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# AGROFORESTRY: MISSING TREES FOR THE FOREST



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# AGROFORESTRY: MISSING TREES FOR THE FOREST

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**Sanjeev Sanyal, Karan Shinghal and Naveen Bali**

## Executive Summary

Despite being a tropical country, India has not been able to unlock the full potential of agroforestry. India's agroforestry sector remains under-utilised and stifled by regulation. According to a study published in the journal of "Environment, Development and Sustainability", as of 2021, the area under agroforestry (defined as tree cover per cent greater than 10 per cent on agricultural land) is estimated to be around 28 million hectares, which is a mere 17 per cent of total agricultural land and is far less when compared to the global average of 43 per cent. Agroforestry is India's primary source of timber. As per the Indian Council on Forest Research and Education (ICFRE), over 93 per cent of India's domestic timber was produced by "trees outside forests", a majority of which are agroforestry plots. However, a stringent, complex and cumbersome regulatory policy combined with a conservation-led approach to forestry has stifled the growth of agroforestry in India. Consequently, India has become a net importer of timber. In 2023, **India imported over USD 2.7 billion worth of timber**<sup>1</sup> (ITTO 2023), which equals almost 12 per cent of all agro-based imports for the same year (Damodaran 2024).

Furthermore, **between 2010 and 2019, 42 per cent of total timber imports came from "at-risk countries", while 80 per cent of teak and more than 70 per cent of Gurjan (high-value native species<sup>2</sup>) came from high-risk<sup>3</sup> countries or conflict-affected states** (Canby 2020). Additionally, the demand for timber from the plywood industry alone is set to increase by almost four times by 2030 (Nautiyal 2021). If business were to continue as is, it could increase import dependency on high-value varieties since 70 per cent of the timber used in the furniture and construction industries is from these trees.

Given that teak is one of India's most abundant native species, it presents an opportunity for India to move from being import-dependent to being an export leader of teak in the world. The global demand for teak is currently valued at USD 43.26 (Skyquest 2024) billion and its dependent wood-based industries like furniture are expected to grow both domestically and globally at a CAGR of 10.9 (Danish 2023) and 8.6 per cent (Skyquest

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<sup>1</sup> Timber here means roundwood, roundwood (Coniferous), roundwood (Non -Coniferous), roundwood (Coniferous - tropical)

<sup>2</sup> High value here means tree species that fetch a high economic value in the market for their timber, as it is used to manufacture high-quality furniture and construction products.

A native species is a species that has arrived in a particular ecosystem through natural processes, such as wind-dispersed seeds or animal migration. Native species are also known as indigenous species. High-value native species are indigenous species of trees that fetch a high economic value in the market for various reasons, from the value of their timber to the medical value derived from their leaves, fruits, etc.

<sup>3</sup> At-risk/high risk is defined as being sourced from countries at high risk for illegal logging based on governance, corruption and harvest indicators, or from fragile and conflict-affected states as per the World Bank. India's top 10 high-risk source countries for logs, sawn wood and veneer in 2019 were Gabon, Ecuador, Brazil, Ghana, Suriname, Benin, Ukraine, Tanzania, Colombia, and Togo.

2024), respectively. Therefore, replacing teak imports by scaling up domestic production through agroforestry provides not only a low-cost opportunity to reduce imports worth USD 350 million per year (2021-2022 total imports of Teak; EXIM Bank 2023) but, more importantly, create new economic opportunities for farmers, artisans and manufacturers by making India a leader in the global teak market.

Agroforestry is critical to transforming the livelihood of the farmers in many ways as well. Firstly, growing high-value trees such as Teak sells for ten times the price of Eucalyptus, with Teak priced at INR 40 to 50 per kg and Eucalyptus at INR 4 to INR 6 per kg on average, directly enhancing their incomes. Hence, it ensures a resilient supply for a rapidly growing furniture and construction industry, predicted to grow at 13 per cent (Danish 2023) and 11 per cent CAGR (Nautiyal 2021), respectively, till 2030. Moreover, according to the Centre for Agroforestry Research Institute (CAFRI), agroforestry provides about 65 per cent of small timber, 70 - 80 per cent of wood for the furniture and construction industries, nearly half of the demand for fuelwood, about 60 per cent of raw material for paper and pulp and 9 to 11 per cent of India's green fodder requirement of livestock as of 2015.

**Lastly, agroforestry have shown evidence of improving the soil's organic carbon content (SOC)**, which is critical for better yields in the long term. A study in 2009 in central Punjab showed that SOC concentration pools increased from 0.62 per cent in the sole crop of wheat and green gram to 1.14 per cent under the poplar trees (Naveen Gupta 2009). Similarly, in Mizoram, the SOC stock in tree-based home gardens was 142.25 Mg C/ha compared to shifting cultivation fallows, which were 94.44 Mg C/ha (Sahoo 2021). Evidence also shows that an optimum tree cover in tropical regions with drier climates can recharge groundwater and alleviate water scarcity (U. Ilstedt 2016). All these benefits directly lower the cost of production for the farmer, resulting in imputed savings. Agroforestry can also help India achieve its carbon sequestration targets; as per some studies, shifting to tree-based farming can sequester anywhere between 13.7 to 27.2 tonnes of CO<sub>2</sub> per hectare per year for up to fourteen years (Dong-Gill Kim 2016), depending on the species composition, age of trees, geographic location, and local climatic factors and management regimes.

However, three critical constraints limit India from realising its timber potential, especially for high-value native species like Teak. Firstly, the prevalence of conservation-led stringent policies has discouraged or outright prohibited tree felling. Secondly, multiple laws govern the felling and transit of trees and require proving of land ownership, complicating the process, creating the need for intermediaries, and deterring farmers from taking up agroforestry. Lastly, an underutilised National Transit Pass System (NTPS) needs to be improved and better utilised to streamline the transportation of trees.

First, conservative-led forest policies have primarily focussed on increasing the area under the forest, but they have significantly hindered the growing of trees outside the forest. The National Forest Policy of 1988 aimed to increase forest and tree cover and restricted the felling of trees without forest department approval. Further, in the Godavarman case (1996), the Supreme Court redefined the scope of forest conservation and suspended tree felling

across the entire country. Such policies have discouraged private players (especially farmers) from entering the timber-growing business. According to the Food and Agriculture Organisation, this has led to a four-fold increase in imports between 1996 and 2022.

Second, each state has multiple acts governing the regulations for growing, harvesting and transporting trees from private lands. Not only are there multiple acts in each state, but different departments also oversee and provide the required permits to farmers to harvest trees on their farmlands, which differ from state to state. A farmer must visit multiple department offices to obtain a felling and transit permit. This is because sale deeds are stored in the registration department, maps are kept in the survey department, and the revenue department holds property tax receipts. Further, farmers must prove that the land they are planting trees on belongs to them by providing the identification details of the land deed. Given that most land records have not been updated and are subject to generational delineation, these aspects pose considerable challenges. In rare cases, while proving the antecedents of land, if the farmland was previously forest land, then any trees planted on the land may come under the Forest Act, and the farmer may not be able to harvest them.

Further, certain species have been exempted from permit requirements, but the exemptions are not consistent across states and do not exempt the harvesting of native high-value timber species like Teak, Meranti, and Gurjan.

Lastly, the Government of India's National Transit Pass System (NTPS), an online transit pass generation system for inter-state and intra-state transportation of timber, bamboo, and other forest products from private lands/government/private depots, remains highly underutilised. Only a little over 86,000 applications have been received in the last four years, of which 82 percent have come from just three states - West Bengal, Telangana and Jammu & Kashmir. Further, the system only issues transit permits and not felling permits, for which farmers have to go through a different process, as explained above, and only 15 states and three union territories have adopted this system. In the case of states which are not on the NTPS portal, the farmer is not only expected to procure the transit permit from the origin state but also needs to follow the rules and regulations of the state in which the trees are transported, which most likely will involve different departments as compared to the origin state, hence forcing the farmers to hire the services of intermediaries and thereby increasing their costs.

Given these constraints, we recommend the following changes to the policies that govern India's felling and transit of timber:

First, to tackle the challenge of conservation-led forest policies, state governments should exempt high-value native timber species like Teak, Gurjan and Meranti from the need to obtain felling and transit permits for the trees grown on private lands. This would make it easy for farmers to grow these high-value native species on their own lands and reduce pressure on India's native forests.

Second, to solve the issue of the farmer needing to go to different departments because of multiple acts and different rules governing the felling of trees, the NTPS should expand its scope to include the issuance of felling permits, thereby creating a single-window clearance system. Further, to tackle the difficulty in proving ownership of land, the MoEFCC and MoAFW should change the mandate from proving the ownership of land to proving the ownership of the tree, which can be done by using the latest tracking technologies like blockchain, microchips, QR codes, etc. These changes would simplify the complexities created by the multiple acts and reduce the burden of proving land ownership, while at the same time controlling the illegal felling of timber in forests.

Lastly, to improve the utilisation of the NTPS system and reduce the need for intermediaries, all states and union territories should be directed to join the portal, and awareness and training activities on using the portal should be conducted for farmers.

The policy interventions proposed above are not the first of their kind. There has been a precedence of using the same principle in the past - India liberalised regulations for bamboo and sandalwood to promote its production and curb illegal felling for the latter. The amendment to the Forest Act 1927 in 2017 redefined bamboo from a tree to grass, and Karnataka's Sandalwood Policy of 2022 incentivised the growing of sandalwood trees on private land by removing all restrictions and allowing the sale of the wood in the open market. Although the regeneration of sandalwood is slow, simplifying the process is expected to increase private player participation in high-value wood and reduce illegal felling. (Department of Parliamentary Affairs and Legislation, Government of Karnataka). While it is too early to pass judgement on the changes, the initial results seem encouraging. These will significantly reduce the complexities in the ecosystem, create transparency, and set the path to making India a self-reliant timber state.

## 1. Agroforestry: Tapping India's Untapped Potential

Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboo, etc.) are deliberately used on the same land-management units as crops and/or animals in some form of spatial arrangement or temporal sequence. It is a dynamic, ecological, natural resource management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. In particular, agroforestry is crucial to smallholder farmers and other rural people because it can enhance their food supply, income and health. Agroforestry systems are multifunctional systems that can provide a wide range of economic, sociocultural, and environmental benefits (FAO n.d.).

India's agroforestry plantations are spread across 28 million hectares (Raza H Rizvi 2022) of land, occupying approximately 8 per cent of India's geographical land area, and play a crucial role in the economy. Agroforestry and all other trees outside forests<sup>4</sup> provide almost half of the demand for fuelwood, 60 per cent of raw material for paper and pulp, and 9 to 11 per cent of India's green fodder requirement of livestock. Furthermore, by 2050, demands for timber, fuelwood and fodder are set to increase by three, two and 1.5 folds, respectively (CAFRI 2015). Agroforestry will have to be scaled up rapidly to meet these demands.

Agroforestry also improves crop yields and reduces the need for external inputs. For example, a long-term experiment in Haryana revealed that in fields containing barley and scattered trees, the yield increased by an average of 51 per cent over the control and increased the soil's nutrient content (A Kumar 1998), reducing the need for fertilisers. Lastly, agroforestry has shown evidence of **increasing farmers' income** (Mahendra Singh 2018). A study in Meghalaya found that a guava-based system resulted in a 3-fold increase, while in Assam, a lemon-based system showed a 1.98-fold increase compared to farmlands devoid of trees (Basu 2014).

Furthermore, Agroforestry and trees outside forests provide 65 per cent of small timber and 70 - 80 per cent of wood for the furniture and construction industries (CAFRI - ICAR 2015). India is the fourth largest consumer of furniture in the world (Danish 2023) with a rising population and a promising growth rate its domestic demand from wood-based industries, like construction, pulp and paper, furniture, and plywood, are all forecasted to grow from 57 million m<sup>3</sup> to 97.8 million m<sup>3</sup> (by 70 per cent) between 2020 and 2030 (Nautiyal 2021). Unfortunately, regulations governing the felling and transit of high-value native Timber species like Teak, Gurjan, and Meranti are limiting the domestic market from fulfilling this demand, which is why India imported over 2 billion worth of these species between 2016 and 2019 (Canby 2020).

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<sup>4</sup> Trees outside forests - any tree that grows outside of recorded forest areas. This includes trees in agroforestry systems, small woodlots and block plantations, trees along linear features, such as roads, canal bunds, etc. and scattered trees on farmlands, homesteads, community lands and urban areas.

Agroforestry plots have shown evidence of improving the soil's organic carbon content (SOC), which is critical for better yields in the long term. A study in 2009 in central Punjab showed that SOC concentration pools increased from 0.62 per cent in the sole crop of wheat and green gram to 1.14 per cent under the poplar trees (Naveen Gupta 2009). Similarly, in Mizoram, the SOC stock in tree-based home gardens was 142.25 Mg C/ha compared to shifting cultivation fallows, which were 94.44 Mg C/ha (Sahoo 2021). Evidence also shows that an optimum tree cover in tropical regions with drier climates can recharge groundwater and alleviate water scarcity (U. Ilstedt 2016). Agroforestry can also help India achieve its carbon sequestration targets; as per some studies, shifting to tree-based farming can sequester anywhere between 13.7 to 27.2 tonnes of CO<sub>2</sub> per hectare per year for up to fourteen years (Dong-Gill Kim 2016), depending on the species composition, age of trees, geographic location, and local climatic factors and management regimes.

Agroforestry has clearly shown evidence as a promising pathway for India's economic and social development; given this context, the authors elaborate on how policies governing Agroforestry inhibit India's farmers from utilizing the untapped potential of this sector. They then make recommendations to unlock India's capacity to domestically fulfil its timber demand and significantly reduce its import dependence on high-value native timber.



## 2. Why Policies Matter

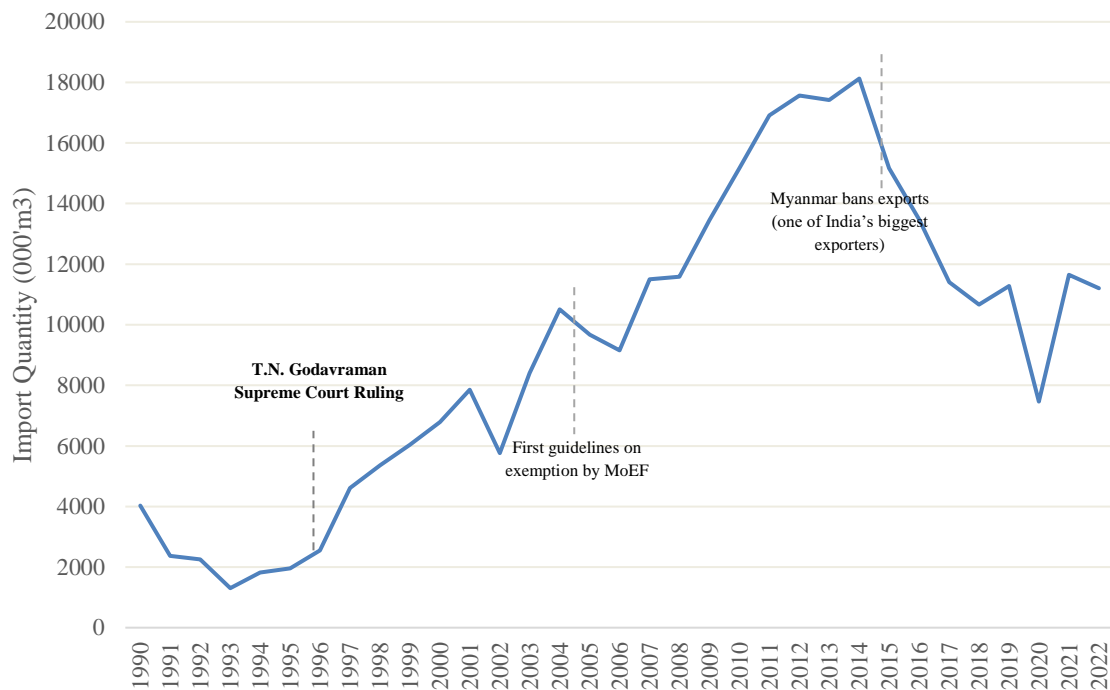
### 2.1 Conservation First Approach

India's approach to timber procurement has evolved significantly over the decades, particularly delineated by the pre- and post-liberalization eras. Pre-liberalization policies, extending until 1991, underscored a concerted effort to balance timber production with conservation imperatives. During this period, the country primarily relied on domestic sources outside “reserved forests” (as identified by the Ministry of Forest and Environment) to meet its timber demands. However, the regulatory landscape underwent a notable transformation following the 1996 Supreme Court ruling, known as the T.N. Godavarman Thirumulpad v. Union of India & Ors., (1997) 2 SCC 267. This ruling redefined forests in India to include any piece of land which resembled the dictionary meaning of forests; while a step ahead in ecological conservation, it drastically reduced the area available for timber production and imposed stringent restrictions on unregulated tree felling and timber logging in forest areas. The 1996 ruling came at the same time that the government of India (GoI) liberalised its import policy of wood and wood products (ICFRE, 2010). Additionally, the Supreme Court Order of 1996 specified that tree felling could only take place in areas approved under working plans prepared by the state government and needed approvals by the central government (Rosencranz et al., 2007). Lastly, the complete prohibition of forest activities in the northeastern states of India, once significant hubs for timber and plywood, ceased all forestry operations, leading to a shortfall in timber supply (Rosencranz et al., 2007). As a result, timber imports have risen since then (Figure 1). An immediate effect of the changes in the law was an increase of about 60 percent in import value and 65 percent in import quantity of timber between 1997 and 1998 (Bansal, 2004).

These imports continued to rise till 2004. In 2004, the letter ' *F. No. 8-14/2004-FP (Vol.1)* ' issued by the Ministry of Environment and Forest was issued as a set of guidelines that directed the states to exempt certain species from felling and transit permit requirements. This temporary easing in regulations led to a slight decline in 2005, after which it increased again due to increased demand from wood-based industries till 2014. Since 2014, India's imports have declined by almost 50 per cent (Figure 1) due to the Governments of Myanmar (India's biggest exporter) and Lao People's Democratic Republic (Lao PDR) enforcing log export bans and Malaysia, another major exporter of India reducing its log export quotas (Canby 2020).

These stringent regulations limited domestic supply, which could not keep up with the demand, leading to **a four-fold increase in industrial roundwood imports between 1996 and 2022 (ITTO 2022)**, which cost the country over 4 billion USD between 2003 and 2022 (UN Trade Map 2024).

**Figure 1: Impact of TN Godavaram and other events on India’s Roundwood Imports**



Source: ITTO 2022

An important point to note is the figure above shows the only changes in India’s imports of industrial roundwood import over time but does not report the domestic production data for the same period because the GoI does not maintain a centralised database of timber production. Because of this, even international agencies like the International Timber Trade Organisation (ITTO) and FAO cannot be relied upon as they depend on domestic data for production numbers. These organisations, therefore, estimate production based on assumed domestic consumption, **leading to enormous data discrepancies**. The 2013 ITTO biennial review report states, “India has never provided reliable production figures, thus necessitating the use of estimates based on reported exports and assumed domestic consumption. Apart from the data on forest cover evaluated by the Forest Survey of India, there is a lack of information on timber production and consumption.” (Milli Ghosh 2016)

While the Supreme Court ruling restricted the felling of trees from timber from all kinds of *forest* areas, which resulted in a shortfall of supply from forest areas, a cumbersome, complex regulatory regime governing the transit and felling of trees outside of forests (agroforestry) inhibited the growth of the domestic timber industry from farmlands and non-forest areas especially for species like Teak, Gurjan and Meranti.

**Key Takeaway:** A conservation-first approach towards forestry leads to increased timber imports and declining domestic production.

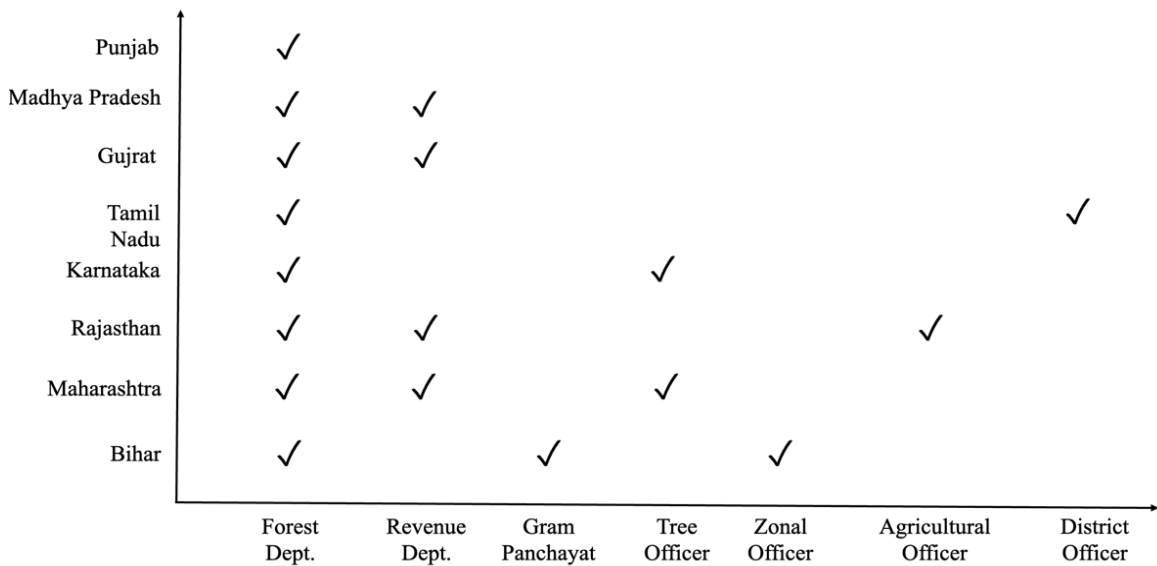
## 2.2 The Complexity of Permits

The 42<sup>nd</sup> Amendment to the Indian Constitution of 1976 moved forests from the state list to the concurrent list, making the governance, administration and management of forests a state and central government matter. While the union government created policies and laws to regulate reserved forests, the governance and management of trees outside forests, including agroforestry plots, was left to the state governments.

**Each state in India has multiple acts governing the regulations for growing, harvesting and transporting trees from private lands.** In Madhya Pradesh (MP), four acts determine the rules around felling and transit: the MP Lok Vaniki Act 2001 for private forests, the MP Land Revenue Code 240-241 1959, the MP Adim Jan Jatiyon Ka Sanrakshan (Vrakshon Me Hit) Adhinyam 1999 and the MP (forest produce) Transit Rule 2000 (Ministry of Environment & Forests 2012 and GoMP, 2014). The Madhya Pradesh Lok Vaniki Act 2001 was implemented to utilise private forests in revenue land, where tree planting and felling follow a specific management plan. The Madhya Pradesh Transit Forest Produce Rules (2000) defines the rules, exemptions and procedures for transit. In Maharashtra, tree felling and transit are governed by three acts for agroforestry: the Maharashtra Felling of Trees Act 1964, the Maharashtra Land Revenue Code 1966 (Ministry of Environment & Forests 2012), and Bombay Forest Rules 1942, which define all rules of transit (Sinha 2018). Not only are there multiple acts in each state, but there **are also six different departments that oversee and provide the required permits to farmers to harvest trees on their farmlands**, which differ both within and across states (inter and intra-state differences). Figure 2 shows the various departments involved in the issue of felling and transit permits for eight key states of India. Therefore, a farmer needs to navigate the complexity of multiple laws and go through a long, cumbersome process with numerous departments to obtain a permit which allows him/her to harvest trees, which can sometimes take up to a year (Sinha 2018). Figure 3, below, explains this process in detail and highlights the bottlenecks. This complexity creates the need for middlemen who then charge a share of the consumer price, leading to lower margins for farmers, which discourages them from adopting agroforestry.

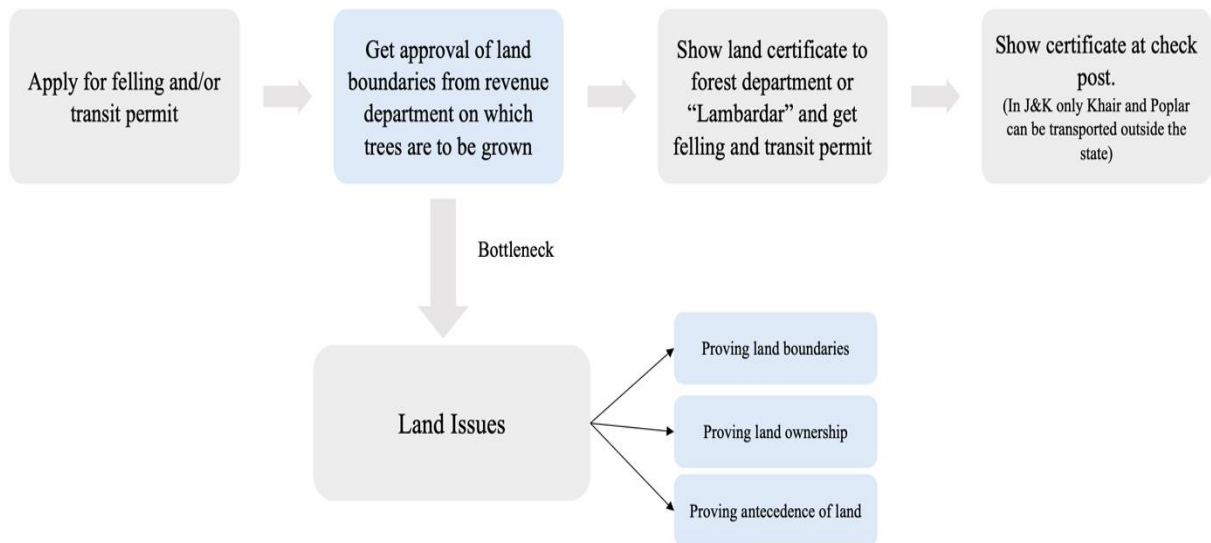
Time and again, there are instances of timber trucks being stranded at state borders due to **delays** and issues with transit permits from the forest or other relevant departments. This leads to a loss in the value of the goods across the supply chain (Khakhariya, 2022). You may refer to Annexure 1 to get a detailed understanding of the chain of custody for tracking timber in India.

**Figure 2 – Different departments and officials who issue transit and felling permits**



Source – Authors’ analysis 2024

**Figure 3 - Process and challenges of obtaining felling and transit permit in Jammu and Kashmir**



Source: Author analysis is based on an interview with Alok K Maurya, Divisional Forest Officer, Jammu, on 18 May 2023.

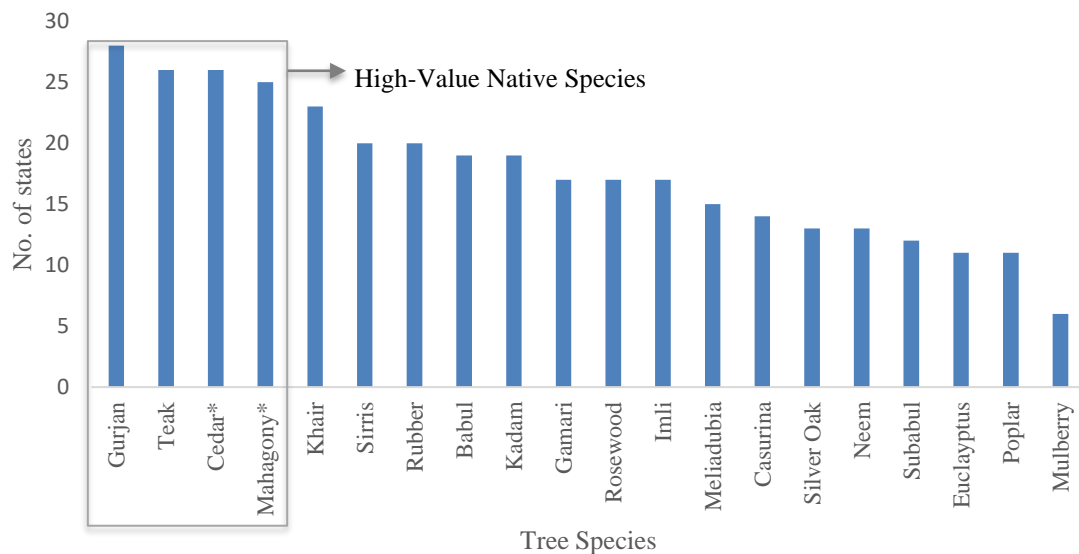
Figure 3 explains the following process: to receive a felling and transit permit, a farmer has to visit multiple department offices because sale deeds are stored in the registration department, maps are stored in the survey department, and property tax receipts are with the revenue department, all of which are documents needed to apply for a felling and transit permit. Now, even if a farmer manages to secure all the documents from multiple departments, they have to prove that the land they are planting trees on belongs to them. This first step has the most hurdles:

- Proving that the land belongs to them, i.e. the identification details of the land deed should match the identification details of the applicant.
- He proves that the land boundaries he is planting match the records of the revenue department, but since most land records have not been updated and are due to generational delineation, both these things become very challenging.

In rare cases, while proving the antecedents of land, if the farmland was previously forest land, then any trees planted on the land may come under the Forest Act, and the farmer may not be able to harvest them. This is simply

Although the central and state governments have passed notifications to exempt certain species from these permit requirements, neither are they consistent across states, nor do they exempt the harvesting of most native high-value timber species like Teak, oak, rosewood, Gurjan, Meranti (aka Cedar and Mahogany) etc. As seen in the graph below, almost all states in India require farmers to obtain felling and/or transit permits for these species. And since Teak, Gurjan, and Meranti are critical to the furniture and construction industry, their imports have increased.

**Figure 4: High-value trees mostly need permits, and differing state exemptions disrupt interstate supply chains.**



Source - Authors analysis based on MoEFCC circular; \*also known as Meranti

To explain the above, take a hypothetical example - Timber from Babul trees is harvested in Delhi and needs to go to Himachal Pradesh for processing. First, it will need a permit in Delhi; second, once the timber crosses the state's border, a different set of rules and regulations specific to Himachal Pradesh will apply; and third, to get permits in Himachal Pradesh, different departments will need to be contacted as different departments issue permits in different states. You may refer to Annexure 2 to get a detailed picture of the various departments involved in the issue of felling and transit permits across key states.

This entire complexity, firstly, deters farmers from growing timber, and second, it creates the need for middlemen who charge commissions, further driving up the cost of sales and reducing profit margins for farmers.

**Key Takeaway:** The complexity of obtaining felling and transit permits disincentives farmers from adopting agroforestry.

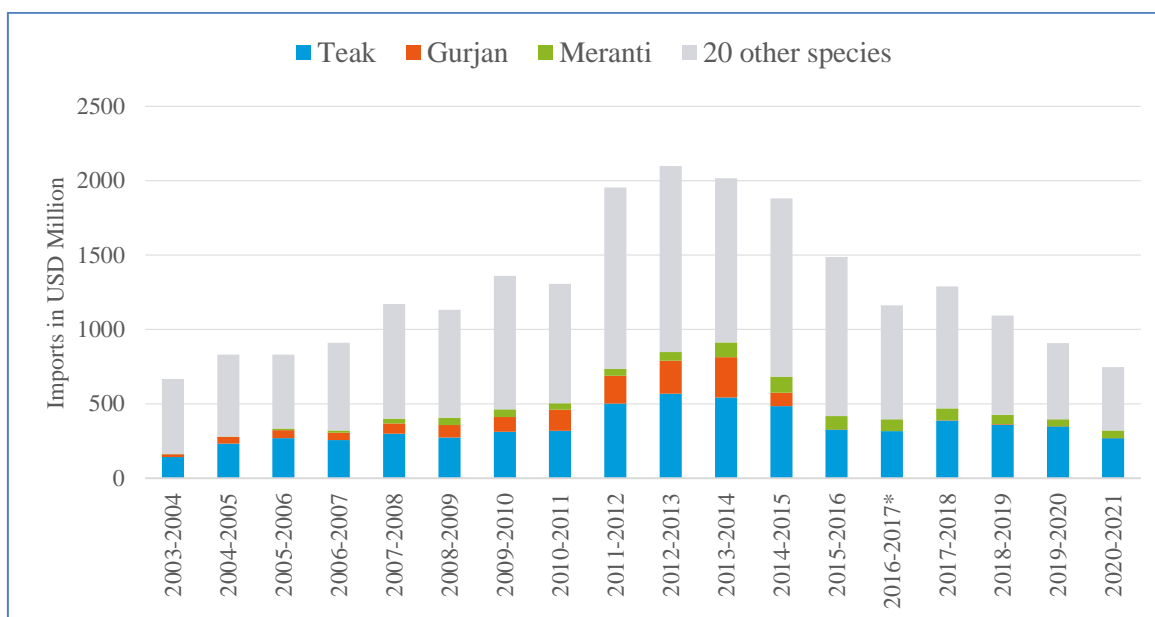
## 2.3 Import Dependency

India's **heavy reliance on timber imports of nearly USD 2.7 billion in 2023** (ITTO 2023) **causes furniture raw material costs to be 14 to 23 per cent higher** (Ikea 2021) as compared to competing manufacturing hubs like Vietnam and China, making our products comparatively uncompetitive in the export market and expensive in the domestic market. While imports of wood and other wood products increased from USD 1,331 million to about USD 1,950 million, round wood increased from 2.5 million m<sup>3</sup> to 6.2 million m<sup>3</sup> (almost threefold) between 2002 and 2014. A ban on log wood exports by Myanmar caused a decrease in imports after 2014 (Figure 1), which was India's largest exporter, though the imports of round wood still cost India over 2 billion US dollars in 2021-22. Total imports of all types of timber are expected to increase to 31.5 million m<sup>3</sup> by 2030 from 18 million m<sup>3</sup> in 2015 (Saxena 2017). Adding to these woes, India is the fourth-largest consumer of furniture in the world and the fifth-largest producer (Danish 2023). India's demand from industries which depend on timber as a raw material, like construction, pulp and paper, furniture, and plywood, are all forecasted to grow from 57 million m<sup>3</sup> to 97.8 million m<sup>3</sup> (by 70 per cent) between 2020 and 2030 (Nautiyal 2021). The furniture industry alone is poised to grow at 10.9 percent CAGR (Danish 2023). This puts India's timber industry in a precarious position as there is an opportunity to create a domestic industry and economic value for farmers, but the regulations and policies prevent the domestic market from leveraging this opportunity.

### 2.3.1 Impact of tree permits on imports of Teak: A case study

Between 2003-04 and 2020-21, India imported a considerable volume of round wood, with Teak wood comprising, on average, 28 percent of these imports, according to EXIM Bank data. Paradoxically, India is the largest importer of Teak globally, accounting for 75 percent of the world's imports, despite possessing the most extensive natural Teak reserves, which encompass 44 percent of the global Teak forest area (Stephen Midgley, 2015). Although India boasts optimal agro-climatic conditions for Teak cultivation, it continues to rely heavily on imports. The primary causes of this conundrum are the stringent regulations governing the felling, transit, and sale of Teak, which deter farmers from cultivating it outside designated forest areas. In some states, Teak is classified as a 'restricted' species to prevent illegal logging, further complicating domestic production.

**Figure 5: Composition of Teak, Gurjan and Meranti as compared to other species<sup>5</sup> in imports (in USD Mn)**



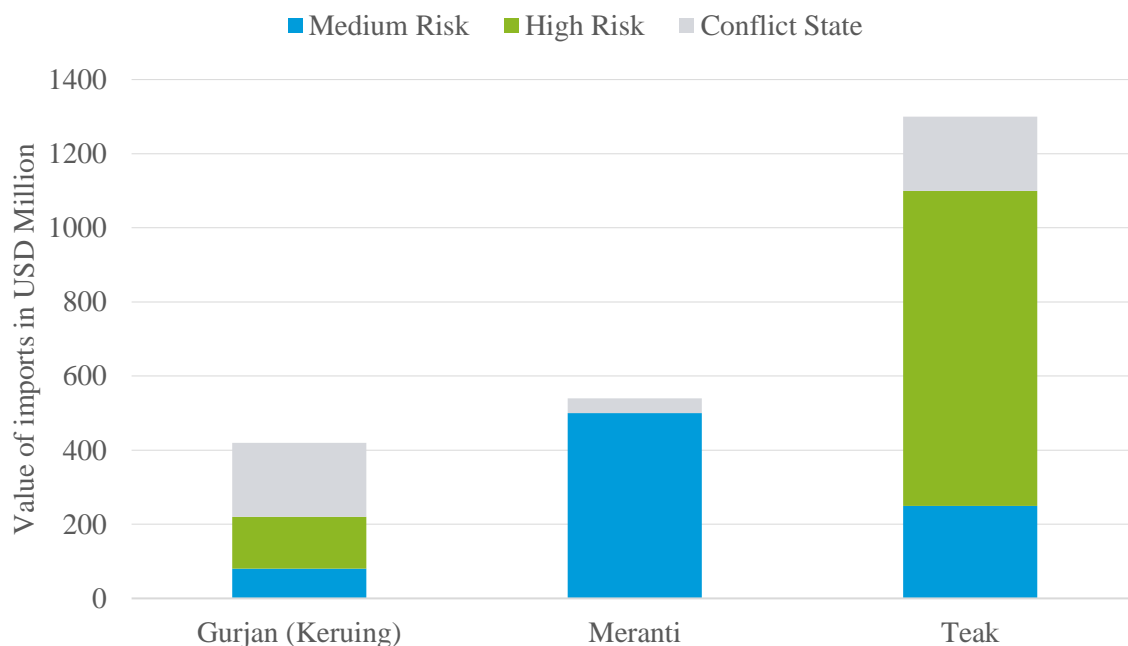
Source – EXIM Bank

India was also the third largest importer of illegally logged timber globally in 2016, with **80 per cent of Teak imports coming from high-risk countries** such as Gabon, Ecuador, Ghana, Benin, Brazil, Tanzania, etc. (Canby 2020). Similarly, native species like Meranti are from medium to high-risk countries. In 2019, 42 per cent of India’s timber had a high likelihood of being sourced from illegal logging activities. This includes 44 per cent of logs, 42 per cent of sawn wood, and over 75 per cent of veneer imports. As per the World Bank’s classification, these origins were identified as high-risk due to factors such as “governance, corruption, harvest indicators, and association with fragile or conflict-affected regions” (Canby 2020). You may refer to Annexure 3 to get a detailed risk profile of India’s timber imports.

Between 2016 and 2019, India imported 60 per cent of its log wood and 20 per cent of its sawn wood imports from nations enforcing log export restrictions, which included full bans. This not only risks an increase in the price of our imports but also puts entire industries like furniture, which employs 4.1 million people, especially vulnerable communities like artisans, at risk. Thus, deregulating the felling and harvest permit laws to incentivise farmers to grow Teak and other native high-value timber species like Gurjan, which made up approximately 19 per cent of rough wood imports between 2001 and 2015 (Verma 2016), can have multi-fold benefits to the economy and, more importantly, to the livelihoods of farmers and artisans of the country.

<sup>5</sup> Examples of other species include rosewood, sal, oak, walnut, sandalwood, etc.

**Figure 6: Value of Teak, Gurjan and Meranti imported from medium, high-risk and conflict-affected countries between 2010 – 2019**



Source: Export Genius 2019, compiled by Forest Trends 2020 and adapted from Canby 2020

Should India implement policies that incentivise Teak cultivation, it could go from being a teak importer (USD 350 million in 2022 - Directorate General of Commercial Intelligence - DGICS, 2023) to an **exporter**, given our favourable agro-climatic conditions and talented artisans and booming wood-based industry. Such a policy shift could not only reduce our imports but more importantly **elevate India to a position of prominence as a leading Teak exporter**, given Teak’s increasing demand and market. This transformation would generate economic opportunities for farmers, artisans, and wood-based industries, catalysing growth in ancillary sectors and enhancing the livelihoods of those involved.

**Key Takeaway:** India's conservation-first policies for forestry and complex regulatory policies for agroforestry, coupled with an increasing demand for timber, put India's furniture and construction industries at risk of becoming import-dependent.



### 3. Recommendations

A complex regulatory system that limits the felling and transit of high-value native species combined with an increased demand for furniture, plywood, and timber for construction has increased India's dependence on imports of these species from high-risk sources. The policy change proposed below will put India on the path to going from a teak importer to a leading exporter, enhancing farmers' income and improving the carbon content of the soil.

- (i) **Deregulation of high-value native timber species:** to tackle the challenge of conservation-led forest policies, we recommend that a directive be issued to all the states where Teak (*Tectona grandis*), Gurjan (*Dipterocarpus turbinatus*) and Meranti, a.k.a as cedar trees are not available in neighbouring forests to be added to the list of trees exempt from the requirement of obtaining permits in their respective felling and transit acts. MoEFCC can do this as a follow-up to the '*guidelines issued on 18 November 2014 by MOEFCC to Letter No. 8-14/2004-FP*' (Refer to Annexure 4 and 5). Haryana, Punjab, Uttarakhand and Uttar Pradesh have a presence of over 1,900 plywood and veneer-making units (Sinha 2018) and hence could be prioritised for the deregulation of Teak and other high-value species, as an already available market will make it easier for farmers to adopt them in their farms.

The good news is that the policy intervention proposed above is not a first of its kind; in the past, India has liberalised regulations for bamboo and sandalwood under a similar principle to not only promote its production but also to curb illegal felling for the latter. The amendment to the Forest Act 1927 in 2017 redefined bamboo from a tree to grass, and Karnataka's Sandalwood Policy of 2022 incentivised the growing of sandalwood trees on private land by removing all restrictions and allowing the sale of the wood in the open market. Although the regeneration of sandalwood is a slow process, simplifying the process is expected to increase private player participation in high-value wood, reduce illegal felling and reduce dependence on imported Australian sandalwood while increasing farmers' income. (Department of Parliamentary Affairs and Legislation, Government of Karnataka).

Similarly, over the last couple of decades, as Eucalyptus was exempt from permit regulations across the country, the area under their plantations reached 3.9 million hectares in 2019 (Laclau 2018), the second largest area under plantations worldwide. Additionally, this led to an improvement in farmer livelihoods and a growth of the plywood industry, especially in the states of Haryana, Punjab, Uttarakhand and Uttar Pradesh, where 1,900 manufacturing units have come up. This is even though Eucalyptus and Poplar are not native in most regions compared to Teak and other high-value timber species. All these will significantly reduce the complexities in the ecosystem, create transparency, and set the path to making India an 'atmanirbhar' timber state.

- (ii) **Change mandate from proving ownership of land to ownership of trees:** to tackle the difficulty in proving ownership of land, the MoEFCC and MoAFW should

change the mandate from proving the ownership of land to proving the ownership of the tree, which can be done by using the latest tracking technologies like blockchain, microchips, QR codes, etc. These changes would simplify the complexities created by the multiple acts and reduce the burden of proving land ownership.

Fundamentally, technology can be used to ascertain whether the tree proposed to be cut and transported grows on farmers' or forest land. We recommend using technologies like TiGram (Timber Traceability tool) to improve tracking mechanisms and streamline the felling and transit processes. Scale-up of tools like TiGram, being piloted in Kerala that:

- (a) Monitors and Manages the sale and movement of timber harvested from private land, which is compliant with the provisions of the Kerala Promotion of Tree Growth in Non-Forest Areas Act of 2005 and subsequent rules framed under this act.
  - (b) Helps the forest department with (i) a simplified online process for applying, verifying, and issuing permits by the forest department for tree felling and transportation that helps tree growers and (ii) the use of QR codes for establishing a communication system, which helps the forest department, timber owners, sawmills, and buyers in the supply chain to track and trace the movement of timber.
  - (c) GPS tracking devices can be attached to timber trucks to monitor real-time movement. This data can be used to ensure that trucks stay on approved routes and do not deviate to illegal logging areas or make suspicious stops.
- (iii) **Create a single window clearance at the central level that creates a uniform process to obtain transit and felling permits** to solve the issue of the farmer needing to go to different departments because of multiple acts and different rules governing the felling of trees. The NTPS should expand its scope to include the issuance of felling permits, thereby creating a single-window clearance system. Other countries aiming to promote the development of agroforestry have done the same with some success in meeting their needs for forest-based products and reducing the pressure on natural forests (refer to Annexure 6) - **Direct all states to adopt the National Transit Pass System (NTPS):** Currently, only 16 states and one union territory are on the portal, and only 60,000 applications have been received in the last four years, of which 76 per cent have come from just two states- West Bengal and Jammu & Kashmir; we therefore recommend that all states join the system. The system provides seamless issuance of transit passes. It helps monitor and keep records of transit permits for inter-state and intra-state transportation of timber and bamboo from private lands/government/private depots and other minor forest produce. Some of the current states and union territories which are listed on the portal are Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Jammu & Kashmir, Karnataka, Lakshadweep, Madhya Pradesh, Tripura, Uttarakhand and West Bengal..

## **Chain of Custody Tracking in India**

In India, tracking of log and processed wood products is regulated under the Forest Produce Transit Rules, which were developed to support the 1927 Forest Act. The Transit Rules deal with the storage, movement and import or export of a broad range of materials defined in the Act as "forest produce", which incidentally include wildflowers and fruits. An elaborate system of passes, licenses, hammer marks and permits is laid down requiring multiple inspections and the decisions of higher officers before a pass can be issued. The procedures are essentially the same for privately owned timber as for government timber. Passes authorizing the transport of the material are required at each stage of transaction.

The log-tracking system starts with the forester who marks trees for felling. Each marked tree is assigned an inventory number which is painted on the tree itself. After felling the same number is chiselled on the logs cut from the tree and a sub-number is added for each log. The logs are also branded with hammer marks to identify the location from which they were harvested. When the logs are loaded onto a transport vehicle (whether a lorry, tractor, bullock cart or any other vehicle), a transit pass is issued to the operator for the specific load of logs and for a specified period. The pass is issued by a Forest Ranger for government-owned timber and by a District Forest Officer for privately-owned timber. Every forest and police officer, regardless of jurisdiction, has the power to stop a vehicle and check the contents using the transit pass and the accompanying list of logs as a reference. In addition, there is a network of check posts of the forest department as well as other agencies of the government where the vehicle must stop and submit a check of documents. The whole scheme of such checks is common to both government-produced logs and those from private lands. The burden of proof that the logs are not the property of the government is always that of the person found in possession of the logs, even when a transit pass can be produced. When the log is scaled to determine its volume and quality (whether in the forest, at a log yard, or at a processing facility), the scaling information is added to the record, as this is the basis on which payment is made to the original owner (whether government, tribal group, community, or private party). All of this information is recorded in documents that can be traced back to the individual forest management unit.

The system makes it possible to determine from the marks on any log, anywhere in India, where it originated as a tree, when was it felled, who did the logging, who transported it, and other relevant facts.

India's log-tracking system is not impervious to misuse, of course. Unscrupulous operators can cut off the ends of the logs, chisel new identifying marks, and add their own hammer brands. Because the identifying marks on the logs must be keyed to other documentation, however, the trail of forgeries must be extensive for this to go undetected. Furthermore, the penalties for such illegal activity are severe, including confiscation of the transport vehicles and the illegal logs, and imprisonment of the offenders.

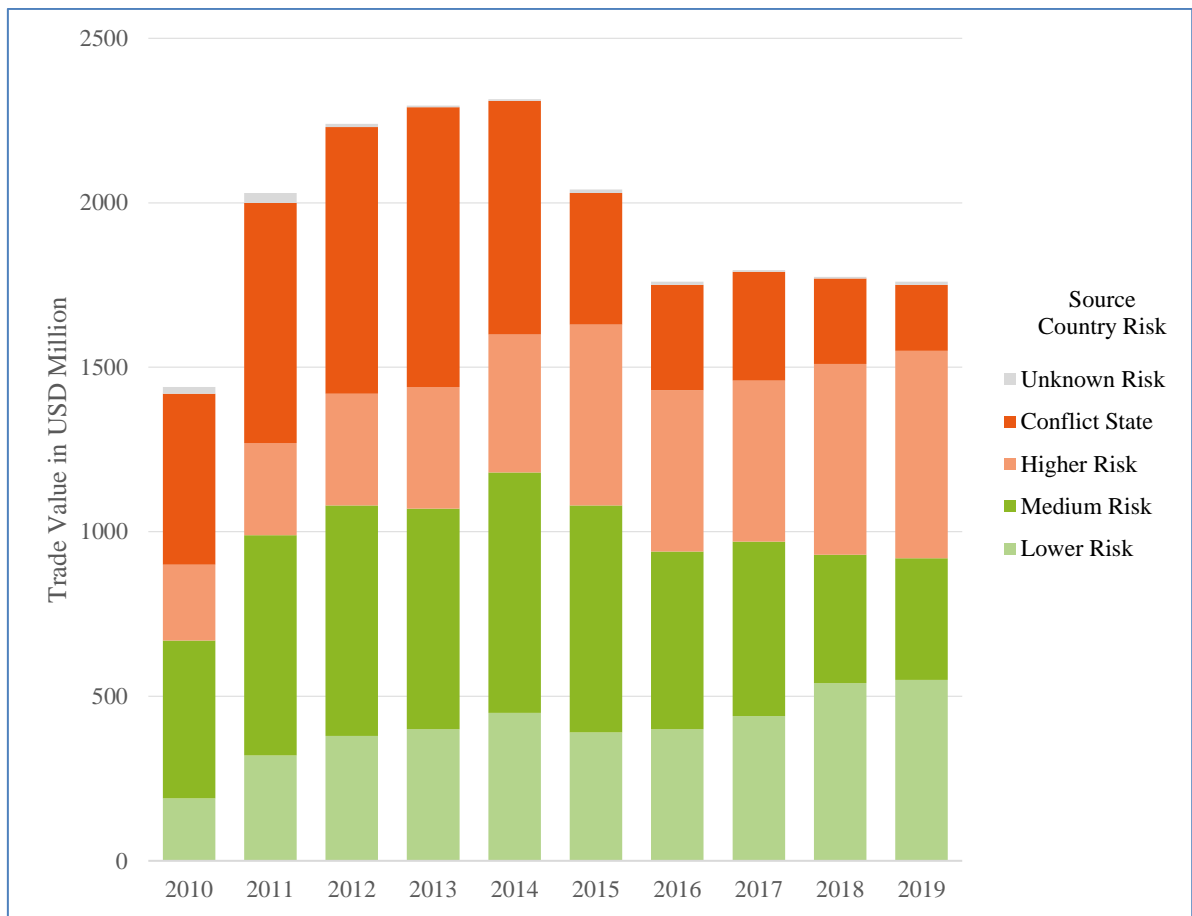
*Source: A. H. Moosvi. Log Tracking and Chain of Custody Practices in Forestry and Forest Products: A Case Study for India. Consultancy report prepared for the World Bank/WWF Alliance on Forests and presented at the workshop on Log Tracking and Chain of Custody Systems held March 19-21, 2002 in Phnom Penh, Cambodia. <https://documents1.worldbank.org/curated/ru/134971468762625582/pdf/263290PAPER0Te1es0for0wood0tracking.pdf>*

**Annexure II****Different departments involved in issuing felling (X) and transit (\*) permits for 18 states in India**

<b>State/ Department</b>	<b>Forest Department</b>	<b>Revenue Department</b>	<b>Gram Panchayat</b>	<b>Agricultural Officer</b>	<b>Zonal Officer</b>	<b>Tree Officer</b>	<b>District Officers</b>
Andhra Pradesh	* X						
Assam	* X						
Bihar	X		X		*		
Chhattisgarh	X*		*				X
Gujarat	X	*					
Haryana	X*						
Himachal Pradesh	X*						
Karnataka	X					*	
Kerala	X*						
Madhya Pradesh	X	*					
Maharashtra	X	*				*	
Mizoram	X*						
Odisha	*						
Punjab	X*		*				
Rajasthan	X	*		X			
Tamil Nadu	X						*
Uttar Pradesh	X*						
West Bengal	* X						

Source: (Mili Ghosh 2016)

**India's Log, Sawn Wood, And Veneer Imports by Risk Profile (2010-19)**



Source –Canby, 2020.

**MOEFCC timeline: Regulatory permits of felling and transit rules**  
(Ministry of Environment & Forests 2012)

- The **Bansal Committee report** was appointed by the Ministry of Environment and Forests in 2011 to study the regulatory regime for felling and transit rules for trees grown on non-forest and private lands. The committee's report identified regulatory bottlenecks that impede the growth of agroforestry. The committee's recommendations, which are mentioned in the guidelines issued by MoEFCC in 2014, included:
  - *Relaxing rules for felling and transit of species preferred by farmers for social forestry*
  - *The need for a simple uniform mechanism/procedure to regulate the transit rules of forest*
  - ***“There should not be any requirement of permission for felling of trees and transit permits in case of important timber species like Teak (*Tectona grandis*), Shisham (*Dalbergia sissoo*), Padauk (*Pterocarpus dalbergioides*) and Pines etc. in the States and Union Territories where these species are not found in natural forests, but farmers and private land owners raise plantations of such species”***
  - *The Revenue and other State Acts/ Regulations/ Rules which inhibit tree felling and free movement of timber within and across the States also need to be suitable amended and liberalised by the concerned States.*
- **Expert committee report<sup>6</sup> by the MoEFCC** to increase the area under Trees outside forests -
  - *Easing out felling and transit restrictions on farm forestry/agroforestry tree species and products is necessary to realise their full potential and to benefit the farmers. State Governments need to declare all agroforestry species as agricultural produce to facilitate ease of felling, transport and marketing under the model Agriculture Produce and Livestock Marketing (APLM) Act, 2017. Also, a clause would be added under model APLM act by MoA that all species declared as agricultural produce would not require any felling permission under the provision of any of the existing acts of the state recommended species be exempted, and the felling and transit regulations be liberalised and streamlined amongst many others.*
  - *There is a need to amend section 2(4) of the Indian Forest Act to indicate that any species of tree/plants notified as agricultural produce under the*

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<sup>6</sup> Expert committee report - Strategy for Increasing Green Cover and Outside Recorded Forest Areas, 2018. <https://moef.gov.in/wp-content/uploads/2019/06/Expert-Committee-Report-On-Tof-18112018.pdf>.

*respective model APLM Act will not be treated as forest produce whether found in the forest or not.*

- *Section 2 would also include that RET species specified under schedule VI of the Wild Life Protection Act, IUCN Red List or CITES or in any Gazette published by the Union/ State Government or notified under an international treaty adopted by Central Government, will continue to be treated as forest produce, even if these are declared as agriculture produce under model APMC Act of any of the states.*
- *MoEFCC should take up with urgency the removal of Dalbergia sissoo from Appendix II of CITES since this is an important species taken up for plantation by farmers and use for furniture and other artefacts.*

**List of trees recommended by MoEFCC marked against states where permit exemptions have been granted**

State Name/ Tree Name	AP	AR	TR	H Y	MN	TS	TN	PB	J& K	KN	G	JH	KL	RJ	U. P.	HP	BH	DL	MP	M Z	CG	NL	OD	CH	UK	AN	AS	LP	M H	ML	SK	GA	WB			
Eucalyptus	X*	X*	*	*	X*	X	X*	X*	X*	X*		X*			X*	X*	*	X		X*																
Poplar	X*	X*	*	*	X*	X		X*	X*		X	X*			X*	X*	*	X	X*		X*															
Subabul	X*	X*	*	*	X*	X	X*	X*		X*	X	X*			X*				X*		X*		X*						X*							
Neem	X*	X*	*	*	X*		X*	X*	X*		X	X*	X*							X*		X*			X											
Casurina	X*	X*	*	*	X*	X	X*	X*		X*	X	X*	X*	X*	X*				X*		X*															
Meliadubia	X*	X*	*	*	X*		X*	X*		X*	X	X*	X*	X*	X*																					
Rosewood	X*	X*	*	*	X*	X	X*		X*	X*					X*								X*													
Teak						X			X*																											
Meranti (Cedar)									X*				X*																							
Meranti (Mahogany)							X*				X		X*																							
Gurjan																																				

Source: Sinha, 2018

- X - Felling Permit Exempted | \* - Transit Permit Exempted (If the box is empty, that means permits are required)
- States marked in red have exempted all trees except high-value native timber trees
- High-value native timber trees recommended for exemption highlighted in orange
- States in which teak trees are naturally found in forests are marked in green



**Other countries and their laws pertaining to the promotion of agroforestry and/or trees outside forests**

<b>Country</b>	<b>Year</b>	<b>Regulation</b>	<b>Features</b>
France	2010	Article 44	Support agroforestry
Australia	1997	Plantation 2020	Develop farm forestry
Kenya	2009	Agroforestry Policy	Bring 10 percent of farmland under tree cover
Philippines	2005	Upland Agroforestry Programme	Create agroforestry farms and plantations of 50ha and above on 4 million ha of degraded and unproductive forest land
China	1999	Grain for Green Programme	Convert a portion of cropland on slopes to forest
Guatemala	2010	Forestry Incentives for Owners of Small Plots of Land Used for Forestry and Agroforestry (PINPEP)	Promote farm forestry on small farms ( less than 15 ha )
Malawi	1997, 2004	Forestry Act, National Environment Policy	Include agroforestry in both regulations
Peru	2011	Forest Law	Recognize the role of agroforestry in timber production

*Source: Sinha 2018*

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