 and 60 years in respect of short medium and long rotation species through consultations with SFD officials (ISFR, 2011 Chapter 7, pp.72-73). In the same report the annual consumption of industrial wood in three sectors namely, construction, furniture, and agricultural implements, was estimated to be 48 million cum - 33.6 million cum plus 30% conversion loss (ISFR 2011, Chapter 7, PP. 77). FSI undertook similar exercise while preparing IFSR 2017 using the same methodology *albeit* with more precise information on rotation periods of various timber tree species wherein the annual production potential was reported to be 74.51 million cum. The estimated timber availability during 2011 was also revised to 69.04 m cum based on rotation period of different tree species. Present potential timber yield from ToF is estimated to be 85.16 million cum from a growing stock of 1642.29 million cum (ISFR 2019 & FSI Technical Information Series Vol 2. No. 1, 2020). Top contributor to annual IRW availability is *Mangifera indica*), followed by Eucalyptus and Poplar and includes several known timber species viz. *Tectona grandis*, *Dalbergia sissoo*, *Azadirachta indica*, *Gmalina arboria*, *Hevea brasiliensis*.

Sl. No	Reference	TOF GS Million cum	Production Potential (timber/industrial wood) Million cum
1	ISFR 2003	1632.338	
2	ISFR 2005	1616.240	
3	ISFR 2009	1599.570	
4	ISFR 2011	1548.427 (SE 2.64%)	69.04
5	ISFR 2013	1484.684	
6	ISFR 2015	1573.340	
7	ISFR 2017	1603.997	74.51
8	ISFR 2019	1642.29 (SE 6.65%)	85.16
9	ISFR 2021	1799.35	

Whereas these estimates are good national indicators they are not adequate for state/regional level planning purposes and does not give information needed by WBIs. In

<sup>7</sup> In 2017, the Government of India amended section 2 clause (7) of the Indian Forest Act,1927 by omitting bamboo from the definition of tree.

recent past some states (Uttar Pradesh and Maharashtra) have sponsored studies for assessing wood availability as required under the Wood-Based Industries (Establishment and Regulation) Guidelines, 2016. However, the findings of these studies are facing legal wrangles<sup>8</sup>. It is therefore necessary that MOEFCC prescribes a methodology for estimating/projecting wood availability from forests as well as from agroforestry and other TOF areas.

In a policy analysis for realizing the potential of timber production from ToF in India (Ghosh and Sinha 2018) concluded that apart from provision of timber, TOF holds an immense potential to combat climate change, particularly in meeting India's commitments as specified under Intended Nationally Determined Contributions (INDC) and Green India Mission. Also, a uniform policy at state and central levels for management of TOF could be helpful.

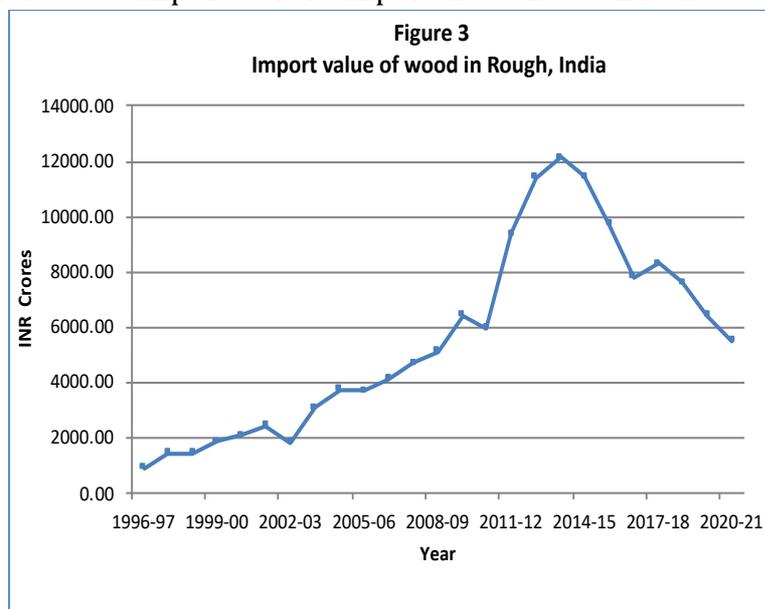
For ToF to become a sustainable national resource their proper and reliable assessment is very crucial for which a separate programme of detailed resource inventory, once in five years, is needed to provide species and girth class-wise number of standing trees at national/state/district level. This will not only facilitate development of required strategic policy decisions for realizing the full potential of this resource but will also facilitate pre-assessment of the availability of IRW in different regions/states in any particular future year and provide critical input for augmentation of plantations of tree species required by the WBIs and establishment of clusters of wood processing facilities/WBIs. It is also advisable to explore establishing a transparent and simple methodology through use of information technology for maintenance of spatial record of trees growing on all private lands, may be through a system of digital tree passbooks, for maintaining a dynamic resource inventory and replace present transit permit with online issuance of Certificate of Origin. This will require effective coordination among various central ministries viz. MOEFCC, MOAFW, MOCI.

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<sup>8</sup> In the case of Maharashtra the study on "assessment of timber availability from all sources" conducted by the Institute of Wood Science and Technology, Bangalore (an institute of ICFRE, and autonomous organization under MOEFCC, GoI) during 2020 was set aside by the Integrated Regional Office of MOEFCC, Bangalore with a direction to switch over to GS based assessment keeping in view the harvestable/non-harvestable/desirable GDS relate to the WBIs preferably by adopting a customized design and methodology. In the matter related to grant licences to 1350 new WBIs by UP of 2019 appeal of the State Government against the orders dated 20.2.2020 of NGT is pending in the apex court.

#### 4. Imports of wood logs, sawn timber, and other wood products

Bansal (2004) presented a detailed analysis of import of IRW and other wood products during the period 1991-92 to 2001-02 and underlined “the increasing trend for import with current annual growth rate of 21% which is likely to further increase on the face of increasing demand and static domestic supply, and the current favourable environment for wood imports”. It is important to note that the Government of India took a major



policy initiative in 1996 and permitted import of wood products under open general license without quantitative restrictions with a view to ease out the timber shortage as also to reduce pressure on natural forests. Since the industry was in its nascent stage immediately after the change in the structure following the closure of plywood manufacturing factories in the northeast after 1996 order of the Supreme Court’s Order in Writ Petition (Civil) No.

202/1995, escalatory tariffs were adopted to facilitate import of wood logs while keeping import of processed wood and products low to provide protection to the domestic wood processing industry. Analysis of import of wood and wood products during last 25 years from the data accessed from the website maintained by the DGCIS<sup>9</sup>, Ministry Commerce & Industries, reveals that wood in rough forms the bulk of the value of imports although it has started declining after peaking in 2013 (Figure 3).

It has been reported that India is the third largest importer of the illegally logged timber<sup>10</sup> in the world, and accounts for close to 10% of the global illegal wood trade (IUFRO, 2016). It is important to note that despite strong commitment towards sustainability and practicing sustainable forest management practices for over a century India has not put in place any system of verification of sustainability/legality of timber at the time of its import into the country. Most of the developed countries have specific requirements related to legality verification for import of timber and wood products viz. European Union Timber Regulation (European countries), Lacey Act (USA), Australia’s Illegal logging Prohibition Act.

<sup>9</sup> DGCIS (Directorate General of Commercial Intelligence and Statistics) Ministry of Commerce and Industries, Government of India maintains a detail data base of monthly and annual imports of exports of all products based on 2, 4, 6, & 8 digit HS codes of International Trade. Quantities are maintained for at 6 & 8 digit HS codes.

<sup>10</sup> Timber harvested in violation of the laws and regulations in the source country.

The pie chart (Figure 4) depicts proportion of average value of various wood and wooden products imported per annum during last five years from 2016-17 to 2020-21. It evident that wood logs constitute almost half of the pie with sawn wood constituting another one fifth of the pie. Major species of imported wood logs during 2019-20 were Pine (40% of total volume of log imports (TVLI) primarily from New Zealand, Uruguay), Teak (25% of TVLI largely from Ghana, Costa Rica, Brazil, Ecuador, Nigeria), Meranti (6% of TVLI form Malaysia). Surprisingly around 27%of TVLI is in “others” category. Bulk of the sawn timber (65%) is from coniferous species viz. Pine, Fir, from New Zealand, Germany, Finland, Canada, Sweden, USA etc. In addition, annually around 1.5 million tons wood pulp was also imported.

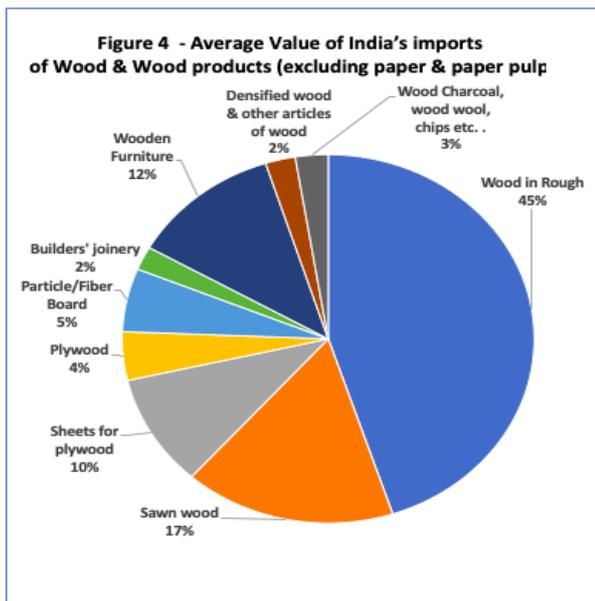


Figure 5 shows the quantities of two most important components of imported wood and wooden products, namely Wood in Rough (HS Code 4403) and Sawn Wood (HS code 4407). It may be noted that in recent years although the import of wood in rough is slowly declining but sawn wood import is having an increasing trend. The decline in the import of wood in rough is partially resulting from log export restrictions by several countries, like Myanmar, Malaysia, other tropical countries, and encouraging more processing activities in their own countries. Reasons for increasing imports of sawn timber include poor/inadequate quality of processing by domestic sawmills, the requirement certified timber for re-export after value addition.

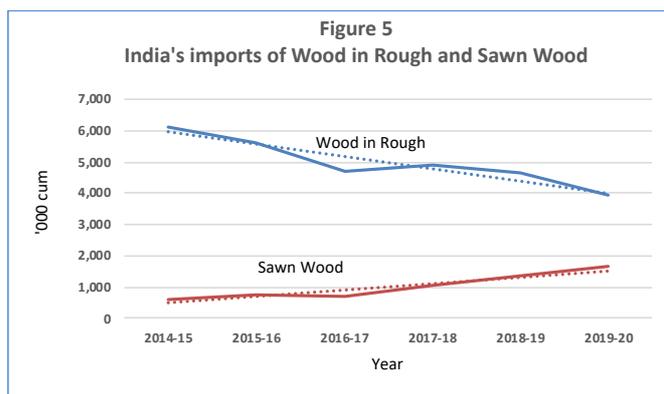
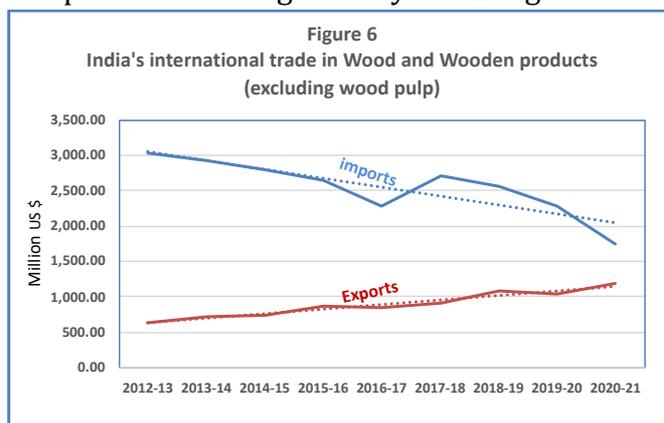


Figure 6 depicts India's international trade in wood and wooden products (excluding wood pulp) since 2012-13. It reveals that import values are gradually declining whereas value of exports is having an increasing trend. It is also important to note that although India is net importer of all wood and wood products in terms of quantity, it is net exporter of wooden furniture in terms of value. This is due largely to a niche market in developed countries for Indian wooden furniture and other wooden articles, made largely from tropical hardwoods, which constitute



around 75% of total value of exports wood and wooden products from India, and there is huge scope for further enhancing this. The furniture sector has rightly been identified as a focus sub-sector under SCALE (Steering Committee for Advancing Local Value Add and Exports). A furniture parks are also planned to be established at Kandla, Deendayal Port, Gujrat (Mehta, 2020) and one near Tuticorin, Tamil Nadu (V.O. Chidmbaranar Port)) – two important ports for import/export of wood and wood products.

Plywood and Fibre board exports are also having an increasing trend although current export volumes are low but large production base existing in the country provides an opportunity for enhancing exports. Similarly, in last couple of years India has been a net exporter of paper and paper board with exported quantity (2.85 million tons) being substantially higher than the imported quantity (1.45 million tons) during 2021-22.<sup>11</sup>

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<sup>11</sup> Personal communication with Secretary-General IPMA.

## 5. Production of IRW

There is no authentic and holistic collection/compilation of data related to production or consumption of IRW in the country. There have been several estimates of annual production of Industrial Round Wood (IRW) in recent years, latest being the report titled “India Timber Supply and Demand 2010–2030” (Kant and Nautiyal, 2021). Prior to that there is the July 2020 report “Growing India’s Agriculture exports through crop-specific, State led plans” of the High-Level Expert Group constituted by the XV Finance Commission which mentions estimated production and consumption during 2017 (Anon., 2020). Centre for Science and Environment had also published such estimates in a report titled “Wood is Good” published in 2017 (Shrivastava and Saxena, 2017). Table 3 gives estimated production during 2017 in the above reports and indicates wide variations due mainly to the secondary data sources relied upon and the assumptions made in course of analyses.

Sl. No.	CSE 2017 #	HLEG report Anon., 2020	ITTO Kant & Nautiyal, 2021
Reference year	2017	2017	2017
	In million cum		
Forests	3.175	3	2.16 @
ToF	44.34	47	44.19
Imports	18.01	15	8.59 &
# The report also mentions additional 5.38 million cum of bamboo @ Based on three year moving average & Import of round wood, RWE of imports of sawn wood, veneers, and pulp.			

Harmonization of production/availability of IRW from various resources i.e., Forests, ToF, and Imports, and its consumption during 2019-20 is attempted through the following approach:

1. Production of form forests comprise of harvested timber and small timber removed by local people under customary/traditional rights & privileges. Timber production figure has been derived from the ICFRE’s Forestry Statistics India 2021 (ICFRE, 2022). In respect of some of States for which reports was NA in the above publication production figures were obtained from respective states. For example, in respect of Odisha timber production during 2019-20 were taken from the website of OFDC which is the agency responsible for working of annual coupes in the entire state, and in other cases average production of previous 2 reporting years was taken. However, these production figures do not include the unauthorizedly felled/collected timbers part of which might have been seized by the concerned authorities.

The small timber production was taken equal to the removal by the local communities estimated by FSI during Sept 2018-June 2019 (ISFR, 2019)

2. Imported and Exported quantities of wood, wooden products, (Chapter 44 HS codes 4401 to 4421; Wooden Furniture HS Code 9403); Wood Pulp (Chapter 47) in CBM/CUM or KG were converted into round wood equivalent (RWE) in cum.

Import/export quantities of some items e.g. wooden furniture and wooden dolls are mentioned in “number” and as such conversion in RWE is not possible and was therefore not attempted. However, it is not likely to significantly affect the overall situation.

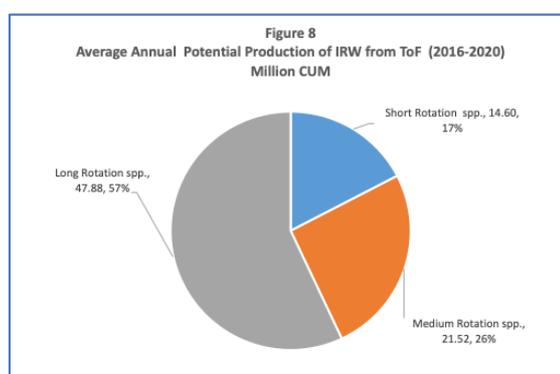
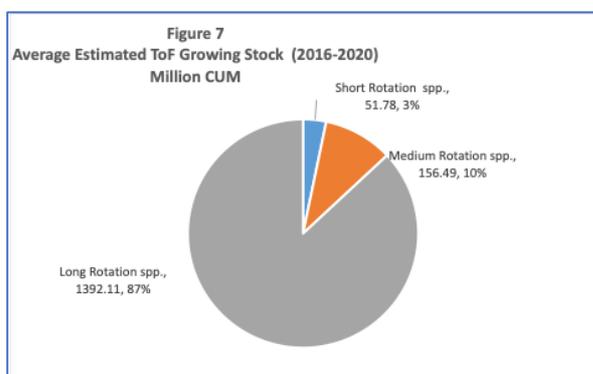
The following conversion factors have been worked out based on extensive personal interactions with industry representatives & experts.

Sl. No.	Product	Reporting Unit	Multiplication factor for RWE	Unit of RWE
1.	Plywood	1000 KG	2.57	Cum
		Cum	1.80	Cum
2.	Particle board	1000 KG	2.14	Cum
		Cum	1.50	Cum
3.	Fibre Board	1000 KG	2.29	Cum
		Cum	1.60	Cum
4.	Sawn Wood	CBM/CUM	1.35	Cum
5.	Other items – builder joinery, table/kitchen etc.	1000 KG	1.90	Cum
6.	Wood pulp (import)	1000 KG	4.2	Cum

3. Analysis of supply, demand and end uses of timber in India by Kant and Nautiyal (2021) suggests production of IRW from ToF to be around 2.8% of the ToF Growing Stock. FSI has adopted a new inventory design in 2016 under which NFI is carried out in 5 km x 5 km systematically selected grids uniformly distributed across the county with 10-year revisit time for ToF areas. Consequently, variation in estimates in GS of different timber yielding species is expected resulting from differential preferences by the tree growers across the country guided by the suitability of spp. in different ago-climatic regions and local/regional demand/supply situation. Therefore, average ToF growing stock for IRW production was computed as the sum of average GS of various timber yielding species estimated by FSI reported in ISFRs 2017, 2019, and 2021 and it came to 1600.34 million cum. Average GS of these species was used to compute potential annual production of IRW based on rotation period of the respective species decided by FSI in consultation with the States/UTs. The potential annual production during the period 2016-2020 comes to 84 million cum. Availability of IRW in 2019-20 was taken to be middle value of “potential annual production” and production computed @2.8% of “average ToF growing stock”.

Forest timber	Small Timber from forests	Import wood & wood products	Import paper pulps	TOF	Total
1.56	5.85	7.81	6.93	64.40	86.54

A quick study of ISFRs about growing stock of timber yielding species estimated by FSI reveals that the long rotation tree species (rotation more than 20 years – including species like *Mangifera indica*, *Azadirach indica*, *Tectona grandis*, *Madhuca latifolia*, *Hevea brasiliensis*, *Dalbergia sissoo*) form the bulk of the growing stock (87%) followed by medium rotation species (rotation 11-20 years including species like *Grewelia robusta*, *Acacia arabica*, *Acacia auriculiformis*) contributing around 10% of the total ToF growing stock. The short rotation/fast growing tree species (rotation up to 10 years - including species like Poplar, Eucalyptus) preferred by tree grower under agroforestry contribute a mere 3% (Figure 7). However, the contribution to average annual potential production of IRW is 57%, 26% and 17% respectively of long, medium, and short rotation tree species (Figure 8).



## 6. Consumption of IRW

IRW is used in housing construction, furniture, transport vehicles, paper and paper products, packaging, agricultural implements, handicrafts and toys, pencils, match sticks etc. Most industrial wood produced undergoes industrial processing for making consumer goods, except when used as small timber for housing and construction, agricultural implements, in local toy making etc. in areas in the vicinity of forests or in rural/semi urban areas. Wood based industries can be broadly divided in three categories (i) Sawn wood industries or Mechanical-wood Industries, (ii) Engineered wood products or Wood-composites/ panels, and (iii) Paper & paper products. Key aspects and challenges related to the WBIs in India are discussed in detail in NCCF Policy Paper No. 1/2021 (Bansal, 2021).

There is no authentic systematic/comprehensive national/state level reporting of wood consumption in various sectors in the country. Latest study of non-fuel round wood used by people living in the vicinity of forest was conducted by FSI in 2018-19 wherein annual consumption of small timber was estimated to be 5.85 million cum. Prior to that FSI has estimated the consumption of RWE in housing and construction, furniture and fixtures, and agricultural implements to be 48 million cum (IFSR,2011). Total IRW processed by sawmills and plywood and veneer industries was estimated to be 42.8 million cum.

Actual demand of raw wood in 2010 as per ‘Indiastat’<sup>12</sup> was 94.89 million cum (22.1 m cum for construction industry, 17.96 m cum for plywood,15.4 m cum paper and paper boards, 6.92 m cum packaging, Furniture 4.62 m cum, 2,5 m cum agricultural implements, and others 25.92 m cum) – India Stats (2015) referred in Ghosh and Sinha (2016).

As per the status report “Wood is Good” by the Centre for Science and Environment, in India sectoral annual consumption of IRW was: 48 million cum in construction, furniture and agricultural implements; 8.47 million cum in plywood and panels; 12.52 million cum in paper, paper boards and newsprint.

A more recent analysis is done by Kant and Nautiyal (2021) for ITTO. According to this estimated demand for IRW in 2019 in million cum is mentioned to be 12.50, 8.01, 11.24, 26.25 respectively for pulp & paper, furniture, panels and plywood, and construction. The report also mentions that “sawmilling and planning industry is the smallest sector, it is the largest consumer of timber, mostly in the form of round wood... The estimated annual consumption of wood by sawmills is about 29 million cum with about 62% of production used by the construction sector (mainly housing), 8% sleepers, 6% packing, 7% furniture, 7% vehicle industry, 4% ship building, 2% mining and the rest used in other miscellaneous uses such as stationery (mainly the pencil industry), sports goods, toys, handicrafts and agricultural implements ... during 2005-2008”

In this paper, IRW requirement of various industrial products has been worked out from the reported/estimated production i.e., wood based paper, plywood and other wood based panel composites. Paper production using pulpwood as the raw material during

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<sup>12</sup> Indiastat is a private initiative of Datanet India Private Limited launched in 2000 to render services in socio-economic information domain.

the year 2019-20 was reported to be 3.91 million tons or 21% of the total production<sup>13</sup> during the year (CPPRI, 2021). With more and more paper mills using Recycled Cellulose Fibre (RCF) share of wood-based paper production has declined from 83% to 21% in last 15 years. IRW requirement for paper calculation: One kg paper requires 2.5 kg wood (average density 0.7).

Production of Plywood, Particle/Fiber boards are taken from a paper by the President FIPPI (Bhajanka, 2020), Pandey and Roy, 2020) which are same as have been reported in the FAO's Forest Products Yearbook, 2019.

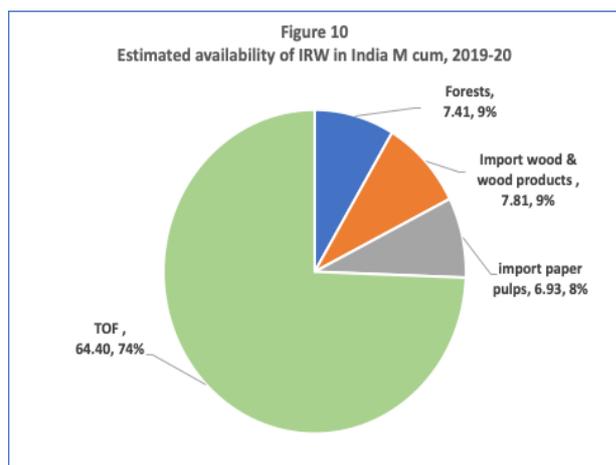
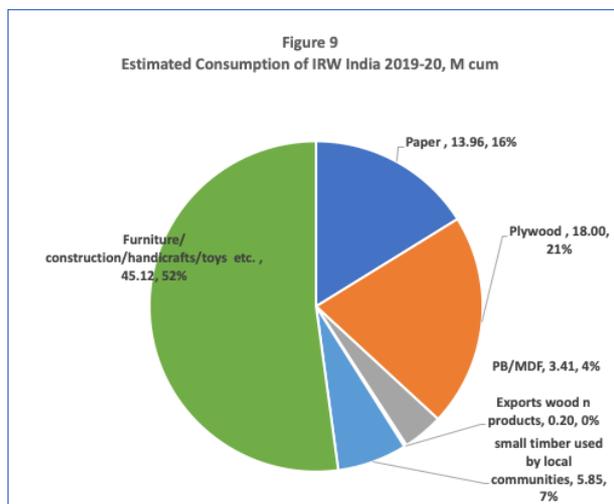
Sawmill, furniture units, and builder's joinery and others are largely in unorganised sector dispersed across the length and breadth of the country. The sawn timber is used mainly in housing/construction sector and by furniture units. In the absence of authentic national statistics, consumption of IRW in various endues sectors has been computed as balance of IRW available after subtracting the IRW used by the WBI industrial sectors viz. paper, plywood, particle board and Fibre board; and exports of wood and wooden products, and this figure is slightly higher than the demand of round wood for housing/construction and furniture sectors for the year 2019-20 projected by Ghosh and Sinha, (2106) [36 million cum based on actual demand on 20.52 million cum during 2010], and by Kant and Nautiyal (2021) [34.26 million cum].

Table 6					
Estimated consumption of IRW during 2019-20 (million cum)					
Paper	Plywood	PB/MD F	Exports wood n products	Small timber used by local communities	Furniture/ Construction/ Handicraft s/ Toys etc.
13.96	18.00	3.41	0.20	5.85	45.12

<sup>13</sup> Total production during 2019-20 was reported to be 21.36 million tons. In addition to pulp wood as raw material, paper produced from RCF was 16.29 million tons, and agro-residues based production was 1.16 million tons in the same year.

## 7. Conclusions

From the analyses of data extracted from secondary sources, it is found that in India around 52% consumption of IRW is in the solid wood form for housing, construction, furniture, handicraft and toys etc. across the country and saw mills play an important role in primary processing of round wood for use in these sectors. Industrial processing of round wood takes place in two sectors namely paper & paper products, and plywood and other wood based panel composites. Bulk of the IRW is processed in saw mills in unorganised sector, plywood and composite industries that are largely MSMEs with only a few large industries.



The demand of IRW is currently being met primarily from ToF resources, contributing about 74% of total production. Contribution of forests towards is only about 9% of the total availability of IRW. Imports, including wooden logs, sawn timber, other wooden products, and wood pulp, though have a declining trend, presently accounting for about 17% of total available IRW, are still quite high. There is an urgent need for evolving a long term strategy to minimise the imports. For this among other steps, a

total supply chain mapping of imported wood logs and sawn wood is absolutely essential so as to get information about the sectors currently depending upon imported wood and to explore substitution by Indian timber spp. with concomitant development of appropriate processing technologies and infrastructure.

The analyses also reveals unambiguously that except for the import/export data maintained by the DGCIS, there is no system of collecting data related to either production or consumption of IRW in the country and collating it at national level. Considering the inherent potential of wood and wood based production/consumption system in addressing climate change impact in a very cost effective manner while also helping the nation in achieving SDG goals, a comprehensive system collection, collation, and publication of authentic data of production of IRW needed by various categories of wood processing industries from the forests as well as the ToF resources, including agroforestry, is urgently required. This will ensure availability of crucial input-data for taking policy decisions by the concerned National Ministries as well as the concerned State departments related to (i) management of forests and evaluating the efficacy of the management system, (ii) targeted growth of agroforestry and ToF resources, (iii) development of wood-based industries, (iv) promotion of environment friendly wood

and wood products, and (v) optimising imports. For this a dedicated cell ought to be created in the MOEFCC.

Although forest areas, spread over 23.58% of total geographical area of the country (ISFR, 2021), are increasingly being managed for ecological security, environmental protection and ecosystem services their contribution in GDP does not take into account monetary value of these services. Therefore, it is a national imperative to evolve a system for valuation of these services which is the management-focus of the forests. There is also a need to review the existing forest management system based on the principles of sustained yield, primarily of timber, to factor in the primacy of ecosystem and ecological services. In the interim, any harvest of timber, that causes large changes in the structural composition of the particular forest patch should be permitted only after ensuring availability of financial and other resources for obtaining successful regeneration. The available globally recognised third party forest certification schemes – including India Specific NCCF FM Standard, may be utilised for sustainability certification.

ToF, including agroforestry and trees planted in other non-forest areas, are the primary resource which is producing the IRW required by WBIs for meeting the demand of products for different end uses. However, for this important resource also there is no comprehensive data gathering system – indispensable for policy decisions and developmental planning. It is therefore absolutely essential that a separate programme of detailed assessment of ToF is launched immediately to provide details of species and girth class wise standing trees at national/state/district levels and to make realistic assessment of availability of IRW in any particular future year. This will also facilitate planning for augmentation of plantations of tree species required by the WBIs and establishment clusters of wood processing facilities/WBIs, and research and extension activities for continuous growth of “wood and wood products production-consumption system” and help the country in meeting its NDC targets and mitigate the climate change impacts.

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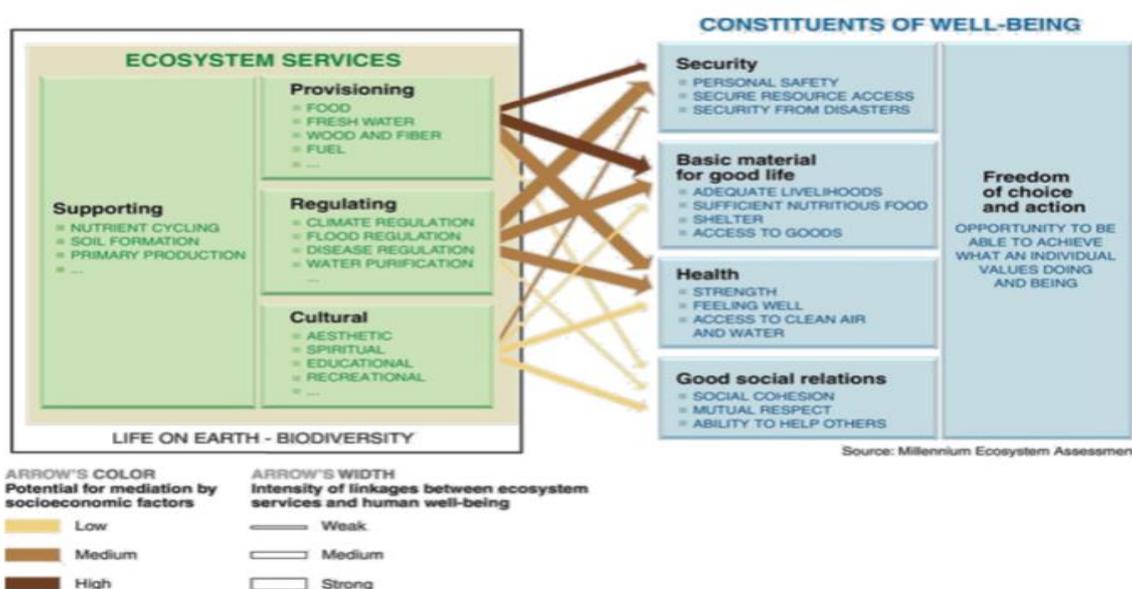
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Annexure 1

Eco System Services and National Resource Accounting

**The ecosystem services** from forest are classified into four major categories namely (i) provisioning services are goods that are produced by the ecosystem and used by people, such as food, water, timber, herbs; (ii) regulating services describe the way ecosystem affect the flow and functioning of larger systems which in turn impact human lives, such as climate regulation, infiltration rate of rainfall into aquifers and flows into rivers thereby influencing the timing and quantity of water availability; strips of vegetation next to waterways that absorb pollutants, providing people living downstream with improved water quality; erosion prevention to maintain arable land; carbon sequestration, (iii) cultural services – non material enjoyment and uses - such as recreation and spiritual benefits; and (iv) supporting services - background processes that people do not use directly but which sustain other services - such as nutrient cycling, soil pollination. This categorization, and how ecosystem services link to human well-being, is illustrated in figure below:



However, in National Resource Accounting the contribution of Forests comprises of Industrial Wood from Forests, Firewood, and Non Timber Forest Products (MFPs and Fodder from Forests) only [Reference: Methodology for compilation of the gross state value added (GSVA) in the new base (2011-12), the Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India]. Consequently, vary large contribution of forest resources in the form of ecosystem services remain unaccounted. This assumes great significance as the vast forest resources are being managed for ensuring ecological security of the nation.

This situation is largely due to the fact no serious attempt has been made either to quantify the ecosystem services or for their monetary valuation at national level.

An attempt was made in 2013 to compute economic value of 12 services provide by

forests as a part of computation of rate of Net Present Value applicable to different classes/categories of forests.(Verma et al. 2014)The 12 services included in the exercise were production of (i) timber, (ii) bamboo, (iii) fodder, (iv) non wood forest products, and (v) fuelwood, (vi) carbon sequestration, (vii) bioprospecting, (viii) pollination and seed dispersal, (ix) soil conservation, (x) water recharge (xi) carbon storage, (xii) water purification. According to this, for the Tropical Dry Deciduous, Tropical Moist deciduous forests, which taken together account for about 60% of the total forest area of the country, the economic value of provisioning services namely timber, fuel wood, NTFP including bamboos, that are presently included in the National Resource Accounting System, is only around 15% of the total economic value of the 12 services. This reflects gross under estimation of the contribution of Forests in Accounting.

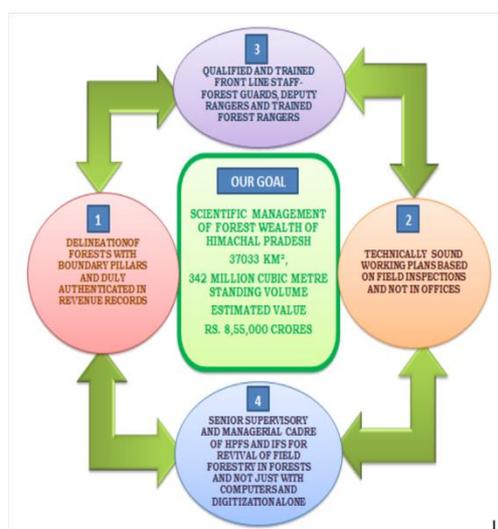
Annexure 2

**Recommendations of Monitoring Committee appointed by the Apex Court in 2018 to supervise green felling in forests in Himachal Pradesh**

On an application filed by the Himachal Pradesh Government (IA no. 3840 of 2014 in WP (civil) NO. 202 of 1995) for felling up to an elevation of 1500 meters above MSL a division bench of the Supreme Court comprising Justice Madan B Lokur and Justice Deepak Gupta granted a major relief to HP government after 22 years and allowed silviculture felling, in three forest ranges Nurpur, Bharari and Paonta range respectively in Kangra, Bilaspur and Sirmur districts, on an experimental basis involving only three species namely Khair, a commercially exploitable variety grown in lower areas of Himachal, Sal and Chir. The programme of experimental silvicultural felling shall be by the SFD under the guidance of two member committee headed by Mr. V P Mohan, former PCCF and a Professor of silviculture nominated by Vice-Chancellor of Dr Y S Parmar University of Horticulture and Forestry, Nauni Solan. Hon'ble Supreme Court vide its order dated 16<sup>th</sup> February 2018, while permitting monitored Experimental Silviculture felling to a limited extent, has laid special emphasis on the stipulation **“Felling of trees in India has been banned for more than two decades. We are of the view that on an experimental basis we may permit silviculture felling of trees to a very limited extent and such felling should be monitored very carefully to see whether such silviculture felling actually helps in the regeneration of forests or not.”**

Monitoring Committee in its report mentioned that the experimental silvicultural felling operations were taken up in Himachal Pradesh from February 2018 to April 2021 and confined mainly to four species, namely Sal, Chirpine, Khair and Eucalyptus in 65 approved forests spread out in four selected Forest Divisions and five Forest Ranges. In principle, we are fully convinced that for Scientific Forest Management, it is essential to carry out prescribed Silvicultural Fellings, thinnings and Subsidiary Silvicultural Operations (SSO) strictly in accordance with approved Working Plans.

The Monitoring Committee has concluded that the only practical way to revive much talked scientific forest management at the ground level is possible only by the compliance of four interrelated pillars/ indicators.



It needs to be stressed that action on all four prioritized core activities has to be taken in tandem.”

**Four Pillars are as follows:**

1. Delineation of forests with Boundary Pillars and duly authenticated in Revenue Records;
2. Technically sound Working Plans based on field inspections and not in offices;
3. Qualified and trained first line staff, Forest Guards and Deputy Rangers and trained Forest Rangers;

4. Senior supervisory and managerial cadre of HPFS and IFS for revival of field forestry in forests and not just with computers and digitization alone.

- a) It can be reported conclusively now that after carrying out silviculture felling and for ensuring adequate regeneration /restocking of a felled forest to its full potential, **complete reliance on a rather slow and uncertain pace of natural regeneration is rather risky**. Therefore, natural regeneration has to be supplemented with nursery grown tall plants of principle species.
- b) An approved Working Plan has to be in place before any felling programme is allowed.
- c) **Methodology of Assessment of Regeneration:** In order to rely only on credible assessment of success of regeneration, instead of just relying on ocular data, we had laid down Guidelines and Methodology of Assessment of Regeneration by adopting **Line-Plot System of Cruising** under Systematic Sampling for carrying out Regeneration Surveys.

Silvicultural Felling operations in forests prescribed for felling including thinning and other cultural operations under approved Working plan must be carried out in accordance with the timetable spread over three years subject to the compliance of the following prescribed basic prerequisites on ground:

1. Boundary Pillars should be in position and area as given in Compartment History File is crosschecked with GPS Latitude /Longitude readings
2. Forest should be free from any encroachment /illegal occupation.
3. The legal status of forests is authenticated in Revenue Records- Reserve, DPF or UPF mentioning name and total area of the forest.
4. Funding has to be ensured particularly for post felling operations in succeeding year within the month of April so that there is enough time to plan and execute works, particularly closure and fencing works.

For a forest area prescribed for felling in 2022-23 all pre-felling operations must be completed in 2021-22, and post felling operations must be completed in 2023-24.

**TIME TABLE FOR IMPLEMENTATION OF SILVICULTURE FELLINGS AND  
RELATIVE INTERVENTIONS**

<b>ACTIVITY/INTERVENTION</b>	<b>IMPLEMENTATION TIME</b>
<b>PRE FELLING PLANNING OF PREPARATORY OPERATIONS IN PRECEDING YEAR OF FELLING</b>	
PREPARATION AND SUBMISSION OF COST ESTIMATES FOR PRE FELLING, FELLING AND POST FELLING OPERATIONS OF FENCING AND PLANTING	APRIL
ERADICATION OF WEEDS IN FORESTS INFESTED WITH LANTANA AND OTHER OBNOXIOUS WEEDS	SEPTEMBER TO FEBRUARY
COMPARTMENT WISE BASIC TECHNICAL DATA IN RELATION TO APPROVED WORKING PLAN AND COMPARTMENT HISTORY FILE TO BE CHECKED BY DFO <b>AS PER APPROVED FORMAT IN ANNEXURE 2.2, PAGES 82-84 OF THIRD SIX MONTHLY REPORT OF 30 AUGUST 2019.)</b> AND TO BE APPROVED BY CF	NOVEMBER
VALIDATION AND APPROVAL IN PRINCIPLE TO TAKE UP THE FOREST FOR SILVICULTURE FELLINGS BY CCF/APCCF- APPROVAL FOR DEVIATIONS, IF ANY, FROM WORKING PLAN PRESCRIPTION TO BE SOUGHT FROM PCCF (WP)	DECEMBER
VALIDATION OF AREAS AND BOUNDARIES BY GIS CELL	JANUARY
<b>OPERATIONS IN THE YEAR OF FELLING</b>	
<b>100% ENUMERATIONS FOR ANALYSING FLORISTIC COMPOSITION OF EACH FOREST AS PER APPROVED GUIDELINES IN ANNEXURE 2.3 , PAGES 57-62 OF FIRST SIX MONTHLY REPORT OF 15 AUGUST 2019.)</b>	APRIL-MAY
SILVICULTURAL MARKINGS WHICH MUST INCLUDE MARKINGS/REMOVALS FOR FIRE LINES <b>AS PER APPROVED GUIDELINES IN ANNEXURE 2.4, PAGES 63-69 OF FIRST SIX MONTHLY REPORT OF 15 AUGUST 2019.)</b>	JUNE-JULY
APPROVALS OF SILVICULTURAL MARKINGS BY CONSERVATORS AFTER FIELD INSPECTIONS	1 - 15 SEPTEMBER
MUST HAND OVER LOTS TO HPSFDC LTD	BY 15 SEPTEMBER
COMPLETION OF FELLING AND EXTRACTION OPERATIONS	31 MARCH
PROCUREMENT OF BARBED WIRE AND RCC FENCE POSTS	MARCH

In order to ensure the continuity and the desired intensity of regular field inspections under Experimental Silviculture Felling programme, it is necessary that a revamped system of mandatory inspections as an institutional mechanism is put in place by the Govt/PCCF to ensure regular monitoring of the interventions.

**State-wise Trees Species growing on non-forest area /private land exempted from Transit Regulations** (received from MOAFW through email in May 2022). Received from MOAFW through e-mail) - MOAFW vide F. No. 10-2/2020-NRM-SMAF

S. No.	Name of State	Name of Trees Species exempted from Transit Regulations
1.	Andhra Pradesh	(i) Orange and related species,(ii) Tati, Tadi, Palmyrah (iii) Casurina, Sarugudu, Sarvi, Saru (iv) Jama, Guava (v) Seema, Thumma (vi) Sapota (vii) Coconut, Kobbari, Tenkai (viii) Cashew, Jeedimamidi (ix) <b>Eucalyptus</b> , Neelagiri, Jama oil (X) <b>Subabul</b> (xi) Semma, Chinta, (xii) Regu, Ber (Xiii) Raintree, Nidragannreru (xiv) Nerudu, Jamun, Jinne (xv) Ravi and related species (xvi) <b>Neem</b> , vepa (xvii) Nalla tumma (xviii) Mango, Mamidi (xix) Panasa, Jackfruit
2.	Bihar	<b>Poplar</b> , <b>Eucalyptus</b> , Kadmb, Gamhar, Mango, Litchi, Toddy, palam, Khajur, Semul, Bbool( Israeli, Babool), <b>Babool</b> ( Vilaiti Babool), Gulmohar, Ber, Guava, <b>Meethi Neem</b> , Jacarandal, <b>Subabool</b> , Shahtoot, Ashok, <b>Casuarina</b> , Silver Oak, Plam, Nimbu, Santara, Mausambi, Peltoforam, Rubber, Safed Babool/ Rrimjha,
3.	Chhattisgarh	<b>Casurina</b> , <b>Subabul</b> , <b>Poplar</b> , <b>Izarysli Babul</b> , Vilayati Babul , Menzium, Babul , <b>Nilgiri</b> , Siris, Rimjha, Rubber, Pine Species , Australian Babul, cassia Saymia, Baken, Gliricidia, Khamer, Kadamba, <b>Sissoo</b> , Kapok, Maharukh, Sliver Oak
4.	Gujarat	<b>Nilgiri</b> , <b>Subabul</b> , <b>Saru</b> , Champa, Laxmanfal , Ramfal, Sitafal, Asopalav, Pendula, Nagkesar, Nagchampha, Falsa, Ingorio/Angarea, Kamrakh, Kadhhipatta, Limbu, Chikotru, Bijoru/Turanj, Narangi, Mausambi, Maharuk, Rukhdo, Motoarduso, Limdo, <b>Neem</b> , <b>Bakan</b> , Bakan, nim, Irani nim, Nimbara, Limbara, Mahanim, <b>Mahogany</b> , Bordi, <b>Bor</b> , Khati bor, Ghulbor, Liehi, Lilchi, Aritha, Aritha, Amba, Kadvo Saragavo, Saragavo , Agathin, Segto, Agastin, Desi Baval, Goras amlili, Gando baval, Ganda baval , Botlle Brush, Jamphal, Dadam, Chikoo, Boralli/Mursal/ Vakal/ Varasd/ Bakul, Saptaparni, Champo, Safed champo, Liar/ Nani/ Gundi/ Nagod, Nirgund/ Nargundi, Lingur Nirgudi, Ambla, Fanas, Pipli/papri, Shetur, Haredo, Harero, <b>Poplar</b> , Golden cane palm, Oilplam
5.	Himachal Pradesh	Kala Siris/Ohi/Srisis, Kachnar/ Karial, Safeda, Kimu/ Chirmu, /Shahtoot/Tut/ <b>Mulberry</b> , <b>Poplar</b> , Indian Willow/Biuns, Kuth, KalaZira, Japanese Shehoot/paper mulberry, Paik, /Koi,/ Kosh/Kunis/ Kunish/Nyun, Khirk/ Khadki, Darark/Bakin, Fagoora/ Phagoora/Tiamble/timla/ tirmal/anjiri/cluster fig/ goolar, Toon, Jamun, <b>Teak/Sagun/Sagwan</b> , <b>Arjun</b> , Semal, Shalmaltas, Bihul/ Beul/ Bhimal/ Bhiunal/Dhaman, Paza/ Padam, Kamala/ Raini/Rohan/Rohini/ Sinduri, Aam(Mango wild variety ), Rishtak/Ritha/Dode.
6.	Haryana	<b>Eucalyptus (Safeda)</b> , <b>Poplar</b>
7.	Jharkhand	<b>Eucalyptus (Safeda)</b> , <b>Poplar</b> , <b>Casuarina</b> , <b>Maha Neem</b> , <b>Baken Kadmb</b> , <b>Subabool</b> , Silver Oak, Israeli Babool Vilayati Babool, Babool, Plam, Ber, Munga, Mulberry Guava, Nimboo, Santra, Mussambi, Ashok.
8.	Jammu & Kashmir	Kikar, Bel, Siris, Champ, <b>Neem</b> , Malugarh, Kakrad, Palas, Amaltus/ Karangal, <b>Sisoo</b> /Tali, Dhamman, Nili Gulmohar, <b>Akhrot(khod)</b> , Kehbal jhingar, Baronkal, Bilati Kikar, <b>Safeda</b> , <b>Poplar</b> , Robin, Chitta banddha, Rondu banddha, Sagwan, Arjun, Beheda, Tun/Toon, Bana, Dhoi.
9.	Karnataka	Acacia hybrid, Acacia mangium, Tree of Heaven, Rain tree, All Cassias except Golden Rain tree, Cashew, Christmas tree, Arecanut, <b>Casuarina</b> , India Beef wood, Lemon, Ornage, Coconut, Coffee, Mayflower, Indian coral tree, <b>Eucalyptus</b> , <b>Glyceridia</b> / Quick stick, Silver Oak, Rubber, Jacaranda, Sausage tree, <b>Subabul</b> , Umbrella tree, Sapota/Chikoo fruit, <b>Melia</b> , Indian Cork tree, <b>Drumstick</b> , <b>Mulberry</b> , <b>Curry leaf tree</b> , Peltoform, Purple bauhinia, Pagoda

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		tree, False Ashoka, Guava, Sesbania, Hummingbird tree, Paradise tree, African tulip, Tabebuia, Trumpet tree
10.	Kerala	Species for Plywood: Vellappine, Kurangandi/ Narivenga/Mundani, Karakily/Kalpina, Kulamavu/ Kulirmavu/ Ooravu, Pali/ Palendinjan, Thellipine/Undapine, Kulavu, Red Cedar, Poon/Punna/Punnappa, Vediplavu/Mullampali, Charu, Pothundi/Perunthondi, Cheeni, Nedunar, Vallabham/Varangu, Chorapine, Chemmaram, Champakam, Cherukonna, Mulliam, Neeramruthu, Peenary, Kumbil, Veembu, Gnavel, Kattunelli, Vakka, Thavala. Species for Matchwood: Aspin/ Kanala/ Nasakam, Elavu/ Poola, Pala/ Mukkampala. Species for Bobbin wood : Vellakil, Manjakkambhu, Species for pencil wood : Venkotta, Perumtholi/Poochakkadmbu, Attuthekku/Cadambu, Species for packing wood: Kara/ Bhadraksham, Amazham, Aval, Arayanjili, Kalaveppu/Malaveppu, Vatta/Uppathi, Fire wood : Palvu(Jack), Parankimavu ( cashew), Kattadi ( Casuarina ), Poovarasu ( Poovarasu), Mavu ( Mango tree), Puli( <b>Tamarind</b> tree), Nattupunna ( Nattupunna), Aanjili( Aanjili), Vaka ( Vaha- species), Poovam, ( Poovam), Konna), Thanni (Thanni), Uthi ( Uthi), Aal Jatikal ( <b>Ficus</b> species), Matti (Matti), Murukku( Murukku), Elappu( Iloia) and Kodamuli(Koadampuli)
11.	Madhya Pradesh	<b>Neelgiri, Casuarina, Poplar, Subabul, Israili Babul, Vilayati Babul, Australian Babul, Babul, Khamer, Maharukh, Kadamb, Cassia Siamea, Gulmohar, Jacaranda, Silver oak, Plam, Ber, Mulberry, Katahal, Amrood, Nimbu, Santra, Mussambi, Munga, Molshri, Ashok, Putranjiva, Imli, Jamun, Mango, Saptparni, Kaitha, Jungle Jalebi, Petltaphorum, Neem, Bakain, Sissoo, Karanj, Palash, Safed Sirus, Pipal, Bargad, Gular, Rubber, Semal, Kapok, Chirol, Gliricidea, Rimjha, meithi Neem, Gurhal, Jasoun, Conifers, imported Timber Species</b>
12.	Maharashtra	<b>Nilgiri trees, Babbul, Subabbul, Prosopis, Ashok, Drumstick, Sindi, Orange, Chiku, Bhendi, Acacia, Poplar, Lac, Casuarina equisetifolia, Rubberwood</b>
13.	Meghalaya	Umbrella thorn, <b>Bael, Cashewnut, Arecanut, Jackfruit, Satavari, Carambola, Sapida, Bay leaf, Broom stick, Chestnut, Beach oak, Assam lemon, Pommelo, Key lime, Indian wild orange, Rough lemon, Khasi papeda, Lemon, Wild Orange, Citron, Mandarin Orange, Sweet Orange, Air yam, Date plum, Wild applie, wild olive, False black pepper, Neelgiri/Gum Tree, Indian plum, Chhal Mogra, China rose, Walnut, Litchi, Mango, European crab apple, Drumstick/Moringa, Mulberry, Black mulberry, Monkey tamarind, Sohphie bah, Sohphie nam, Indian Gooseberry, Long pepper, Ashoka, Algaroba, Apricot, Plum, Sohiong(Prunus sps), Peach, Guava, European Pear, Pear, Tamarind, Heart-leaved moonseed, East Himlayan blueberry, Alu fruit, Jujube.</b>
14.	Mizoram	Kothal, Tung, <b>Eucalyptus spp., Mulberry, Neem, Rubber tree, Imli, Silver Oak, Subabul, Mango, Guava, Coconut, Citrus, Areca nut</b>
15.	Nagaland	<b>Aam, Korei, Walnut, Neem, Alder, Manipur Sim, Kadam, Hollock, Khokan, Teak, Gamari</b>
16.	Odisha	Bada chakunda, Sana Chakunda, Jhaun, Sliver Oak, Patas/ <b>Nilgiri, Sunajhari/Acacia, Subabul, Kaitha, Ambada, Batapi, Oau, Sajana, Karamanga, Sahada, Plam tree, Debadaru, Bhersunga, Gohira, Giliricidia, Paladhua, Coconut</b>
17.	Punjab	"forest produce" shall specifically mean timber (converted or otherwise), firewood, charcoal, katha and resin, but shall not include Non Timber Forest Produces (NTFPs) like bamboos and agro-forestry species such as <b>Populus spp., Eucalyptus spp., Melia azedarach (Drek), Morus alba (Mulberry), Leucaena leucocephala (Subabul), Casuarina spp., Grevillea robusta (Silver Oak), Acacia mangium, Melia dubia (Malabar Neem), Prosopis cineraria (Khejri), Salix alba (Indian willow), Gmelina arborea (Gamari) or</b>

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		any other species declared by the State/ authorised agency as agro-forestry species from time to time.
18	Rajasthan	<i>Casuarina, Australian babul, Khamer, <b>Cacia Siamea</b>, Gulmohar, Jaccaranda, Silver oak, Plam, <b>Ber</b>, Mulberry, Katahal, Amrood, <b>Sehjana</b>, Molshri, Ashok, Putranjiva, Iml, Jamun, Saptarni, Kaitha, <b>Jungle Jalebi</b>, Petaphorum, <b>Bakain</b>, <b>Karanj</b>, <b>Safed Sirus</b>, <b>Semal</b>, <b>Kapok</b>, <b>Churel</b>, <b>Mithi neem</b></i>
19.	TamilNadu	<i>Mesquite, <b>Casuarina</b>, <b>Subabul</b>, Palmyrah, Dadops, Umbrella thom, White Back Acacia/ Panicked Acacia, Maharuch, Maharukh/East India Walnut/Siris, Cashew, Kadam, Jack, <b>Neem</b>/Margosa, Red silk cotton/ Kapok, Sappan, Cassia, white silk cotton tree/kapok, <b>Sissoo</b>, Coral tree, <b>Eucalyptus</b>, Gamari, Rubber, Sea Hibiscus, Mohua, Mango, Persian Lilac, Malabar Neem, Morinda /Suranji, Manila/ Tamarind, Pongam/ Indian Beach, Rain tree, Mahogeny, Jamun/Indian cherry, <b>Tamarind</b>, Esperanaza, Indian Portia tree/Indian Tulip, <b>Red Cedar</b>/Toon, Silver Oak.</i>
20	Telagana	(i) <b>Eucalyptus</b> , Neelagiri, Jama oil (ii) Casurina, Sarugudu, Sarvi, Saru(iii) Poplar(iv) <b>Subabul</b> (v) Israeli Babool (vi) Seema,Thumma(vii) <b>Australian babul</b> (viii) <i>Gummaadi teak (ix) Pddamanu (x) Kadamb, (xi) Seema/ Tangedu (xii) Jacaranda (xiii) Silver oak (xiv) Regu, Ber (xv) <b>Mulberry (xvi) Jama, Guava (xvii) Orange and related species,(xviii) Munga (xix) Ashok/ Naramamidi (xx) Mahaputrajivi/Putrajeevi (xxi) Edakulapala (xxii) Turakavepa(xxiii) Kanuga (xxiv) Rubber / Seemamarri (XXV) Tella Tumma (xxvi) Gliricidea/Seema/Kanuga(xxvii) Tella Tumma (xxviii) Kaivepaku (xxix)Mandara (xxx) Conifers( chir, Kail, Deodar, Pine species) (xxxii) Tati, Tadi, Palmyrah (xxxiii) Sapota (xxxiiii)Coconut, Kobbari, Tenkai, (xxxiv ) Cashew , Jeedimamidi ( xxxv) Semma, Chinta, (xxxvi) Raint ree, Nidragannreru, (xxxvii) Mango,Mamidi( xxxviii) Panasa, <b>Jackfruit</b></b></i>
21	U.P.	<b>Mango</b> (Desi, Tukhmi or Kalmi), <b>Neem</b> , <b>Sal</b> , <b>Mahua</b> , Bijasal Pipal Bargad, Gular, Pakar, Arjun, Palash Bel, Chiraunjee, Krirnee, Kaitha, <b>Iml, Jamun, Asna</b> , Kusum, Ritha, Bhilawa, Toon, Salai, Haldu, Bakali/Kardhai, Dhau, <b>Khair, Sheesham, Sagaun</b>
22	Ladakh	Apricot, Lavender,Apple, Artimesisa,ephedra, <b>Silex alba (Willow), Poplar, Elegancehortence (sarsing)</b> , other silex sps.
23	Manipur	<b>Parkia Roxburghii, Artocarpus integrifolia</b> , Delonix Regio,Eucalyptaus sps., Grevelia Robusta, Jacaranda Mimosoefolio, Litchi Sinensis, Mangiferaindica, <b>Melia Azodirachta</b> ,Polyalthia sps., <b>Poplar</b> Queltoids,Tamarindus indico, Zizyphus jujube, Leucoena Leucocephalo,Celtis Australia, Syzium Cumini, Psidium Guajava, Kigelia Pinnota,Paulownia Fortunii, <b>Salix sps., Anthocephalus Kadambo,Acacia Manjum.</b>

Note: Tree spp. marked in bold are preferably planted under agroforestry scheme by the states.



NCCF, a Network for Certification and Conservation of Forests, was established in 2015, for augmenting globally aligned sustainable standards for natural resources and promote responsible usage. NCCF is constantly striving to improve environmental, economic and social aspects of sustainable management of natural resources with lower carbon and ecological footprints. NCCF is supported by multiple stakeholders including representatives of forest-based industries, government organizations, and qualified auditor to regime and quantify sustainable standards.

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