

NCCF Policy Paper 1/2024

**Enhancing the Contribution of Agroforestry
and other Tree outside Forest Resources of India
in
National Development
by
Arun K. Bansal
Former Addl. Director General of Forests, India**



Network for Certification and Conservation of Forests

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Foreword

It is my privilege to introduce this research paper, which delves into an area of critical importance in our field today. Authored by Mr. A K Bansal, this work represents a significant contribution to our understanding of —Enhancing the Contribution of Agroforestry and other Tree outside Forest Resources of India in National Development.

I have witnessed the evolving landscape of Agroforestry, and the insights presented in this paper resonate deeply with current challenges and opportunities. Mr. Bansal brings to this research not only a profound understanding of the theoretical frameworks but also a rigorous approach to empirical investigation. What makes this research particularly compelling is its potential impact on National Development.

In closing, I commend Mr. Bansal for his dedication and scholarly rigor in producing this insightful work. It is my sincere belief that this research will inspire further inquiry and advancements in the field of Agroforestry and Trees outside Forest. I invite readers to engage deeply with the findings and consider their implications for future practice and research.



A. M. Singh, IFS (Retd.)
Director General, NCCF

Acknowledgements

The research derives from my association with —tree cultivation outside designated forests|| 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 the special processing needs of fast growing plantation timbers and as Project Director Orissa Forestry Sector Development Project from 2006-2010 I was confronted with the challenges in promotion of agroforestry. As Additional Director General of Forests, Ministry of Environment and Forests (now MOEF&CC), Government of India from 2011-2012 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, as FSC-FM lead Auditor I got fresh opportunity to interact with group of farmers pursuing tree cultivation in farm lands for production of industrial round wood, and also in the course of my association with the Network for Certification and Conservation of Forest (NCCF) in development of standard for certification of ToF.

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 Dr A. M. Singh, IFS (retd.) 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.)
Former Addl. Director General Forests, India

Abbreviations

ACZ	Ago Climatic Zone
AfPS	Agroforestry Production System
ASI	Agroforestry Suitability Index
CAFRI	Central Agro Forestry Research Institute
CARB	California Air Resources Board
CDM	Clean Development Mechanism
CER	Carbon Emission Reduction
CITES	Convention on international Trade in Endangered Species
COOO	Certificate of Origin and Ownership
cum	cubic meter
dbh	Diameter at Breast Height
DoLR	Department of land Records
EPCH	Export Promotion Council for Handicrafts
EUDR	European Union Deforestation Regulation
EUTR	European Union Timber Regulation
FAO	Food and Agriculture Organization
FCA	Forest Conservation Act
FSI	Forest Survey of India
FTC	Forest and Tree Cover
GIS	Geographic Information System
GoI	Government of India
GROW	Greening and Restoration of Wastelands
Ha	Hectare
ICAR	Indian Council of Agriculture Research
ICFRE	Indian Council of Forestry Research and Education
IRW	Industrial Round Wood
ISFR	India State of Forest Report
IUFRO	International Union of Forest Research Organizations
MBr	Methyl Bromide
Mha	Million hectare
MDF	Medium Density Fiber board
MOAFW	Ministry of Agriculture and Farmers Welfare
MOEFCC	Ministry of Environment, Forests and Climate Change
NAfP	National Agro Forestry Policy
NAfIS	National Agro Forestry Information System
NCCF	Network for Certification and Conservation of Forests
NFP	National Forest Policy
NITI	National Initiative for Transforming India
NPPO	National Plant protection Organisation
NPV	Net Present Value
NTFP	Non Timber Forest Product
NTPS	National Transit Permit System
NWFP	Non Wood Forest Product
PEFC	Programme for Endorsement of Forest Certification
QCO	Quality Control Order
QPM	Quality Planting Material
RFA	Recorded Forest Area
RKVY	Rastriya Krishi Vikas Yojna
SDG	Sustainable Development Goals
SEZ	Special Economic Zone
SFD	State Forest Department

SLC	State Level Committee
sq. km.	Square Kilometer
sq. m.	Square meter
SMAF	Sub-Mission on Agroforestry
TERI	The Energy and Resources Institute
TGA	Total Geographic Area
ToF	Tree outside Forests
UNCCD	United Nations Convention on Climate Change
USAID	United States Agency for International Development
UT	Union Territory
WBI	Wood based Industries

Executive Summary

Agroforestry, characterized by the intentional integration of trees into agricultural landscapes, represents a multifaceted approach to sustainable land management with profound implications for ecological resilience, economic development, and climate change mitigation. This synthesis examines India's strategic initiatives, scientific assessments, and policy frameworks aimed at promoting agroforestry and ToF practices, emphasizing their role in achieving national forestry targets and sustainable development goals. Globally, agroforestry spans over 1 billion hectares, impacting approximately 1.2 billion people, predominantly in tropical and subtropical regions. In India, recent estimates from the Forest Survey of India (FSI) indicate that Trees outside Forest (ToF) resources cover 29.29 million hectares, significantly contributing to the country's forest and tree cover goals. These resources are critical for sustaining biodiversity, enhancing ecosystem services, and supporting rural economies through the production of industrial round wood (IRW), non-wood forest products (NWFPs), and other ecosystem goods.

Scientific evaluations underscore agroforestry's diverse benefits, including enhanced soil health, biodiversity conservation, and climate change adaptation. Studies reveal that transitions from traditional agricultural practices to agroforestry systems have led to improved soil organic carbon levels and resilience against climate variability.

Agroforestry practices in India, rooted in traditional knowledge systems, were formalized through enunciation of the National Agroforestry Policy in 2014, the first such policy anywhere in the world. It is gaining prominence for their ability to meet domestic demand of industrial round wood apart from enhancing agricultural productivity, diversify rural livelihoods, and mitigate environmental degradation. The integration of multipurpose tree species such as fruit trees, timber species, and medicinal plants with crops and livestock not only optimizes land use but also improves soil fertility, water retention, and carbon sequestration capacity.

As envisaged in the NAFp the Ministry of Agriculture and Farmers Welfare, the nodal ministry of the Government of India for agroforestry implemented a Sub Mission on Agro Forestry (SMAF) from 2015-16 which was subsumed in Rastriya Krishi Vikas Yojna in 2022-23 due to unsatisfactory response from the States. Coordinated efforts across ministries and sectors aim to integrate agroforestry into broader agricultural and environmental policies, enhancing rural livelihoods and ecological resilience while contributing to national climate change adaptation strategies.

Challenges in scaling up agroforestry include regulatory complexities, variable state-level engagement, and limited financial incentives for farmers. Addressing these barriers requires streamlined policies, enhanced institutional support, and strengthened stakeholder collaboration to facilitate widespread adoption and implementation of agroforestry practices across diverse agro-climatic zones. Commercially, agroforestry plays a pivotal role in supplying raw materials for industries such as pulp and paper, furniture, and construction,

thereby fostering rural economic development and employment generation. Presently, ToF resources account for about 74% of the total availability of IRW in the country. Recognising the need for independent certification of management of forests, agroforestry and other ToF resources, MoEFCC India has recently initiated Indian Forest and Wood Certification Scheme (PRAMAAN) adding yet another certification scheme to the two already prevalent global independent third party forest certification systems namely Program for Endorsement of Forest Certification and Forest Stewardship Council aiming at promotion of sustainable wood production practices, ensuring market credibility and competitiveness for Indian wood products in domestic and overseas markets. To enhance quality of wood based composites the Bureau of Indian Standard have recently notified Quality Control Orders (QCOs) for Wood Based Boards, Plywood and Wooden flush door shutters, and Resin Treated Compressed wood laminates applicable to manufacturing of these goods in the country as well to the foreign manufactures exporting these goods and articles to India.

Urban forestry initiatives complement rural agroforestry efforts by enhancing urban resilience, improving air quality, and promoting community well-being through the establishment of green spaces in urban areas. Programs such as the Urban Forest scheme in India aim to integrate nature into urban planning, aligning with sustainable urban development goals and enhancing urban biodiversity.

Scientific research and technological advancements are pivotal in advancing agroforestry practices in India. Efforts by research institutions like the Indian Council of Agricultural Research (ICAR) and the Indian Council of Forestry Research and Education (ICFRE) focus on developing region-specific agroforestry models, improving tree breeding techniques, and enhancing the resilience of agroforestry systems to climate change impacts.

India can and need to enhance the contribution of agroforestry and other ToF resources to achieve national forestry targets, enhance rural livelihoods, and contribute significantly to global environmental sustainability efforts through holistic implementation of NAFIP for which it is necessary to undertake a comprehensive review of the current status of its implementation including causative analysis of performance of SMAF, adoption of agroforestry and tree cultivation under state plans/schemes and externally aided projects/programs, use of wood substitutes, import trends of IRW and wood products (including paper pulp and paper boards etc.) and evolve a long term strategic road map and a robust institutional arrangement covering the entire agroforestry value chain. Agroforestry and tree cultivation need to be organically linked to —climate mitigation and adaptation strategies and integrated with the concept of —Grow more wood use more wood

1. Introduction

Although the term Agroforestry seems to have been coined in mid-seventies, the use of woody perennials in agricultural systems is a very ancient practice. Agroforestry refers to land use systems where woody perennials (trees, shrubs, palm, bamboos, etc.) are deliberately grown along with agricultural crops and/or animals on same piece of land in some form of spatial arrangement or temporal sequences. Agroforestry has been practiced in many countries in the world, including India, for centuries with multi-functional trees integrated in the crop and livestock-production systems ranging from scattered trees in farm land, to linear low of tree along farm boundaries, to tree canopies above crops, depending upon the agro-climatic and other local conditions. Growing of trees along agriculture crops also facilitates nutrient cycling, enhances productivity and sustainability of agriculture production system. There are both ecological and economical interactions between these different components. Tree cultivation on agricultural lands is an important pathways to improve agricultural production systems along with multiple environmental, ecological, and socio-economic benefits, while potentially contributing to at least nine of the 17 Sustainable Development Goals (SDGs).

In recent years agroforestry is getting recognised as a natural climate solution having ability to mitigate climate change without compromising food security or biodiversity. A recent updated study on estimation of biomass carbon on agricultural lands has found that existing tree cover makes a major contribution to the carbon pool on agricultural lands, nationally, regionally, and globally. Agroforestry species sequester as much carbon in below ground biomass as the primary forests, and far greater than the crop and grass systems. The total biomass on agricultural land globally was estimated to grow 4.6% over the previous decade, with trees contributing more than 75% (Zomer et al. 2022).

A recent systematic review of grey and peer-reviewed publications about the contribution of on-farm trees to global wood supply and tropical forest conservation by Mutune et al (2024) found that on-farm trees are a significant alternative source of wood supply in South Africa, India, and Kenya, supplying 27, 36, and 70 per cent of total apparent consumption, respectively. On-farm trees were the chief source of wood fuel. With supportive policies and good governance, on-farm trees can sustainably contribute to the wood supply chain, save the tropical forest, and enhance forest ecosystem services.

Globally, about 1.2 billion people practice agroforestry on 10% of the total agricultural cover, which accounts for over 1 billion hectares (Zomer et al. 2022). Several traditional agroforestry practices have evolved in different regions of the world, specially tropical and sub-tropical areas and they continue to play significant role.

There are three main classes of agroforestry systems, viz. Agri-silvicultural system - combination of crops and trees (including fruit trees), Silvo-pastoral systems combine trees and grazing of domesticated animals on pastures, rangelands or on-farm, and Agro-silvo-

pastoral – have all the three elements, namely trees, animals and crops, and are illustrated by home gardens involving animals as well as scattered trees on croplands used for grazing after harvests. Based on socio-economic criteria and management input agroforestry can be grouped into three categories namely Subsistence, Commercial, and Intermediate systems. The plantation of trees may be in blocks with canopies above the agricultural crops in initial years, or rows of trees along the farm boundary or as scattered/isolated trees. The underlining concept is purposeful growing or retention of trees with agricultural crops in interacting combinations for multiple products or benefits from the same land parcel.

With increasing population and living standards in the country there is immense pressure on land resources in India for various societal needs. For several decades immediately after independence, forest areas were being made available by the States for other uses, largely for extension of agriculture.

However, in a major constitutional amendment in 1976 —Forest land was transferred from the —State list to the —Concurrent List of the Indian Constitution empowering the Central Government to legislate in the forest related matters. In 1980 the Central Government enacted the Forest Conservation Act (FCA) requiring the States to take prior approval of the Central Government for diversion of —any forest land for non-forestry purposes and such diversions are approved with mitigation measures including compensatory afforestation, and net present

Box 1

FCA lowers Deforestation

FCA has resulted in substantial reduction in the rate of diversion of Forest areas for non-forestry uses from 0.15 Mha to only around 0.02 Mha per annum till 2011 (Bansal, 2013). Total diversions of forest land under FCA for various non-forestry purposes till February 2020 was around 1.4 Mha including regularisation of encroachments and conversion of forest village. Major activities for which forest areas have been diverted are mining (20.2%) irrigation projects (16.7%), hydel power (11.9%), defence projects (10%), road construction (8.5%), transmission lines (5.7%). It is important to note that in many activities such as mining, firing range in defense, including removal tree growth from the diverted areas may take place in phases spread over few years. Consequently forest/tree cover remains intact in the area. Moreover, the —diverted areas continue to remain —forest legally and are therefore not reflected in forest areas statistics. However, impact of these diversions is not limited to deforestation of diverted areas and associated loss of livelihoods. There are serious influences on remaining forests due to honey-combing and increased anthropogenic pressure etc. which are neither assessed nor addressed through any remedial measures.

value (NPV) to be deposited by the user agency depending upon the quantity and density of the land converted for non-forest use. NPV is to be utilized for undertaking forest protection, other conservation measures and related activities¹. Moreover, since —forest is not defined in any law², the supreme court of India decided in their order of 12.12.1996 in WP No. 202/1995 ‘. the term ‘forest land’ occurring in Section 2, will not only include ‘forest’ as understood in the dictionary sense, but also any area recorded as forest in the Government records irrespective of its ownership. With the amendment in 2023 the FCA has been renamed as Van (Sanrakshan Evam Samvardhan) Adhiniyam) and

¹ Orders of October 29, 2002 of the Supreme Court in Writ Petition (Civil) No. 202/95

² The Indian Forest Act 1927 and various State Forest Acts define various categories of forests such as Reserved Forest, Protected Forest, Village Forests which are notified under the Indian Forest Act or the State Forest Acts.

will be applicable to (a) the land that has been declared or notified as a forest in accordance with the provisions of the Indian Forest Act, 1927 or under any other law for the time being in force, and (b) the land that is not covered under clause (a), but has been recorded in Government record as forest, as on or after the 25th October, 1980. Categories of land that shall not be covered under the provisions of this Act include such tree, tree plantation or re-forestation raised on lands that are not specified in (a) or (b) above³. This is likely to promote tree cultivation in private/non-forest areas.

Under present circumstances, there is very little possibility for increasing the notified/recorded forest area. As such, tree cultivation in non-forest areas and private lands (agroforestry) is an important activity that can *inter alia* contribute in achieving the national goal of 1/3rd of total land area under forest and tree cover (FTC) as envisaged under the National Forest Policy (NFP), 1988. According to India State of Forest Report (ISFR) 2021, of the 3,287,469 sq. km. total geographical area (TGA) of the country recorded forest area (RFA) as per state records is 775,288 sq.km. (23.58% TGA) and 738,373 sq.km. as per digitised RFA/Green Wash (GW) boundary. Total Forest and Tree Cover (FTC) 809,537 Sq.km. which is only 24.62% of TGA far below the national goal. It may be important to note that RFA includes forest land diverted for non-forestry purposes, and forest lands given for

cultivation and other uses under the Scheduled Tribes and other Forest Dwellers (Recognition of Forest Rights) Act, 2006 since such diverted forest areas continue to be —forest|| legally.

In India, although plantation of trees along the periphery of agricultural lands and integration of tree species with agricultural crops, in different crop combinations, has been traditionally practised in different part of the country for subsistence, commercial, and intermediate purposes. For past few decades commercial Tree outside Forest (ToF) resources

have gained importance primarily to meet the growing demand of IRW and Non-wood Tree Products.

Although —agroforestry|| is sometimes used to describe —trees outside forest||, *actually Agroforestry is a sub-set of Trees outside Forest.*

³ The Amendments are Sub Judice in the Apex Court in WP (Civil) No. 1164 of 2023

The agroforestry and other ToF resources are becoming increasingly significant since timber production from forests has gone down substantially as a result of enhanced understanding about and greater realization of ecological role of forests and their management as a social and environmental resource. Ecosystem services provided by forests underpin an important defense against the climate change impacts. Indian constitution also envisages protection of environment by the State which has a direct bearing with citizens' right to life makes protection and improvement of the natural environment as one of the fundamental duties of every citizen. This assumes greater significance for human existence due to accelerated climate change

India became the first country in the world to enunciate National Agroforestry Policy (NAfP) 2014 with a view not only enhance farm productivity but also increase resilience against Climate Changes, and thereby provide insurance against crop failures due to vagaries of nature and furthering forest conservation through reduction of pressure on forests for industrial round wood (IRW), fuelwood, grazing, and other forest products. (Anon. 2014

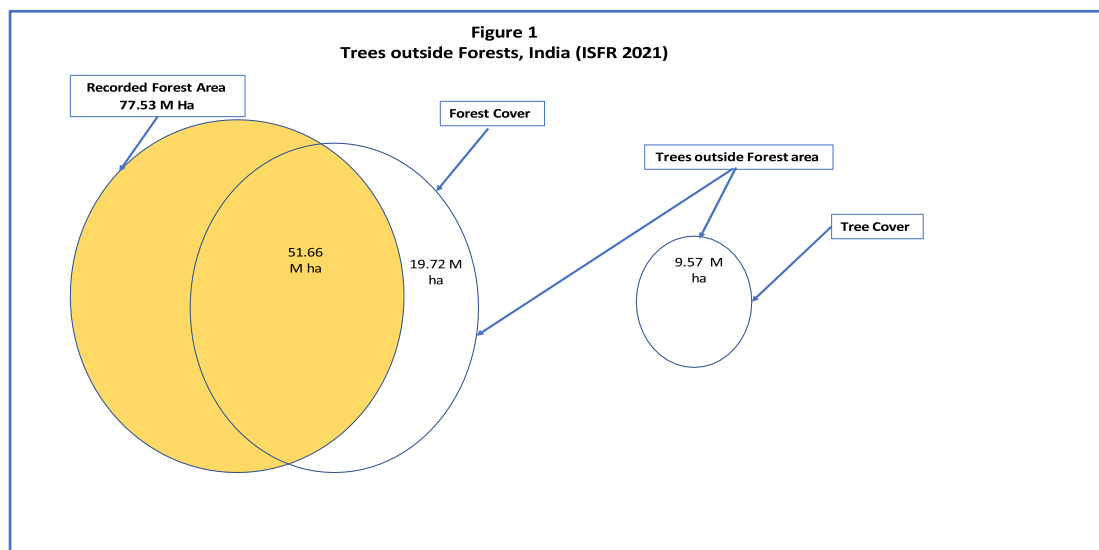
2. Extent of Tree outside Forest and Agroforestry

Based on geospatial analysis of remote sensing-derived global datasets of the period ending 2010, agroforestry, with tree cover of greater than 10%, was found on more than 43% of all agricultural land area in the world and was prevalent in Southeast Asia, Central America and South America. Moreover, during the period 2000-2010 there was around 3% increase in tree cover on agricultural lands, largely in Southeast Asia (Zomer et al. 2014). Around the same time period, while attempting quantification and distribution of agroforestry systems at global level Kumar et al. (2014) estimated that of the total agricultural area 2283 Mha about 46% (1,023 Mha) was under agroforestry – cultivated areas with tree cover of more than 10%. They also estimated that 27% of agricultural land has tree cover more than 20%, but only 7.5% area has tree cover more than 50%. More recently, Nair et al. (2021) estimated that global area under agroforestry systems to be 1600 Mha, with roughly 78% in the tropics and 22% in the temperate regions.

2.1 Tree outside Forest Resources in India: In India ToF resources are assessed by forest Survey of India, as a part of biennial assessment of forest and tree cover in the country published as India State of Forest Reports (ISFRs). Under these biennial assessments, ToF comprise two types of areas viz. (i) forest cover outside the recorded forest areas (estimated as a part of forest cover based on digital interpretation of satellite data with areas one ha or more having more than 10% canopy cover - in three canopy density classes i.e. very dense forest, medium dense forest and open forest), and (ii) tree cover in blocks, rows, isolated or sporadic trees in patches smaller than 1 ha in area not covered as forests (estimated from ToF inventory data in rural and urban areas following a new grid-based national forest inventory design, since 2016, and represented as *notional area corresponding to 70% canopy density*). Both these categories include trees growing under farm/agroforestry in agricultural lands, urban areas, and other non-forest areas. Although —tree cover is being estimated by FSI since 2003, the extent of the other component of ToF i.e. —forest outside recorded forest area was reported for the first time in ISFR 2019. Table 1 gives tree cover in the country as estimated in various ISFRs published since 2003 and also ToF area assessed during last two ISFRs.

ISFR	Tree Cover (Mha)	ToF Area* (Mha)
2003	9.9896	Not estimated
2005	9.1663	
2009	9.2769	
2011	9.0844	
2013	9.1266	
2015	9.2572	
2017	9.3815	
2019	9.5027	
2021	9.5748	29.2907

According to the latest ISFR 2021 (FSI, 2021) total ToF area in the country is assessed to be 29.29 Mha. The extent of above mentioned two components is: Forest Cover - 19.72 Mha, and Tree cover 9.57 Mha. According to this report total forest cover (comprising all lands parcels of more than 1 hectare with tree canopy density of more than 10% irrespective of species composition, legal status – recorded as forest or not, and ownership) in the country was 71.38 Mha (21.71% of TGA). Out of this 51.66 Mha were in the RFAs.



2.2 Extent of agroforestry in India: There is no national system in place in the country for periodic assessments of the extent of agroforestry and as such authenticated figures of area under agroforestry are wanting. However, there have been several assessments reporting widely varying estimates. FSI in its biennial forest cover assessment in ISFR 2013 included a chapter on Trees in Agroforestry Systems in India where in total green cover in the agroforestry system in the country was estimated to be 11.12 Mha (3.39% of TGA). This assessment was based on ToF inventory data of rural areas in 179 sampled districts during 2006 to 2012, covering block and scattered formations excluding linear stratum and private forests.

According to another assessment around the same time by Dhyani et al. (2013) the area under agroforestry was estimated to be 25.32 Mha (8.28% of TGA) in 2013 (increased by 44%, from 17.58 Mha in 1999). This 25.32 Mha comprises 20 Mha in cultivated lands [7.0 Mha in irrigated areas (11.23% of total irrigated areas) and 13.0 Mha in rain fed areas (16.54% of total rain fed area)], 5.32 Mha in other areas such as shifting cultivation, home gardens. The area under agroforestry works out to only around 13% of the gross cropped area during 2013 (198.9 Mha). It may be seen that the area under agroforestry in India was far below the global average of 43% (as mentioned earlier).

In a recent study area under agroforestry was estimated through sub-pixel classification and object-based image analyses of medium-resolution (LISS III – 23.5 m) and high- resolution (LISS IV/Sentinel 2 – 5.8/10 m) remote sensing data respectively. The overall area under agroforestry in all the 15 Agro Climatic Zones (ACZ) of India was 28.427 M ha, which is about 8.65% of TGA. The accuracy of the estimation is mentioned to >75% and >90% for sub-pixel classification and object-based image analysis methods respectively. Across the ACZs, the Upper Gangetic Plain Region had greater area (15.55%) under agroforestry while the lowest was in the Western Dry Region (2.45%) and the Island Region (2.48%). Mentioning that the agroforestry area reported in this study indicates tree and crop canopy areas, it recommends not to equate the agroforestry area to trees outside forest areall which includes tree cover and forests outside the Recorded Forest areas. (Arunachalam et al. 2022)



There is wide variation in number of trees per ha and their spatial arrangement (isolated trees not having any regular spacing or density, trees on boundaries, wind breaks shaded perennial systems, intensive tree-intercropping, block plantations) and there are different approaches in estimation of area under agroforestry – from —gross areall to —area of influence to —tree-cover converted notionally equivalent to area with a fixed canopy density. The varying estimates of extent of agroforestry underline the need for collaborative effort involving the Ministry of Agriculture and Farmers’ Welfare (MOAFW), the nodal ministry for agroforestry, and the Ministry of Environment, Forest and Climate Change (MOEFCC) of the GoI for standardising the methodology for mapping and estimation of area under agroforestry and establishing a National Agroforestry Information System (NAFIS).

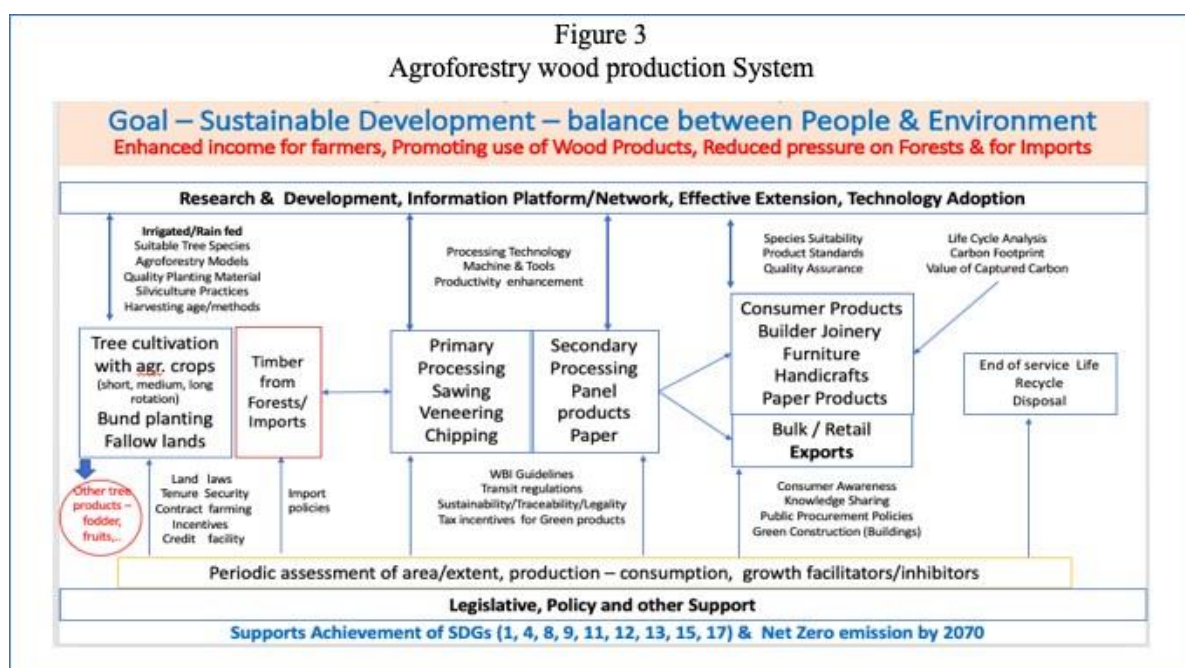
Haryana has become the first state in the country to conduct ToF Tree Census in 2023 on the pattern of decadal population census and livestock census. Total number of ToF trees standing on non-forest lands including farm lands, panchayat lands, community lands, strips along roads, canals and railway lines, inside the premises of institutions, schools and colleges etc. are counted to be 41.197 million with major share coming from Eucalyptus - 10.21 million, Poplar - 4.7 million, Neem (*Azadirachta indica*) - 3.02 million, Sheesham (*Dalbergia sissoo*) - 2.96 million, Kikar - 2.02 million, Papdi - 1.23 million, Jamun – 0.49

million, Pipal - 0.32 million, Mango (*Mangifera indica*) - 0.31 million etc. Total Volume of ToF trees is computed to be 15.25 million cum- 5.6 M cum Eucalyptus, Neem and Sheesham around 1 million cum each, 0.4 million cum Poplar, 0.7 million cum Kikar etc. Girth class wise details are also available. The information on tree count was used for calculating equivalent tree cover outside forests in acres (200 tree of Eucalyptus or Poplar = one acre, and for other species 80 trees = one acre). According to this, forest and tree cover area is reported to be 0.289 Mha which is 6.73% of the TGA – forest cover 0.164 Mha and tree cover 0.125 Mha. District wise details are also published in the report. It is envisioned the result this census will be used in formulating a comprehensive afforestation plan to increase the green cover in the state (Anon. 2023). At macro level, the results are comparable to the assessment done by the Forest Survey of India published in ISFR 2021.

3. Agroforestry Production System

Agroforestry is a comprehensive production system that provides many goods and services and plays a significant role in reducing vulnerability and enhancing resilience of crop production against impact of climate change. It has potential for additional employment generation in through production, processing and value addition to a variety of tree products. Apart from various produces from traditional systems, commercial agroforestry revolves around tree products with industrial round wood as the main product, and fuel wood and fodder as bye products. Other products may be fruits, fibres, gums, resins, bamboo, and products used as in gradients in pharmaceuticals and nutraceuticals, cosmetics etc. in different ACZs.

Figure 3 depicts a generalized agroforestry wood production system and its interactive component including policy/legal aspects, processing/utilization/disposal at the end of service life, research & development needs.



It is evident from the above infographic that any agroforestry production system (AfPS), particularly the AF wood production system, supports achievement of several SDGs. Two key stakeholders of AfPS are the tree growers and the processing industry with government providing conducive environment through facilitative policy and legal framework, credit and technical support. For accelerated growth of agroforestry it is necessary to have facilitative regulatory mechanism – relating to production and movement of raw produce, establishment and operation of processing industries, quality standards and compliance system; and required processing infrastructure to convert agroforestry tree products into consumer goods to meet the domestic demand and for exports with robust research & development and information systems covering all aspects of AfPS.

The industry has to play a major role, as is also envisaged in the 1988 NFP —to raise the raw material needed for meeting its own requirements, preferably by establishment of direct relationship between the factory and the individuals who can grow the raw material by supporting them with inputs including credit, constant technical advice and finally harvesting and transport services. This has been successfully achieved to an extent by the paper industry. ITC forestry program backed with its strong R&D has now become a brand name for its Eucalyptus clones and most paper industries are having their own well developed programs for production of QPM and promoting agroforestry in their respective catchment areas. Other wood processing industries, including plywood, wood based panel composite and furniture industry have yet make a beginning in this direction. Industry also need to establish organic linkages with research institutes for development of appropriate processing technologies for manufacturing engineered wood products from agroforestry wood to substitute imported wood and wood products to the extent possible.

A study in the Nilgiri Biosphere Reserve, Kerala found that the farmers engaged with the cultivation of any kind of agroforestry practices received significant returns like food, security of livelihood, additional income, and reduced climatic pollution (Kumar 2010). Singh et al. (2022) have reviewed published research in the field of agroforestry in last two decades to get an insight into the significance of the agroforestry including *inter alia* the benefits. It was opined that the interaction between tree and crop depends on the type of the model, species selection, composition of varieties. Tree roots improved the quality of water absorption, increased the beneficial microorganism in turn enhanced richness of soil nutrients and found to decrease soil salination and acidification (Murthy et al. 2013). Under agroforestry physico-chemical properties of soil organic carbon and soil pH were found to improve significantly (Sharma *et al.* 2019). In a recent study —the transition from shifting cultivation to indigenous agroforestry as nature-based solution for land restoration in the Indian Eastern Himalayas Hazarika et al. (2023) found that transition from shifting cultivation to pineapple agroforestry improved soil organic carbon (SOC) and stratification ratios while reducing soil erodibility and concluded that pineapple agroforestry is a nature-based solution to restore degraded lands and presents an excellent opportunity for sustainable soil health and carbon sink management.

Needless to say that improvement in soil properties results in increase in productivity of the land. Agroforestry has significant benefit to farmers with marginal and small landholdings due to increase the productivity in the same piece of field.

AfPSs offer immense opportunities of creating synergies between adaptation and mitigation actions. Recent studies under various AfPS in diverse ecological conditions showed that these systems increase and conserve aboveground and soil carbon stocks and also have an important role in increasing livelihood security and reducing vulnerability to climate change. The potential of agroforestry systems in India to accumulate carbon is estimated to be 0.29 – 15.21 mg/ha/year (Dhyani et al. 2020).

An AR/CDM project titled —Improving Rural Livelihoods Through Carbon Sequestration By Adopting Environment Friendly Technology based Agroforestry Practices⁴ is implemented (in the two states of India: Orissa and Andhra Pradesh with the support of JK Paper Mill and VEDA Climate Change Solutions Limited between 2004-2007. The project comprise afforestation with Eucalyptus hybrid (Clonal & seed) and Casuarina equisetifolia over 1607 ha. in 1708 land parcels belonging to 1590 small landholders spread over a total of six districts: Rayagada, Koraput and Kalahandi districts in Orissa and the districts of Visakhapatnam, Srikakulam, and Vizianagaram in Andhra Pradesh. VCCSL has piloted the CDM project in coordination with JKPL, farmers, and other stakeholders to facilitate the flow of Carbon revenue to the participating farmers with JKPL doing the main project implementation work/planting activities in the field. The plantations were planned to be managed with a 5 year rotation period. It is seen that after first cycle in several land parcels replantation/cropping was not taken up and there was land-use change. By now, two cycles of monitoring have been completed and based on verified Carbon Emission Reduction (CERs) farmers have received payment @ Rs. 2000/year/ha for each cycle⁴.

Under commercial or industrial agroforestry block/boundary plantations of several tree species are being preferred by tree growers in different parts of the country due to market demand and good financial returns. These include Eucalyptus, Casuarina, Poplars, Melia dubia, Teak, Sandal, Bamboo, Rubber. Industry and R&D institutes are also working to develop new clones, genetically improved varieties, and agroforestry models of fast growing spp. such as eucalyptus, poplar, and casuarina to enhance productivity and income to tree growers. State Governments are also sensitive and making regulatory regime less cumbersome to the tree growers and the processing industries.

Box 3

Private Sector in promoting agroforestry

The private sector's role in promoting agroforestry started in 1980s with WIMCO - a safety matches manufacturing company initiated poplar plantations on farmers' fields for match wood production. ITC has invested substantially in R&D and achieved good success in development of eucalyptus clones. This model was adopted by other paper industries and has been contributing to growth of tree cultivation in private lands, primarily fast growing spp. eucalyptus and casuarina. However, this is limited to big industries through backward and forward with farmers to sustain availability of wood.

Relaxation in felling and transit regulations for poplar and eucalyptus and some other tree species by States created an enabling environment for development of WBIs and expansion of agroforestry in several regions of the country.

Other WBI sectors – plywood and penal industries, furniture and toy etc. are indirectly promoting agroforestry through increased demand for IRW.

Sandal trees found pre-dominantly in Karnataka, Tamil Nadu, Kerala, has high-value end uses including essential oils from heartwood as an ingredient in fine perfumes, exclusive natural body-care products and pharmaceuticals, and also for carving handicrafts. It is cultivated in these states as well as in several other states due to its high value and cultivation is on increase after amendments in state laws during 2001-2002 to permit/promote cultivation in private lands. Institute of wood Science and Technology,

⁴ Personal communication with project personnel.

Bangalore is the nodal agency for Sandalwood for Research and Development and also encouraging its cultivation in in the country.

Teak is an important species found in several states, mostly in the southern parts of the country, is recognised as a benchmark for wood quality for comparing other species. Due to its high value farmers and tree growers in several states including Kerala, Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha also prefer to cultivate teak in private lands. To increase teak cultivation many SFDs are incentivising farmers (Warrier et al. 2022). In addition to 8.9 Mha teak bearing forest, teak plantations in the country is estimated to be 1.5 Mha (Tailor and Rekha, 2022). However, despite wide spread plantations in forest as well as in private lands, plantation grown teak wood is also being imported in sizable quantities from several countries. Average annual import of teak logs in last five years was around 1 million cum (analysed by the author based on import data of Ministry of Commerce and Industries, GOI (<https://tradestat.commerce.gov.in>))

Bamboo, a versatile tree-like grass, has around 1,500 different uses ranging from food, wood substitute in building and construction to handicrafts, and has wide spread natural occurrence in most of the States in the country extending over 14.94 Mha (ISFR, 2021). Several species of bamboo are also cultivated in various parts of the country. Some bamboo species are preferred by farmers in home stead and vacant lands. The author did a pilot study of Bamboo and Rattan resources of Odisha under Global Assessment of Bamboo and Rattan Resources program launched by INBAR in 2015. Subsequently, a comprehensive country-analysis ‘Unlocking the potential of Bamboo Sector in India’ covering all its aspects was undertaken by the author in 2020 (Bansal, 2020).

Rubber (*Hevea brasiliensis*) plantations are raised by small holders, accounting for 88 per cent of area and production in India, primarily for latex in mainly in Kerala, Tamil Nadu, Karnataka having suitable climatic conditions. Rubber wood is a bye product when mature trees that no longer produce latex are harvested, and is an important raw material for furniture etc. albeit after proper treatment and seasoning to enhance service life and dimensional stability. Total area under rubber cultivation is about 0.8 MHA. The Rubber Board, under the Ministry of Commerce and Industry, which has been effectively supporting the rubber industry since seventy years, has conducted exploratory surveys and has identified North Eastern region, parts of West Bengal, Orissa, Maharashtra and Karnataka as potential regions of rubber cultivation. Tripura is considered as the ‘second rubber capital of India’ has emerged as the frontrunner among the non-traditional rubber growing regions. Rubber can be grown in an area of 1.2 million hectares with appropriate refinements in agro-management practices in these regions.

In addition to block plantations, long rotation tree species such as *Azadirachta indica*, *Madhuca longifolia*, *Mangifera indica*, *Acacia nilotica*, *Dalbergia sissoo*, *Syzygium cumini*, *Artocarpus heterophyllus*, growing in rural landscape as isolated trees or in clusters or along roadside, which are either remnants of earlier clearance of forest to for agriculture or were

planted by previous generations for non-wood products mainly fruits, flowers etc, or shade, are now important sources of IRW. A recent study (Brandt et al., 2024) through tracking of around 0.6 billion large size trees growing in farm lands in India, other than block plantations, that can be identified as individuals within farmlands in satellite imageries with a spatial resolution of 3–5 m, during, 2010-1, 2018 and 2022. According to this study —around $11 \pm 2\%$ of the large trees (about 96 sq. m. crown size) were generally mapped in 2010/2011 were not detected during 2018-2022. These tree were generally mature trees having reached their later stage of development and were most likely harvested. The study observes that —disappearance of mature farmland trees was observed in many areas, but numbers rarely exceed 5–10%, except for areas in central India, in particular in the states Telangana and Maharashtra, where we document massive losses of large trees. The study further reports found that during the period 2018–2022, more than 5 million large farmland trees (about 67 sq. m. crown size) have vanished (harvested), due partly to altered cultivation practices, where trees within fields are perceived as detrimental to crop yields. However, as the authors have not mapped new trees that might have achieved similar crown sizes in the intervening period, study is silent about actual growth dynamics of such trees.

However, there is a need to further promote cultivation of tree species, having very well recognised high-value end uses, under agroforestry and in other private lands models and address the bottlenecks in their extensive cultivation to meet the growing demand in domestic market, substituting imports and also enhancing exports.

Urban Forests: In addition to tree cultivation in rural landscape it is also important to provide lungs to the rapidly developing, largely unplanned, urban areas, expanding municipalities at the expense of common lands. Cities4Forests, a global initiative, defines an urban forest as the trees and shrubs in an urban area, including trees in yards, along streets and utility corridors, in protected areas and in watersheds. This includes individual trees, street trees, green spaces with trees and even the associated vegetation and the soil beneath the trees. Urban forests, comprise of all woodlands, groups of trees, and individual trees located in urban and peri-urban areas including forests, street trees, trees in parks and gardens etc., are important socially, and also offer multiple ecological benefits, from building resilience against climate change to water security, biodiversity, resident health and well-being. Trees in urban areas help to reduce air, dust, water and noise pollution and are known to ameliorate micro climate in the localities, and improve physical and mental health, strengthen social interactions as they serve as green recreational spaces. Urban forests provide critical social and cultural benefits that may strengthen community resilience to climate change. Studies have reported the concept ‘proximate principle’ wherein people are willing to own or reside in a property in greener areas/localities at higher prices (Chaudhury, 2006; Wolf 2007)

In India, many cities, including Bangalore, New Delhi, Chandigarh, Gandhinagar, are known for having good green spaces in the range of 20% of the geographical area. But many cities have very small areas devoted to green cover. There is therefore an urgent need to increase tree cover in urban, peri urban areas through creation of parks and gardens, biodiversity

reserves, city forests and wilderness areas wherever possible without undermining the local rights and customs. This need to be an integral part of town planning and smart city programme. The Urban Forest scheme, launched in 2020, aims at developing 200 Nagar Van (City Forests) across the country in cities having Municipal Corporation or Municipalities by involving local communities, educational institutions, local bodies, NGOs etc.

4. Promotion of Agroforestry and ToF

The Ministry of Agriculture and Farmers Welfare (MOAFW), Government of India, is the nodal ministry dealing for agroforestry.

Indian Council of Agricultural Research (ICAR) initiated agroforestry research in India 1983 through an All-India Coordinated Research Project on Agroforestry under which a number of agroforestry systems and technologies were developed. A compilation of information on agroforestry technologies which can be taken up by farmers and other stakeholders for increasing overall productivity, and ensuring natural resource conservation was published in 2016 (Chaturvedi et al., 2016). The National Research Centre for Agroforestry, established in 1988, upgraded as the Central Agroforestry Research Institute (CAFRI) in 2014, continues to be a premier multidisciplinary research institute with a major focus on integrating trees, crops and livestock on farmland. In addition to collection and evaluation of germplasm of multipurpose tree species, ICAR-CAFRI has published several successfully tested well-researched agroforestry systems suitable for wastelands and degraded lands (Handa et al., 2019). ICAR-CAFRI has documented several successful agroforestry systems for income enhancement and ecosystems services (Handa et al. 2020).

Indian Council of Forestry Research and Education (ICFRE) of MOEFCC has also published a compilation of agroforestry models developed by its institutes in Trans Himalayan, Western Himalayan, Eastern Himalayan, Gangetic plains, Plateaus, Western dry areas, Coastal plains and Ghats (ICFRE 2020). In addition, the SFDs are also involved in development of agroforestry models suitable in different regions/states. These models provide information about suitability of different combinations of perennial (tree) and seasonal (agriculture/vegetable) crops in various agro-climatic zones – generic edaphic and environmental, and establishment/management requirements, silvicultural practices and also economics. However, adoption of these models by farmers need adaptive research and effective extension services to facilitate site specific matching of hydro-edaphic characteristics and requirements of the tree/agriculture crops, and silviculture requirements at various growth stages of the crops covering the rotation period of the tree crops.

In addition to continued R&D, tree cultivation in private/agricultural lands has been promoted under 1988 NFP; National Agriculture Policy, 2000; Planning Commission Task Force on Greening India – 2001; National Bamboo Mission - 2002; National Policy on Farmers – 2007; and Green India Mission, 2010; and also under state schemes and externally aided projects which had limited success. This led to the realisation about the need for a dedicated and focused national policy and a suitable institutional mechanism for promoting agroforestry in the country.

4.1 National Agroforestry Policy, 2014: Defining agroforestry as a land use system which integrate trees and shrubs on farmlands and rural landscapes, the preamble of India's NAFIP recognises it as a dynamic, ecologically based, natural resource management system that, through integration of woody perennials on farms and in the agricultural landscape,

diversifies and sustains production and builds social institutions. Practiced in both irrigated and rain fed conditions, it produces food, fuel, fodder, timber, fertilizer and fibre, and contributes to food, nutritional and ecological security, sustains livelihoods, alleviates poverty and promotes productive and resilient cropping and farming environments. NAFp recognises the potential of agroforestry to enhance ecosystem services through carbon sequestration and storage, prevention of deforestation and forest degradation, biodiversity conservation, and soil and water conservation. NAFp recognizes that agroforestry is perhaps the only alternative to meeting the target of increasing forest or tree cover to 33 per cent from the present level of less than 25%, as envisaged in the NFP, 1988.

The NAFp also mentions that given the fact that land-holding size is shrinking, tree farming combined with agriculture is perhaps the only way forward to optimize the farm productivity and increase farm incomes of small farmers, landless and the women. Agroforestry can become an important tool to build resilience of farmers and rural people against threats of climate change and natural calamities. Moreover, it has the potential in greening the rural employment and rural development opportunities by providing tree produce based economic opportunities.

The major goals enshrined in the NAFp are:

1. Setting up a National Agroforestry Mission or an Agroforestry Board to implement the National Policy by bringing coordination, convergence and synergy among various elements of agroforestry scattered in various existing, missions, programs, schemes and agencies pertaining to agriculture, environment, forestry, and rural development sectors of the Government;
2. Improving the productivity; employment, income and livelihood opportunities of rural households, especially of the smallholder farmers through agroforestry.
3. Meeting ever increasing demand of timber, food, fuel, fodder, fertilizer, fiber, and other agroforestry products; conserving the natural resources and forest; protecting the environment & providing environmental security; and increasing the forest / tree cover, there is a need to increase the availability of these from outside the natural forests.

With the above overall goals, basic objectives of the NAFp include:

- i) Encourage and expand tree plantation in complementarity and integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households, especially the small holder farmers.
- ii) Protect and stabilize ecosystems, and promote resilient cropping and farming systems to minimize the risk during extreme climatic events.
- iii) Meet the raw material requirements of wood based industries and reduce import of wood and wood products to save foreign exchange.
- iv) Supplement the availability of agroforestry products (AFPs), such as the fuel-wood, fodder, non-timber forest produce and small timber of the rural and tribal people, thereby reducing the pressure on existing forests.
- v) Complement achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions.

- vi) Develop capacity and strengthen research in agroforestry and create a massive people's movement for achieving these objectives and to minimize pressure on existing forests.

The *strategic interventions* to achieve the policy goals and objectives mentioned in the NAFp include: establishment of institutional set-up at the national level to promote agroforestry under MOAFW; simple regulatory mechanism related to harvesting, felling and transportation of trees grown on farmlands; ensuring security of land tenure and creating a sound base of land records and data for developing an agroforestry market information system; investing in research, extension and capacity building and related services; improving farmers' access to quality planting material; providing institutional credit and insurance cover for agroforestry; facilitating increased participation of industries dealing with agroforestry produce, and strengthening farmers access to markets for tree products; incentives to farmers for adopting agroforestry, and promoting sustainable agroforestry for renewable biomass based energy. It also seeks to mainstream agroforestry in agriculture policies and strategies and initially each state was required to identify 20 commonly grown agroforestry tree species and these are to be exempted from all regulatory regimes, specially related to growing, harvesting, and transit. The policy recommends to consider the recommendations of the committee constituted by MoEF under Shri Arun K. Bansal on regulatory regime (MOEFCC, 2012) for inclusion in the NAFp guidelines.

4.2 Sub Mission on Agro Forestry (SMAF): NAFp provided for setting up an institutional mechanism, such as a Mission or Board for implementing the agroforestry policy, which will provide the platform for the multi-stakeholders to jointly plan and identify the priorities and strategies, for inter-ministerial coordination, programmatic convergence, financial resources mobilization and leveraging, capacity building facilitation, and technical and management support. Accordingly, under the National Mission for Sustainable Agriculture MOAFW implemented SMAF as a centrally sponsored scheme (with 60:40 centre and state share, 90:10 in respect of NE and hill states) from 2016-17. SMAF was planned to ensure availability of quality planting material, to popularize various Agroforestry practices/ models suitable to different agro-ecological regions and land use conditions through demonstration plots, to create database, information and knowledge support in the area of Agroforestry, to provide Research & Development (R&D), extension and capacity building support to Agroforestry sector.

SMAF was implemented in 23 States and UTs⁵ which have liberalized transit regulations for selected tree species. The main components of the sub mission were development of small, big, and hi-tech nurseries, (total 899 nurseries have been established), Peripheral/boundary plantations, low/high density plantations (total coverage 0.125 Mha) and capacity building. It was learnt that in most states farmers generally preferred fast growing tree species which were exempted under transit regulations. Some farmers also planted long rotation tree species

⁵ Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana and Uttar Pradesh and UT of Jammu & Kashmir and Ladakh.

like Sheesham, Teak. However, details of species-wise number actually planted were not available in national data base. However, during the period 2016-17 to 2021-22 actual expenditure was less than 50% of the approved Budget Estimate of Rs. 3,700 million. The factors ascribable for the lukewarm response from states/UTs include very small overall outlay of the scheme compared to other schemes of MOAFW that too with the provision of state share, cost norms being less than MGNREGS and other plantation schemes of the state forest departments, better incentives under State scheme for promoting tree growing in private lands. It seems even in the MOAFW the scheme did not get due attention in the course of its execution. As the response from the participating States/UTs had not been satisfactory, from 2022-23 it has been subsumed under Rastriya Krishi Vikas Yojana (RKVY).

Other efforts of MOAFW to implement NAFIP include - research on agroforestry through IACR-CAFRI, establishment of AF demo units at KVKs, formation of Farmer Producer Organisations in AF sector, Training to farmers, workshops, etc.

4.3 Perspective Study on Policymakers views on Agroforestry: The author had conducted a Perspective study on policymaker's views on agroforestry (and landscape restoration) in India for The Nature Conservancy, at the behest of NITI Aayog, during 2021 (Bansal, 2021) wherein it was found that:

- a. Agroforestry has been more successful in States having less area under natural forest cover. In forest-rich States, there are more restrictions to prevent illegal felling of trees and smuggling of timber from natural forests. In states where the farmers are more enterprising, they go for mixed cropping and agroforestry.
- b. Proper education and awareness about tree crops among farmers of Punjab, Haryana and Gujarat are major causes of expansion of the agroforestry in these states. Legal restrictions for harvesting trees on farmlands and the subsequent transportation were non-existent in these states. Interventions by Wood Based Industries to promote agroforestry with better clones, buy back guarantee and technical support also had positive impacts.
- c. Factors inhibiting growth of agroforestry include lack of demand for industrial wood due to limited number of wood-based industries, lack of market linkages resulting in involvement of middlemen in catchment areas of processing industries, uncertainty/lack of clarity in regulations, lack of detailed information about suitable agroforestry models for flood-prone areas, subsistence for fuel wood needs from home-grown tree species.
- d. Other important reasons for slow progress for agroforestry in several regions are small land holdings and awareness deficit. Even the barren land holdings in many villages, which can sustain some tree species, are not being taken up for tree cultivation. There is a strong need for sensitizing the land owners to utilize their vacant lands and upland for tree planting through proper extension service.
- e. Key bottlenecks and constraints in effective implementation of National Agroforestry Policy, 2014, and SMAF include small land holdings of farmers, hilly terrain and less emphasis on agroforestry species and more attention to agri-horti crops model due to immediate and sustainable returns, lack of availability of Quality Planting Material

(QPM) of preferred species, lack of infrastructure for collection, storage, seasoning, value addition & market linkage. There was no uniform mechanism for implementation across the states. Rather implementation by various state departments was guided by their own work cultures. Moreover, incentives provided are not adequate and in fact in some states higher incentives are available under state schemes/programmes e.g. Bihar, Jharkhand, Chhattisgarh. There were also delays in release of funds from the central Government.

- f. The priority interventions necessary to boost agroforestry include extension and increasing awareness amongst the farmers, facilitative/simplified regulatory regime for felling, transport and trading of various tree species - common and widely available agroforestry species when cultivated in private lands, simplification of the process involved in procuring the ownership certificate of land involved (a statement of Mukhiya of the village should suffice), suitable models for diverse landscapes, establishing sufficient numbers of wood-based industries and market linkages, adequate incentives (more than the cost of plantation and protection activities etc.), result-based support farmers for an initial period of few years to kickstart the process, better quality seedlings - nursery development - planting material certification for private nurseries, institutionalizing effective convergence of schemes / programs of Forestry, Soil Conservation, Agriculture, Horticulture, Rural Development and industry sectors.

4.4 Task Force for synergies between various NFP and NAfP: GoI had constituted a Task Force headed by Director General of Forests & Special Secretary MOEF&CC to develop synergies between the National Forest Policy, Forest (Conservation) Act, 1980 and National Agroforestry Policy, 2014.⁶ The Task Force *inter alia* recommended that:

- i. Various interventions mentioned in the NAfP (including access to Quality Planting material, Research extension and capacity building, institutional credit and insurance cover, facilitating increased participation of industries, farmers access to markets, and sound data base and information system etc. need to be planned and executed in a holistic manner covering the entire value/supply chain for achieving the growth of the Agroforestry Wood production.
- ii. There should be online registration of wood based industries and e-compliance for legitimate sourcing of wood. The system can be developed as a pilot project in 1-2 willing states and gradually extended to other states.
- iii. In agroforestry production systems key stakeholders are the tree growers and the processing industry in addition to the Government whose role lies primarily in creation of conducive environment comprising facilitative policy and legal framework, credit and technical support. Industry is required to play a major role by establishment of a direct relationship between the factory and the grower by supporting with inputs including credit, constant technical advice and finally harvesting and transport services.

⁶ Vide O M F. No. 1-1/2022-Forest Policy Division dated 31st March 2022. Author was a member of the task force and also the Chairperson of its working group constituted vide MOEFCC OM F. No. 1-1/2022 FP dated 29th April 2022.

4.5 Tree Outside Forest India Program: MOEFCC and USAID have launched the Tree Outside Forest India (TOFI) program in 2016 in seven states, viz. Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu, and Uttar Pradesh. The program aims at strengthening enabling environment, providing economic incentives and reduction of risks, and improving access to quality and actionable information about trees in expansion of area under ToF, and is being implemented by a consortium of organizations and institutions led by CIFOR-ICRAF with Ashoka Trust for Research in Ecology and the Environment; Central Agroforestry Research Institute; Gramin Vikas Vigyan Samiti; National Institute of Agricultural Economics and Policy Research; Network for Certification and Conservation of Forests; The Energy and Resources Institute; Tropical Forest Research Institute; and Forest College and Research Institute of Tamil Nadu Agricultural University as the key consortium partners bringing complementary areas of expertise and experience in the course of program execution. Under the program, efforts are also being made to evolve State Agroforestry Policies to address the state specific needs⁷.

4.6 Regulatory Regime

Regulatory framework for establishment of wood processing industries, harvesting and transport of agroforestry wood/timber, international trade of wood and wood products etc. is often cited to be one of the primary hurdles in the growth of agroforestry, particularly for production of IRW.

4.6.1 Transit Regulations

One of the major factors perceived to be inhibiting the growth of agroforestry is —transit regulations under the forest laws. Bansal Committee constituted by MOEF in July 2011 to study the *‘regulatory regime regarding felling and transit regulations for tree species grown on private land’* recommended for exemption of tree and bamboo species *‘preferred by farmers and not naturally available in neighbouring forests’* from transit permit and felling regulations, authorizing Gram Sabha to regulate felling and transit of trees/timber grown under agro-farm forestry or private lands in the village in respect of those species which are *‘preferred by farmers and are also found in the natural forests/forests’*. It also recommended for evolving common regional strategy for simple uniform mechanism/ procedure to regulate the transit rules of forest produce, to evolve transparent and simple methodology for maintenance of records of tree plantation on private lands to maintain a dynamic resource inventory. (MOEF, 2012)

Following this, 'Guidelines for Felling and Transit Regulations for Tree Species Grown on Non-Forest Private Lands' issued to all State/ Union Territory (UT) by the MOEFCC⁸ for augmenting the pace of tree plantation on private land were revised in Nov 2014⁹.

⁷ Author is associated with the development of Tamil Nadu State Agroforestry Policy as consultant to the TOFI Program..

⁸ Vide letter F. No. 8-14/2004-FP dated 15.12.2004.

⁹ vide Ministry's letter F. No.8-14/2004-FP (vol.2) dated 18th November 2014

Subsequently, an advisory was issued in 2017 to consider exempting ten commonly grown agroforestry species (Eucalyptus, Poplar, Casuarina, Subabul, Silver oak, *Acacia mangium*, *Melia dubia* (*Malabar neem*), *Khejri* (*Prosopis spp.*), Indian willow (*Salix alba*) and *Gamari* (*Gmalina arborea*) from the requirement of felling and transit permits. SMAF under the National Mission on Sustainable Agriculture was implemented in the States which have liberalized transit regulations for selected tree species. List of various tree species exempted from transit regulation under Forest laws as in 2022 is given at Annexure 1. However, list is dynamic since the State/UT governments are exempting additional tree species preferred by farmers and tree growers.

Another advisory was issued by MOEFCC in October 2017 for Pan India Transit Permit to facilitate smooth inter-state movement of bamboo. The restrictions on movement of bamboo from non-forest areas, an important species preferred by tree growers in many states, was removed through an amendment in the Indian Forest Act in November 2017 where by —bamboo was omitted from section 2 clause 7 of the IFA 2017).

In January 2018 draft Pan India Transit Permit System for inter-state movement on commonly grown agroforestry species, initially with 10 spp. indicated in 2017, was issued. MOEFCC launched the Pan-India National Transit Pass System (NTPS) in December 2023 to facilitate seamless movement of timber, bamboo, and other forest produce across the country to replace the present system of issuance of transit permit based on state specific transit rules. The NTPS is envisioned as a "One Nation-One Pass" regime. This initiative involves a unified, online mode for issue of transit permit for transport of forest produce across the country and will benefit the tree growers and farmers practicing agroforestry.

It is to reiterate that the Forest (Conservation) Act, 1980 as amended and renamed as *Van (Sanrakshan Evam Samvardhan) Adhiniyam* in 2023, is not applicable to trees and tree plantations raised on lands that are not notified as forest or recorded as forest in any government record. This removes the lurking doubt about applicability of FCA to plantations on private lands, although this has already been clarified by the MOEFCC through guidelines issued earlier in 2013. This is expected to give a boost to cultivation of trees on private and other non-forests lands.

4.6.2 Wood Based Industries

Under the National Industrial Classification (NIC), the economic activities which use wood as raw material are covered mainly in two categories of wood based industries (WBI). Division 16 - Manufacture of wood and products of wood and cork, except furniture, and Division 17 - Manufacture of paper and paper products. Of the various wood based industries Paper industry is in the organized sector, and all other industries such as saw mills, plywood and panel manufacturing, furniture, handicrafts, toys are largely in the small-scale or —unorganized sector. Majority of wooden furniture, joinery, and other household products are made to order by small workshops or individual artisans. In recent years larger firms are

increasing in number, to serve both the export and growing domestic market for wood furniture and other wooden items.

In compliance of directions contained in the Order dated October 5 , 2015 of the Hon'ble Supreme Court of India in Writ Petition (Civil) No. 202 of 1995 MOEFCC issued the Wood Based Industries (Establishment and Regulation) Guidelines 2016¹⁰ on 11th November 2016. The guidelines were amended through a resolution dated 11th September 2017.

Under these guidelines WBI means any industry which processes wood as its raw material (Saw mills/Veneer/plywood/or any other form such as Sandal, Katha wood, Charcoal etc.¹¹ These guidelines provide for constitution of state level committee (SLC) headed by PCCF & HOFF in each state which is *inter alia* required to assess availability of timber in the state through an appropriate demand and supply study and devise suitable mechanism for sustainable use of timber in a way that does not affect the forest adversely, and approve grant of fresh license or enhancement of the existing licensed capacity subject to its satisfaction about availability of timber legally. No license to a WBI is to be granted or renewed without prior approval of the SLC.

However, licensing is not required for industries/processing plants not using round logs of domestic origin or operating without a band saw or re-saw or circular saw of more than 30 cm diameter viz. Industries/processing plants which use (a) sawn timber, cane, bamboo, reed, plywood, veneers or imported wood, procured from legitimate sources, (b) block board, medium density board, or similar wood-based products, procured from legitimate sources, (c) round log/timber from species declared as agroforestry/agricultural crops and/or exempted from the purview of the felling and transit regime in the concerned State/UT, and procured from legitimate sources. Such industries are required to be registered with the Forest Department of the concerned State/UT and regulated as prescribed by the concerned State/UT. The SLC of the concerned State may allow installation of circular saw of diameter up to 60 cm in such industries having specialized requirement. The guidelines also contain assessment of annual requirement of round logs for sawmills of different capacities, and timber requirements for other WBIs.

The guidelines require all WBIs to follow environmental and other applicable regulations prescribed by the State Pollution Control Board, Central Pollution Control Board, and MOEFCC under Environment Protection Act, 1986 and other Central/State Acts.

Although some states viz. Andhra Pradesh, Punjab, Haryana, Tamil Nadu, have already notified rules in this regard, there is a wide spread demand for revision of guidelines with separate provision for industries based on agroforestry wood and their online registration.

¹⁰ Vide SO 3456(E) dated 11th November 2016, amended vide SO 3000 (E) dated 11th September 2017, and SO 995(E) dated 22nd Feb, 2019 (pursuant to NGT Order dated 13th August 2018).

¹¹ Paper industries were excluded from the definition of WBI vide the amendment issued in September 2017.

The conditions of license and availability of wood while granting registration in most of the states need a relook, and may be prescriptive methodology by MOEFCC since most wood availability studies commissioned by States are faced with legal hurdles.

- However, it needs to be appreciated that liberal / no transit regulation on Agroforestry species may be a necessary but is not sufficient condition for growth of agroforestry. Downstream processing using appropriate technologies and improvement of infrastructure and creating public awareness about use of wood and wood substitutes made from plantation wood and other renewable fibers are critical for the agroforestry sector.
- Suitable amendment may be done in the existing Indian Forest Act, 1927 and the State Forest Acts in respect of agroforestry tree produces, as was done by MOEFCC in the case of bamboo, *albeit* after wider consultations with the States and all stakeholders.
- Electronic timber traceability protocol or standard based on IT technologies should be established by the Union Government for and subsequent block chain-based tracking and traceability. IT based technologies are possible to create a database of all trees planted and harvested outside forests and use this inventory for analysis, forecasting and demand supply management including associated risk management, as well as issuance of certificate of ownership and origin (COOO). This should however be developed and tested through a pilot project in few districts in different states in the country and subsequently scaled up.

The actual facilitation resulting from the provision of registration instead of licencing of certain WBI requires more detailed study of the rules framed by different States¹² (also to ascertain practical obstacles if any, for amending the WBI guideline contained in 8(ii) to give a boost to the growth of WBI processing agroforestry wood. Moreover, a pilot IT based system needs to be evolved in few states to confirm and document legality of woods procured, and online registration of such WBIs.

Recently, the Ministry of Commerce and Industries has notified¹³ three Quality Control Orders (QCO) for Wood Based Boards, Plywood and Wooden flush door shutters, and Resin Treated Compressed wood laminates under the Bureau of Indian Standards Act, 2016 under which the Goods or articles specified therein are required to conform to the corresponding Indian Standard and bear the Standard Mark under a license from the Bureau of Indian Standard as per the Bureau of Indian Standards (Conformity Assessment) Regulations, 2018. The Bureau of Indian Standard is the certifying and enforcing authority. These QCOs apply not only to goods or articles manufactured domestically but also to import of these products and their manufactures in foreign countries are required to obtain License or CoC from the BIS under the Foreign Manufacturers Certification Scheme. The QCOs will come in to force with effect from six to twelve months from the date of respective notifications depending

¹² Three states namely Andhra Pradesh, Punjab and Haryana have framed rules under the IFA/State Forest Act for regulation of WBIs. Other states might be regulating as per the MOEFCC Guidelines)

¹³ S.O. 3604(E) dt10.8.2023, and S.O. 3841(E) dt. 29.8.2023 published in the Gazette of India

upon the class of industry based on size. Annexure 2 the Guidance Document on QCOs for comprehension of the QCOs and explains various requirements. Annexure 2a, 2b, 2c are the three QCOs mentioned above). QCOs aim at improving the quality of domestic production and also curbing import of substandard products. However, it is being felt by the Industry BIS needs to strengthen its enforcement arm for effective enforcement of the QCOs. Simultaneously, some standards that prescribe fixed requirements in terms of strength properties require a relook to incorporate application (e.g. General Purpose plywood for packaging, kitchen cabinets, furniture etc.) specific strength requirements and appropriate changes in certification marks, and large number of MSMEs/micro enterprises need to be facilitated in adoption of appropriate technologies, building capacity of manpower etc. to develop competency. The unpreparedness of the BIS is evident from the fact that effectiveness dates have already been extended. As per the notification issued in March 2024, QCOs for wood based boards will now be effective from 11th Feb 2025, 11th May 2025 for MSMEs, and 11th August 2025 for micro enterprises.

4.6.3 Regulations related to India's international trade of wood and wood products

At the CITES COP17, held in September/October 2016, the entire genus *Dalbergia* [except for Brazilian rosewood (*Dalbergia nigra*), which is listed in Appendix I], was put under Appendix II. Consequently, each shipment of products made from wood from *Dalbergia* genus (including sheesham and rosewood) would require a CITES permit. This has serious implications for India as bulk of wooden furniture and handicraft items exported from India are made from *Dalbergia sissoo*, whose management is regulated under the Working Plans. India has already filed a reservation against the above decision of COP 17. The Ministry of Environment and Forest, the CITES Management Authority, has designated the Export Promotion Council for Handicrafts (EPCH) as the competent authority to issue the comparable document in lieu of the CITES permit for handicraft products made from *Dalbergia sissoo* and *Dalbergia latifolia*¹⁴. EPCH is issuing such certificates under its VRIKSH timber legality and certification standard following procedure prescribed therein. In a subsequent CITES COP in 2019, voted to exempt finished musical instruments, parts and accessories made with rosewood from requiring CITES permit.

Illegal logging is considered to be one of the key drivers of deforestation, harming the environment, endangering biological diversity and aggravating climate change impacts. Many developed countries including EU and Australia, have put in place stringent verification process for legality verification for import of wood and wood products. Although India strongly supports sustainable forest management, and is signatory to all conventions related to climate change and biodiversity, wood and wood products can be imported into India without verification of legality (certification) or quantitative restrictions, except when species attract CITES provisions. It has been reported that India is the third largest importer

¹⁴ Vide F. No. 4-07/2017/WL dated 3rd March 2017

of the illegally logged timber¹⁵ in the world, and accounts for close to 10% of the global illegal wood trade (IUFRO, 2016).

The basic customs duty is also very low compared to the bound rates – 5% for wood products and logs under HS code, 4401, 4402, 4403 and 10% for other manufactured wood products under HS code 4404 to 4421, as well as paper and paper boards etc. under chapter 48. The basic customs duty on wooden furniture and other such items is 25%, and on wooden toys (HS code 95030010) it is 60%.

Plant Quarantine (PQ) order 2003 enforced by the Directorate of Plant Protection, Quarantine and Storage under the Ministry of Agriculture, Cooperation and Farmers Welfare (MOAFW) is an important non-tariff regulation applicable to imports of timber logs into India¹⁶ requiring fumigation of timber /wood with Methyl bromide (MBr) prior to export to India. And the treatment is required to be endorsed on the Phyto-sanitary Certificate issued at the country of export or re-export. However, since methyl bromide is toxic and classified as a class 1 ozone depleting substance, there is a need to prescribe alternate treatment regime. Considering that many countries have phased out use of MBr, it has been decided that —in case of consignments requiring pre-shipment fumigation with MBr originating from countries which have phased out the use of MBr for quarantine and pre-shipment purposes, the consignment shall be released after charging the normal inspection fee. The NPPO of the country will be required to submit relevant documents to NPPO India to establish phased out country status. NPPO India would notify the list, which would be updated regularly based on the information received.¶ (MOAFW S.O. 4871(E) dt 13 October 2022)

Box 4
Fumigation with Methyl Bromide

Plant Quarantine order of India prescribes that the timber/wood with or without bark shall be fumigated prior to export to India with **methyl bromide** at 48 g/cum for 24 hours at 21 degrees Celsius or above, or an equivalent thereof, or any other treatment approved by the Plant Protection Adviser, Government of India. Similarly, any shipment of timber or sawn or sized wood with or without bark prior to export to India must be either fumigated with methyl bromide at 48 g/cum for 24 hours at 21 degrees Celsius or above, or an equivalent thereof, or kiln dried or heat treated at 56°C for 30 minutes.

For exports of wood and articles of wood under chapter 44 of HS code from India also no objection certificate from the Plant Quarantine Department may be required.

CARB (California Air Resources Board) regulation aims to reduce formaldehyde emissions from composite wood products that are sold, supplied, used, or manufactured for sale in California. The regulation focuses on hardwood plywood, particleboard (PB), and medium density fiber board (MDF). Under this any export of these products from India to USA requires CARB certificate. At present there is no recognised lab in India for testing formaldehyde emission, due to which exporters are facing problems as the samples are to be

¹⁵ Wood harvested in violation of the laws and regulations in the source country.

¹⁶ The species of hardwoods/softwoods (logs/lumber) not listed in the Indian Plant Quarantine Schedule VI and VII are prohibited from import in India.

sent to USA or China for conformity assessment. It is learnt that IPIRTI is in the process of getting its testing facility recognised.

It is important to note that more than three-quarters of India's timber products are exported to the countries that now have laws in place restricting import of illegal wood and forest products. These include European Union Timber Regulation (EUTR)¹⁷ (now replaced with EUDR – European Union Deforestation Regulation)¹⁸, Lacey Act of USA¹⁹, Australia illegal Logging Prohibition Act, 2012²⁰, and California Air Regulation Board (CARB) certificate (formaldehyde emission from wood composites). To avoid the potential decline of export of wooden furniture and other wood products to these countries from India it is necessary put in place a system to facilitate issuance of document (similar to the one issued for CITES compliance) acceptable under the regulations of the importing countries.

Importers that are non-compliant with these laws risk enforcement actions including fines, penalties and prosecution, while Indian suppliers risk losing out to other countries that can provide the legal assurances requested. This includes the United States and the EU, but also in Australia, Indonesia, Japan and some other countries. Buyers in these markets, as well as Indian exporters looking to maintain market access are therefore exposed to the risks associated with India's imported timber products. Indian furniture manufacturers use tropical hardwood species sourced either from forests, ToF areas or through imports but practically there is no verification and certification system in vogue.

There is therefore a need to put in place specific measures to verify that India's imported raw materials and domestic wood used by wood based industries are legally sourced or come from forests/ToF areas. It needs also to ensure that India continues to supply wooden furniture and other products to its niche markets in developed countries and also access new markets for the growth of domestic wood based industries. It would also be worth considering import duty concession on import of wood, sawn wood, and other wood products that are used for re-export after value addition (through handicrafts/manufacturing) in selected SEZs.

¹⁷ EUTR, applicable to both imported and domestically produced timber and timber products, prohibits the placing on the EU market for the first time of illegally harvested timber and products derived from such timber and requires EU traders who place timber products on the EU market for the first time to exercise due diligence for the supply chain of each individual shipment to their country.

¹⁸ EUDR is a regulation for deforestation and degradation free supply chain. Only products that are both deforestation-free and legal would be allowed on or exported from the EU market – need to be covered by a due diligence statement. Products will need to be legal according to the laws of country of production, including applicable human and labour rights and free, prior and informed consent. Main obligations applicable to operators and non-SME traders. Strict traceability linking the commodity to the plot of land where it was produced.

¹⁹ The Lacey Act is a 1900 United States law that bans trafficking in illegal wildlife. In 2008, the Act was amended to include plants and plant products such as timber and paper. This landmark legislation is the world's first ban on trade in illegally sourced wood products.

²⁰ The Act makes it a criminal offense to intentionally, knowingly or recklessly import wood, pulp and paper products into Australia or process Australian raw logs that have been illegally logged. It also outlines that businesses must undertake 'due diligence' on certain regulated processes.

4.7 Promotion of Use of Wood and Wood Products

It is a national imperative to enhance the use of wood and wood products substituting the alternate materials including plastics and metals to reduce carbon emissions and achieve its net zero emission goal. This will in turn increase the demand for agroforestry wood and give a boost tree cultivation by farmers and other tree growers. A recent policy research study—Popularization of the Use of Wood and Wood²¹ (ICFRE, 2023) emphasized upon the need for evolving a National Policy for Use of Wood and Wood Products/Substitutes, and launch a national campaign aiming at creating/enhancing awareness regarding benefits for usage of wood and wood products and *inter alia* recommended that:

- (i) Tripartite collaborations among Industry, Producers and Researchers, the three main stakeholders in the production value chain can bring in the interest of industry to support cultivation of suitable tree species by the farmers/tree growers for producing the requisite raw material and the research institutes can facilitate R&D to develop variants of tree species along with compatible agroforestry models for different agro-ecological regions,
- (ii) Establishment of a national system of collection and compilation of annual production of wood and wood substitutes in the country shall facilitate mapping of the supply chain of manufactured products and develop strategies to meet domestic and international demand.
- (iii) Database of imported timber species (both in logs and sawn timber form), including its supply chain maps within country is critical to identify wood-based industry sector that are driving the demand for imported timber, and also to assess the suitability of domestic tree species for substitution of imports.
- (iv) Government support through enabling policy framework is necessary to support availability of quality planting material, financial incentives for tree cultivation/plantations, adoption of agroforestry models, leasing degraded lands to industry for plantations, ease of felling and transit regulations etc., incentives to tree growers, as well as incentivizing industry to support farmers for plantations.
- (v) Industry needs to collaborate with and support the farmers/tree growers for selection of suitable tree species, production of QPM, technical support in respect of agroforestry models and tree cultivation practices, and buyback assurance for timber. Based on the models set up by Pulp and paper industry in India, other flourishing industry sectors, such as composite wood and furniture sectors, may also adopt such means of collaboration with the farmers to secure the sustainable supply of raw material with desired species.
- (vi) Construction is one of the key drivers of economic growth in the country and there is need to enhance awareness among architects and engineers about wood and wood substitutes. Inclusion of wood and wood substitutes in graduate/post graduate courses for Civil Engineers and Architects and other vocational courses can be a step forward to lay the foundation of green construction and resulting acceleration in use of wood and wood substitutes.
- (vii) There is a need to incentivize adoption of national standards and code of practices related to wood and woody products or to make basic standards mandatory to ensure that manufactured materials have minimum product quality to enhance consumer satisfaction. Alternately, Industry Associations may create minimum standards and encourage industries to enhance product quality. To this end, it is also advisable to have comparative life cycle assessment of

²¹ The present author was the Principal investigator in this Policy Research Study by NCCF for ICFRE.

Wood substitutes and wood alternates in Indian situations to document science-based evidence in favor of wood substitutes.

- (viii) Government should take lead in constructing demonstrative green public buildings using wood and wood substitutes wherever possible, and also enhance utilization of wood substitutes in various government funded/supported affordable housing schemes and incentivize use of green materials similar to use of solar panels and solar water pumps.
- (ix) Suitable alternate timber species can be identified for this purpose, to avoid dependence on few known species and also promote biodiversity, and their cultivation need to be supported through tree-based production at farm levels - survival growth-based incentives and ease of transit regulations.

5. Current contribution of Agroforestry and ToF in production of IRW

Products from the trees growing in agroforestry systems are either utilized by the farmers for their own use or are traded. Marketable products can be broadly put in two categories viz. Wood (industrial round wood) and Non-wood products. Non wood plant and animal products used in pharmaceuticals, nutraceuticals, cosmetics include various fruits and nuts; fibres e.g. bamboo and grasses used in construction, furniture, clothing; resins, gums etc. which are important part of livelihood activities and means of economic growth of the farmers. India is a pioneer in the field of NWFPs, owing to its rich biodiversity and is recognised as treasure house of medicinal and aromatic plants, and virtually has monopoly in world over some natural gums and resins (lac, gum karaya, and guar gum). Although bulk of NWFPs are collected from forests gradually cultivation of many NWFPs including medicinal and aromatic plants is increasing. There is no system of collection and collation of wild collection, cultivation and production of NWFPs in the country from forests, and more so under agroforestry production system.

The most widely recognised product is round wood used by various wood processing industries including paper and pulp, engineered wood products, builders joinery, wooden furniture, handicrafts and toys. Many tree species growing in Agroforestry and other ToF areas yield number of non-timber products some of which are consumed locally and also traded but production data are not available at national/state/district levels. Recognises that —he contribution of agroforestry to the national GDP is also not known. Number of trees on farm, species grown, survival rate, number of trees planted /harvested, or quantity of timber/fuel wood/fodder produced is not available. NAFIP suggests the need for a more efficient system of data recording due to complete lack of data on agroforestry.

Recently Bansal (2022) analysed —Wood Production and Consumption in India during 2019-20 (Table 2 & 3). The analysis found that the demand of IRW is currently being met primarily from ToF resources which account for about 74% of the total availability of IRW whereas contribution of —forests is only about 9% and remaining 17% is through Imports,

Table 2

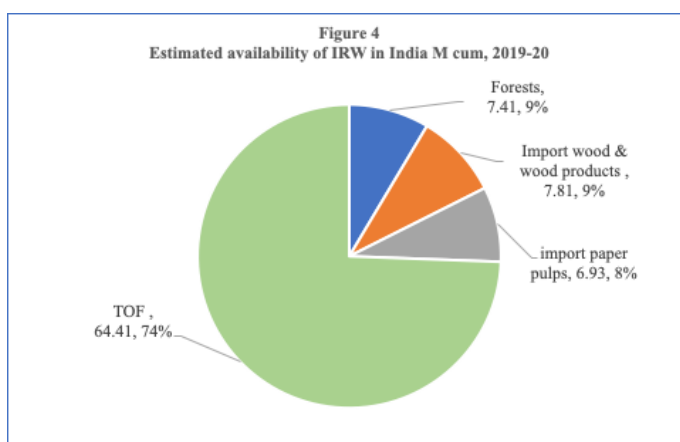
Estimated consumption of IRW during 2019-20 (million cum)						
Consumption	Paper	Plywood	PB/MDF	Exports wood n products	small timber used by local communities	Furniture/ construction/handi crafts/toys etc.
2019-20	13.96	18.00	3.41	0.20	5.85	45.13

Table 3

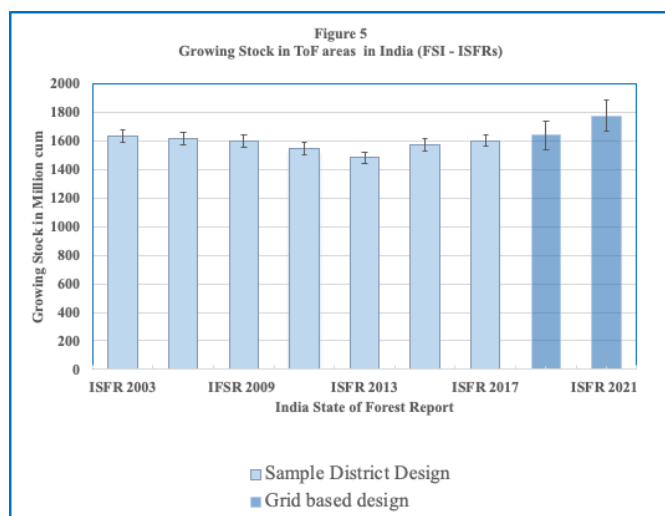
Estimated availability of IRW during 2019-20 (million cum)				
Production	Forests	Import wood & wood products	import paper pulps	TOF
2019-20	7.41	7.81	6.93	64.41

The above study also mentions that “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 in which the contribution of agroforestry system is estimated combinedly with other non-forest resources.

However, as mentioned earlier the biennial report of FSI published in 2013 has a separate chapter on agroforestry resources. The total growing stock under agroforestry was estimated to be 1022.85 million cum, and total carbon stock was estimated to be 279.83 million tons (25 tons/ha). Annexure 3 lists the number of species wise stems in Agroforestry as estimated in the above report. The category of plantations which seem to have been included in the inventory are: Farm Forestry and Block plantations (tree in small patches up to 0.1 ha), Village woodlots (naturally growing/planted trees on community land), Road/Pond/Canal/Railway line side plantations, and Homestead (trees appearing in the house premises and not covered under Farm Forestry/Village woodlots/Block plantations)²². It also contains species-wise estimated number of stems in agroforestry systems in India (FSI, 2013), which reveals that of the total 40 species 16 primarily timber yielding spp. (including Teak, Sheesham, Gambhar Jackfruit, Oak, Silver Oak, Eucalyptus, Poplars, Acacia) account for 21% of the total stems and 24 species accounting for 50% of the total stems are primarily those whose main product is non-timber (including Mango, Khair, Neem, Coconut, Rubber, Jackfruit, Mahua etc.) although these species also yield timber when they felled when annual yield of NTFP declines substantially. Remaining 29% of the stems are of other spp. Moreover, more than 80% of the total stems have DBH in the range of 10-30 cm. Potential annual production was computed in two different methods – (i) Sum of computed annual production for the timber yielding spp. (Von Mantel’s Formula: $2 \times \text{Growing Stock} / \text{Rotation in years}$), and (ii) 2.8% of the total growing stock. Average of these two figures is taken to be the availability of IRW. It is found that contribution of agroforestry was around 87% the total annual availability of IRW the ToF resources. Timber form long rotation spp. (rotation > 20 years) constitute around 70% of the total IRW available form agroforestry.



²² ISFR 2013, pp. 13.



A quick analysis of Growing Stock estimated by FSI based in national forest inventory (NFI) and reported in ISFRs reveals that the in ToF Growing Stock, at macro level irrespective of the tree species, is almost stabilised (Figure 5) which is important since ToF are meeting the bulk of the IRW demand in the country. The changes are within the range of —standard errors^{||} and marginal increase seen from IFSR 2019 may be largely due to inclusion of all trees down to 5 cm dbh (earlier all tree above

10 cm dbh were counted), and also change in ToF inventory design (selecting 60 districts spread over the entire country representing all the 14 physiographic zones districts in a cycle of two years to 5 km x 5 km grid based design with a ten year cycle) and

It needs no emphasis that the consumption of wood products in the country is having an increasing trend that is likely to get accelerated due to multipronged mitigation and adaptation approaches to combat the impacts of climate change. Recently Kant and Nautiyal (2021) have analysed the dynamics of timber supply and demand in India covering the period 2010 to 2030 considering the historical trends from 2010 to 2019 and estimated demand of IRW in pulp & paper, furniture, plywood and panel products and construction sectors from 2021 to 2030 based on forecasts of population and incomes, wood product consumption trends, and growth in important wood-based industries. The models developed by them have projected demand to have an increasing trend with average annual growth rate of 6.4%.

There is already a renewed emphasis on use of renewable materials and products made from such materials including wood substitutes²³ in place of wood alternates²⁴. In 2020, Central Public Works Department lifted the 27 years old ban on wood usage in construction. This is bound to enhance use of wood and wood substitutes, and likely to give a boost to the

²³ Wood substitutes are products made from materials that are not graded as lumber and include wood from fast growing plantation trees, bamboo, wood residues, and residues of agriculture crops e.g., rice, wheat, hemp. These include engineered wood products. These products have low carbon footprint and embedded energy and are biodegradable.

²⁴ Wood alternates are materials used for the same purposes as wood but are made from non-wood materials that are not obtained from the biosphere and are not biodegradable. They are mostly synthetic, derived from abiotic sources or are by-products of the remains of biotic forms. These include cement, metals and plastics which are being used instead of wood due to shortage in supply of the same. These alternatives have a huge carbon footprint, embedded energy (consumed in production), and the subsequent combustion leads to the formation of greenhouse gases.

economy in several regions in the country, particularly around ToF /Agroforestry resources, for producing wood to meet the increasing demand of wood products.

Although India is a net importer of wood products, it exports several wood products including wooden furniture, for which there is a niche market in developed countries, with an increasing trend, including to France, Germany, Belgium, Canada, USA, Netherlands, UK, Italy, Australia. (Bansal, 2021). Figures 6 & 7 depicts the values of wooden furniture and other wood products exported from India since in last 7- 8 years.

Figure 6

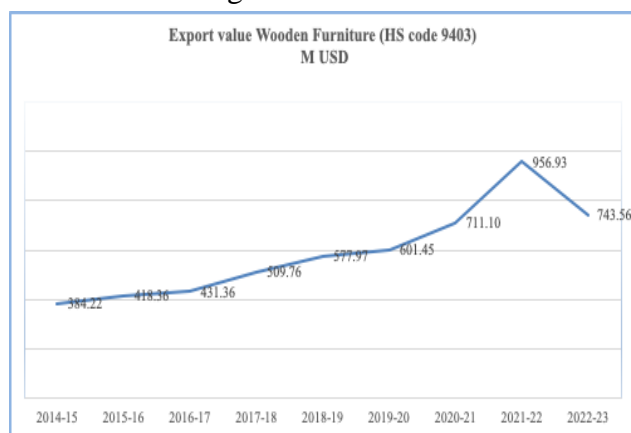
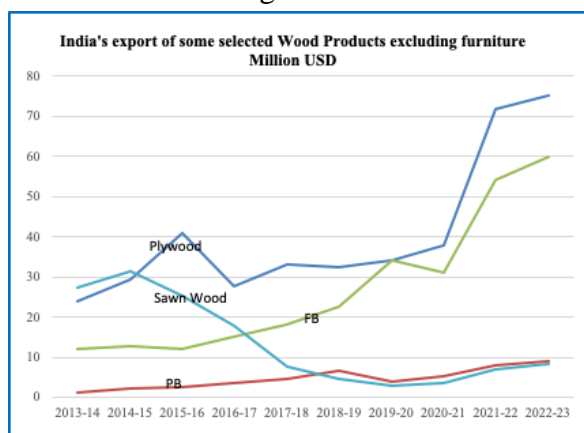


Figure 7



Furniture clusters in Kerala, Punjab, Andhra Pradesh, Rajasthan Uttar Pradesh, Haryana, Punjab and West Bengal have been operational for several years using largely Indian Tropical woods. Artisans working in the furniture and handicrafts sector are accustomed to and prefer teak and other hardwoods such as Sheesham, Mango, Mahogany, Sal etc. which are perceived to be resistant towards decay and pests and are seen as a benchmark with respect to grade and price. In recent years use of lesser-known species like mango, rubber, acacias are increasingly being used produces largely in ToF areas and also under agroforestry.

6. Scope for extending agroforestry

NITI Aayog Working Paper 02/2023 has described the achievements of India’s Agriculture sector since 1950-51. Visualising the likely changes during Amrit Kaal²⁵ it has identified forestry as one of the four sub-sectors of Agriculture whose contribution is around 8% of the sectoral income at current prices. Suggested road map for achieving the Goal of Viksit Bharat (Developed India) mentions that —there is huge scope for raising tree plantations and agroforestry on arable land and culturable waste lands. Complete removal of restrictions on tree felling on private lands, timber marketing and wood-based industry will pave the way for greening India, environment improvement as well as raise employment and income (Chand and Singh, 2023).

6.1 Land Suitability for agroforestry: A study was undertaken by Ahmed et al. (2019) to

evaluate the land potentiality in India for agroforestry based on FAO land suitability criteria in GIS domain by scientifically integrating various thematic layers. Their analysis revealed that of the total geographical area 32.8% is highly suitable, 40.4% moderately suitable, 11.7% is marginally suitable for agroforestry. Only 9.1% of the total area was found to be not suitable for agroforestry.

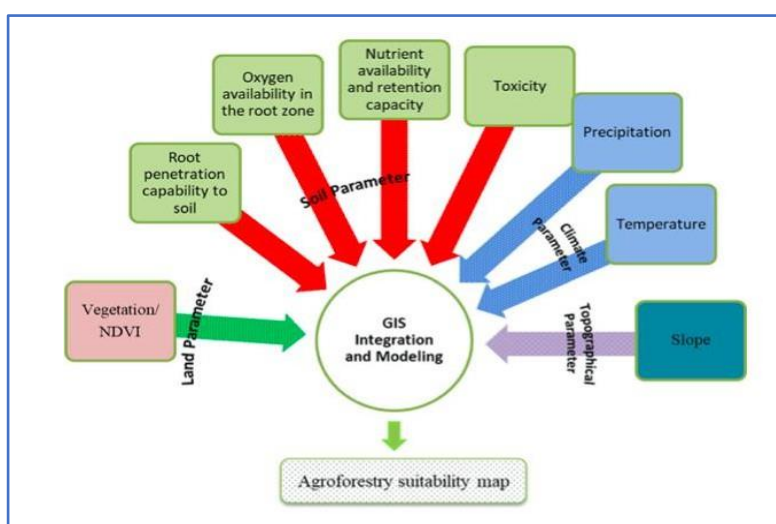


Table 4 – Agroforestry suitability of land in India (Ahmed et al. 2019)

Suitability Category	Area in Mha	% of TGA
Highly Suitable	122.25	37.4
Moderately Suitable	137.11	41.8
Marginally Suitable	3.83	11.7
Not Suitable	2.98	9.1

The study also revealed that about 46% of the cropland areas in the country fall into —high agroforestry suitable category and provide huge opportunity for harnessing agroforestry practices.

6.2 Agroforestry Suitability Index for Wastelands: More recently, NITI Aayog has published a technical report on Greening and Restoration of Wastelands with Agroforestry in which the suitability has been assessed through GIS based analysis of multi-thematic datasets on wastelands, land use land cover, water bodies, soil organic carbon & slope. Agroforestry Suitability Index (ASI) for wastelands was derived using a weighted index approach to integrate identified parameters viz. Land Use Land Cover, wastelands, soil organic carbon,

²⁵ A 25-year period culminating in the centenary of independence of India in 2047.

slope and waterbodies. The methodology includes the pre-processing of input datasets related to generating surface areas of water bodies, slope and soil organic carbon data for each state, proximity analysis of the water bodies data, waterbody layers with classes for ASI computation, assignment of ranks, computation of ASI and finally classification of land using ASI to derive the output results. Based on the analysis 6.31% and 4.94% of the total geographical area of the country have been respectively found to be highly suitable and moderately suitable for agroforestry. Total area assessed to be suitable for agroforestry is reported to be 36.46 Mha²⁶. The total area assessed to be suitable for agroforestry is one and a half times of the area currently estimated to be under agroforestry. *However, it is not clear if there is any overlap between the area assessed to be suitable and the area currently already under agroforestry. It is also not clear whether the waste land areas assessed to be suitable for agroforestry are likely to be actually available for tree cultivation and other agroforestry practices and by whom due to ownership and other issues.* Table shows state-wise estimated areas under AF and the areas assessed to be suitable, with high and moderate suitability. The report also provides district-wise area analysis of the results for the country. (Niti Aayog, 2024).

State /UT	TGA Mha	Highly suitable %	Medium Suitability %	Highly suitable Mha	Medium Suitability Mha	Total area suitable for Agroforestry Mha
Andhra Pradesh	27.51	8.66	6.63	2.38	1.82	4.21
Arunachal Pradesh	8.37	3.04	2.71	0.25	0.23	0.48
Assam	7.84	7.2	6.13	0.56	0.48	1.05
Bihar	9.42	3.01	3.08	0.28	0.29	0.57
Jharkhand	7.97	11.55	7.57	0.92	0.60	1.52
Goa	0.37	8.87	4.4	0.03	0.02	0.05
Gujarat	19.60	6.55	7.74	1.28	1.52	2.80
Haryana	4.42	1.67	1.96	0.07	0.09	0.16
Himachal Pradesh	5.57	6.33	4.13	0.35	0.23	0.58
Jammu & Kashmir	22.22	17.97	5.03	3.99	1.12	5.11
Karnataka	19.18	5.05	1.97	0.97	0.38	1.35
Kerala	3.89	3.45	2.27	0.13	0.09	0.22
Madhya Pradesh	30.82	9.65	3.85	2.97	1.19	4.16
Chhattisgarh	13.52	6.95	2.35	0.94	0.32	1.26
Maharashtra	30.77	7.97	6.49	2.45	2.00	4.45
Manipur	2.23	17.74	8.83	0.40	0.20	0.59
Meghalaya	2.24	9.86	8.06	0.22	0.18	0.40
Mizoram	2.11	11.1	9.04	0.23	0.19	0.42
Nagaland	1.66	17.04	14.14	0.28	0.23	0.52
Odisha	15.57	7.29	4.88	1.14	0.76	1.89
Punjab	5.04	0.4	0.3	0.02	0.02	0.04
Rajasthan	34.22	8.1	9.74	2.77	3.33	6.11
Sikkim	0.71	0.93	0.72	0.01	0.01	0.01
Telangana		9.46	5.71	0.00	0.00	0.00
Tamil Nadu	13.01	3.65	9.76	0.47	1.27	1.74

²⁶ It may be pertinent to note that total area of waste lands in the country in 2015-76 was 55.77 Mha of which 10.79 Mha was glaciers and snow covered, and 9.21 Mha was Rocky and stony (wasteland atlas of India, DoLR, GOI, 2019). Thus, practically rest of waste land area have been assessed to be suitable for agroforestry.

Tripura	1.05	6.16	2.81	0.06	0.03	0.09
Uttar Pradesh	24.09	1.51	2.28	0.36	0.55	0.91
Uttarakhand	5.35	2.26	4.38	0.12	0.23	0.36
West Bengal	8.88	1.49	0.87	0.13	0.08	0.21
A & N Islands	0.82			0.00	0.00	0.00
Chandigarh	0.01	0.33	10.88	0.00	0.00	0.00
D N Haveli	0.05	0.04	0.07	0.00	0.00	0.00
Delhi	0.15	3.52	0.65	0.01	0.00	0.01
Daman Diu	0.01	0	0	0.00	0.00	0.00
Lakshadweep	0.00			0.00	0.00	0.00
Puduchery	0.05	0.5	2.47	0.00	0.00	0.00
Ladakh		1.53	0.72			

An analysis undertaken by TERI reveals that there it is possible to achieve around one-third of the target with conservation approach through converting around one-third of the 30 million hectare of open forests into moderately dense forests and part of the moderately dense forests into dense forests through conservation approach and assisting natural regeneration. The remaining two-third targets is to be met through afforestation on non-forest land. The report also mentions that agroforestry has a huge potential to contribute towards achieving India's forestry NDC target for which, in addition to financial resource, there is a need to have institutional strengthening, capacity building, innovative financial mechanism, and policy interventions. (TERI 2020).

A recent meta analyses of carbon sequestration potential of agroforestry systems in Indian landscape undertaken by Kumara et al. (2023) indicated that the AF systems are technically feasible and economically profitable. Reorienting and extending incentives for agroforestry, improving certification standards for agroforestry products, and strengthening the AF extension system will be crucial in enhancing ecosystem services and supporting India's efforts toward achieving its net zero emission target.

Under its updated Nationally Determined Contributions India stands committed to reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level and the ways to achieve this among other initiatives includes creation of an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. (Anon, 2022) Although, to achieve India's NDC goals, a mix of conservation and afforestation approach is needed, bulk of this additional carbon sink has to come through raising trees on non-forest areas including under agroforestry.

At present the extent of agroforestry in the country is 13% of total cropped area which is well below the global average of 43%. Thus, there is ample scope for promotion of agroforestry and enhance the contribution of agroforestry tree production system. In addition to croplands sizable areas of so called waste lands and un-utilized or under-utilized fallow lands and non-forest community lands can also be suitable for tree cultivation.

6.3 Sustainability of ToF & Agroforestry resources

From the foregoing analyses, it is clear that in future bulk of industrial wood required by WBIs will be produced under agroforestry production system and other ToF resources across the country. And it is also evident that there is ample scope for extension of agroforestry offering a win-win situation for the tree growers as well as the wood processing industry. For other tree based products also focus is gradually moving towards tree cultivation to supplement/substitute collection from the forests.

Considering the need for continued availability of various tree products it is necessary to establish systems in place to ensure sustainability and also to verifiable evidences for sustainability, legality, and traceability which are increasing being required by the responsible consumers in the domestic and overseas markets.

Realising this, MOEFCC has issued guidelines of —Indian Forest and Wood Certification Scheme²⁷ for voluntary third-party certification which is designed to promote sustainable forest management and agroforestry in the country. This program for recognition and accreditation of sustainable management practices for agroforestry and natural forestry resources called —PRAMAAN²⁷ includes certification of forest management, ToF management, and Chain of Custody²⁷. The Scheme Operating Agency - Indian Institute of Forest Management is responsible for overall management and also for approval of certification standards, processes, accreditation of certification bodies and other necessary procedures.

Considering the increasing contribution of ToF area including agroforestry Programme for Endorsement of Forest Certification - the world's leading forest certification system (PEFC www.pefc.org)²⁸ had included ToF in the scope of certification in the Sustainable Forest Management benchmark standard developed by a dedicated Task Force with strong expertise in agroforestry, farm forestry, and small holders through consultations and discussions with experts around the world over a three year period. The standard was approved in November 2018. Consequently, it is now possible to get ToF and agroforestry areas certified similar to forests for sustainable management and the products can have outreach to global markets.

²⁷ MOEFCC F. No. 3-19/2022–SU dated 6th December 2023.

²⁸ PEFC is world's leading forest certification system. PEFC and FSC are globally recognised forest sustainability certification systems which work with key stakeholders including environmental groups (NGOs), wood processing industries, foresters and local peoples. PEFC has benchmark standards and endorses national certification standards iff they meet its benchmarks through a very rigorous and independent evaluation/assessment procedure. This system recognizes the sovereignty of each country to set their own standards. Chain of Custody (COC) and Forest Management (FM) certifications are provided through independent accredited certification bodies. FSC has one international standard applicable to all countries. Presently, PEFC system has a larger share of certified forest in the world.

A Indian Certification Schemes developed by NCCF (www.nccf.in) for forest management, and ToF (first of its type in the world) has been duly endorsed by PEFC are already operational and NCCF-PEFC certified products have global recognition.

7. Way Forward

The forgoing discussion unambiguously manifests that agroforestry is an important nature-based land use system that can address all the major national concerns, i.e. *Sustainable Food and Nutritional Security*: through maintenance of soil fertility of agricultural lands through more efficient nutrient cycling and also production of nutritious edible fruits and other non-wood tree produces, etc.; *Livelihood Security*: through generation of employment in planting and primary processing, and downstream processing for market driven tree based products; and *Ecological Security*: through conservation of forests through timber substitution, efficient sequestration, land reclamation, alternate materials to non-biodegradable & high energy consuming materials like metals, and plastics.

It has immense potential to support the country not only in poverty alleviation and in meeting the increasing domestic demand of various tree products, including IRW but also in achievement of its international and national

commitments viz. Nationally Determined Contribution as part of the Paris Agreement on Climate Change, Bonn Challenge, UN Sustainable Development Goals, United Nations Convention on Combating Desertification (UNCCD), Doubling Farmers Income, Green India Mission, National Action Plan on Climate Change, and Atma Nirbhar Bharat. Therefore, agroforestry is a national imperative and need to be promoted across the country for overall and climate resilient economic growth while also addressing climatic challenges.

In recognition to the potentials of agroforestry in national development, India became the first country in the world to enunciate National Agroforestry Policy in 2014 and its implementation was also started with the launching of SMAF in the following year. However, after almost five years of implementation, an evaluation conducted by the Niti Aayog concluded that SMAF has not been able to receive satisfactory response from the participating States/UTs. Consequently, rather than conducting a comprehensive review with a view to draw up a road map for holistic implementation of the NAfP to achieve the policy goals and objectives, SMAF was discontinued and subsumed in RKVY.

It is therefore *essential that agroforestry and tree cultivation are organically linked to “climate mitigation and adaptation strategies” and integrated with the concept of “Grow more wood use more wood”* to achieve its full potential and benefits encompassing the entire value chain. It is a national imperative to undertake a *comprehensive review of the current status of implementation of NAfP* including *causative analysis of performance of SMAF*,

Box 5

State Action plans for Climate Change

An analysis of SAPCCs, India's initial attempts at endorsing the actions at the sub-national-level on climate change, revealed that many of the mitigation and adaptive benefits of agroforestry are reflected in the SAPCCs with predominant focus on tree based agroforestry. Agroforestry systems have been listed by most states either in their priority list or among the strategies for combating climate change. Expansion of agroforestry was a major focus area as a way to sequester carbon and increase tree cover outside forest areas. The Study also concluded that the current constraints to the expansion of agroforestry have not been adequately addressed which are further compounded due to required finances for executing the planned activities. (Dutta et al. 2024)

adoption of agroforestry and tree cultivation under state plans/schemes and externally aided projects/programs, use of wood substitutes, import trends of IRW and wood products (including paper pulp and paper boards etc.), and evolve a *long term strategic road map and a robust institutional arrangement covering the entire agroforestry value chain*. Although agroforestry is essentially the pathway to achieve the objectives of NAFIP also includes ToF through —*Public private partnership (PPP) for road side/canal side/barren community land/other non-forest waste lands to promote agroforestry to provide opportunities of economic returns and contributing ecological services*¶. In the interim, immediate attention is necessary with regard to: Assess climate mitigation and adaptation potentials of various models, Resource Assessment, Resource Augmentation and Sustainability (certification), Efficient resource utilization - meeting domestic demand and import substitution. Some specific action points are (not in any order of priority):

1. Prioritize various agroforestry models in vogue based on their climate mitigation and adaptation potentials and effective extension of climate resilient models indifferent agro-climatic zones.
2. Establish a system of periodic inventory of agroforestry and ToF due not only to their production and ecological functions and moreover for sustainable natural resource management, but also their monitoring to formulate mitigation and adaptation strategies. Initiation need to be made through a quick analysis of resources in existing agroforestry rich areas, like Punjab, Haryana, Tamil Nadu, Uttar Pradesh, and areas around paper mills (Andhra Pradesh, Telangana, Odisha) and other wood based industries. This needs to include species wise growing stock and sustainable annual harvests, and supply chain of timber/wood produces in these areas with a view to remove the bottlenecks if any, and creating better market linkages through a system of tracking and traceability of wood so as to target international markets. One possibility is to create a system of registration of trees with species on an online platform and issuance of Certificate of Origin to facilitate smooth movement of wood/timber across the country with traceability to the source as a proof of legality.
3. Utilization of the agroforestry suitability mapping data set and tool developed under GROW by the States, and initiate efforts to bring suitable wastelands under tree cultivation.
4. A rapid assessment of existing/potential regions for growth of wood processing industries, viz. Yamuna Nagar (Haryana), Saharanpur (Uttar Pradesh), Jodhpur (Rajasthan), Channapatna (Karnataka), and promote cultivation of tree species required by the processing industries to meet the domestic demand of wooden products and enhancing the pace replacing wood alternates by wood substitutes.
5. Monitoring the adoption of the NTPS to facilitate its evolution to achieve the goal of seamless movement of tree products across the length and width of the country. It is to necessary to underline the that farmers grow trees primarily for commercial reasons and are at times discouraged due to local market fluctuations and lack of uniformity in felling and transit regulations across the country.
6. Supporting the formulation and adoption of independent third party certification system for ToF resources and nurseries.

- 7 Establishment of certified nurseries for production of reliable planting material of species preferred by tree growers/farmer in different regions to meet the requirements of wood processing industries.
- 8 Facilitate WBIs, particularly the MSMEs and micro enterprise in enhancing their competency for improving product quality.
- 9 In view of the QCOs the BIS need to strengthen its enforcement mechanism, revising the standards to incorporate performance based parameters, and establishment of NABL accredited testing facilities for certification of WBIs.
- 10 Provide positive policy push for greater use of wood products in key growth sectors for green/sustainable development. Although alternate wood products like iron, steel, cement, aluminium, have serious adverse environmental impacts, they continue to be preferred compared to wood products due largely to lack of awareness about the negative environmental effects of wood alternates and positive environmental impacts of wooden products. Some suggested actions in that direction include:
 - a. Comparative life cycle assessment of wood substitutes and wood alternates in Indian situations to document science-based evidence on their carbon footprints to support policy initiatives for promoting and incentivizing use of wood substitutes in construction and other sectors.
 - b. Effective enforcement of mandatory quality control orders for manufactured wooden products including sawn timber (seasoning and preservative treatment to ensure dimensional stability and durability), wood composites and panel products, with view to enhance production quality and cost-competitiveness of end products in domestic market as well as for exports.
 - c. Inclusion of wood and wood substitutes in graduate/post graduate courses for Civil Engineers and Architects to lay the foundation of green construction.
 - d. Government to take demonstrative lead in constructing green public buildings using wood and wood substitutes wherever possible to showcase the benefits of their uses as well as impact on direct and indirect costs of construction.
 - e. Promotion of wood substitutes in government funded/supported affordable housing schemes such as in Pradhan Mantri Awas Yojana.
 - f. Modification in Public sector procurement policies to enhance use of domestically produced and certified wood products/substitutes
8. Supply chain mapping of imported timbers within the country. Detail knowledge about the endues of various imported timber species is a primary requirement assessing suitability assessment of domestic tree species with appropriate processing technologies aiming at their preferential promotion under agroforestry.

Above all, it is a paramount need for creating a National Institution for holistic execution of the NAFIP. Additionally, a national wood development board need also be set up under the Ministry of Commerce and Industries to promote the development of wood based industries to meet the domestic demands and also to export of wood based products.

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State-wise Trees Species growing on non-forest /private lands exempted from Transit Regulations

(received from MOAFW)

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) Eucalyptus , Neelagiri, Jama oil (X) Subabul (xi) Semma, Chinta, (xii) Regu, Ber (Xiii) Raintree, Nidragannreru (xiv) Nerudu, Jamun, Jinne (xv) Ravi and related species (xvi) Neem , vepa (xvii) Nalla tumma (xviii) Mango, Mamidi (xix) Panasa, Jackfruit
2.	Bihar	Poplar, Eucalyptus , Kadmb, Gamhar, Mango, Litchi, Toddy, palam, Khajur, Semul, Bbool(Israeli, Babool), Babool (Vilaiti Babool), Gulmohar, Ber, Guava, Meethi Neem , Jacarandal, Subabool , Shahtoot, Ashok, Casuarina , Silver Oak, Plam, Nimbu, Santara, Mausambi, Peltoforam, Rubber, Safed Babool/ Rrimjha,
3.	Chhattisgarh	Casurina, Subabul, Poplar, Izarysli Babul , Vilayati Babul , Menzium, Babul , Nilgiri , Siris, Rimjha, Rubber, Pine Species , Australian Babul, cassia Saymia, Baken, Gliricidia, Khamer, Kadamba, Sissoo , Kapok, Maharukh, Sliver Oak
4.	Gujarat	Nilgiri, Subabul, Saru , Champa, Laxmanfal , Ramfal, Sitafal, Asopalav, Pendula, Nagkesar, Nagchampha, Falsa, Ingorio/Angarea, Kamrakh, Kadhipatta, Limbu, Chikotru, Bijoru/Turanj, Narangi, Mausambi, Maharuk, Rukhdo, Motoarduso, Limdo, Neem, Bakan , Bakan, nim, Irani nim, Nimbara, Limbara, Mahanim, Mahogany , Bordi, Bor , 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, Poplar , Golden cane palm, Oilplam
5.	Himachal Pradesh	Kala Siris/Oh/Siris, Kachnar/ Karial, Safeda, Kimu/ Chirmu, /Shahtoot/Tut/ Mulberry, Poplar , 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, Teak/Sagun/Sagwan, Arjun , Semal, Shalmaltas, Bihul/ Beul/ Bhimal/ Bhiunal/Dhaman, Paza/ Padam, Kamala/ Raini/Rohan/Rohini/ Sinduri, Aam(Mango wild variety), Rishtak/Ritha/Dode.
6.	Haryana	Eucalyptus (Safeda), Poplar
7.	Jharkhand	Eucalyptus (Safeda), Poplar, Casuarina, Maha Neem, Baken Kadmb, Subabool , Silver Oak, Israeli Babool Vilayati Babool, Babool, Plam, Ber, Munga, Mulberry Guava, Nimboo, Santra, Mussambi, Ashok.
8.	Jammu & Kashmir	Kikar, Bel, Siris, Champ, Neem , Malugarh, Kakrad, Palas, Amaltus/ Karangal, Sisoo/Tali , Dhamman, Nili Gulmohar, Akhrot(khod) , Kehbal jhingar, Baronkal, Bilati Kikar, Safeda, Poplar , 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, Casuarina , India Beef wood, Lemon, Ornage, Coconut, Coffee, Mayflower, Indian

		coral tree, Eucalyptus , Glyceridia / Quick stick, Silver Oak, Rubber, Jacaranda, Sausage tree , Subabul , Umbrella tree, Sapota/Chikoo fruit, Melia , Indian Cork tree, Drumstick , Mulberry , Curry leaf tree , Peltoform, Purple bauhinia, Pagoda tree, False Ashoka, Guava, Sesbania, Hummingbird tree, Paradise tree, African tulip , Tabebula, Trumpet tree
10.	Kerala	Species for Plywood: Vellappine, Kurangandi/ Narivenga/Mundani, Karakily/Kalpine, 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, Manjakkdambu, Species for pencil wood : Venkotta, Perumtholi/Poochakadmbu, 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(Tamarind tree), Nattupunna (Nattupunna), Aanjili(Aanjili), Vaka (Vaha- species), Poovam, (Poovam), Konna), Thanni (Thanni), Uthi (Uthi), Aal Jatikal (Ficus species), Matti (Matti), Murukku(Murukku), Elappu(Iloia) and Kodamuli(Koadampuli)
11.	Madhya Pradesh	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, Saptarni, Kaitha, Jungle Jalebi, Petltaphorum, Neem, Bakain, Sissoo, Karanj, Palash, Safed Sirus, Pipal, Bargad, Gular, Rubber, Semal, Kapok, Chirrol, Gliricidea, Rimjha , meithi Neem , Gurhal, , Jasoun, Conifers , imported Timber Species
12.	Maharashtra	Nilgiri trees , Babhul , Subabhul , Prosopis , Ashok , Drumstick , Sindi, Orange, Chiku, Bhendi, Acacia, Poplar , Lac, Casuarina equisetifolia , Rubberwood
13.	Meghalaya	Umbrella thorn, 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,Eoropean Pear,Pear,Tamarind, Heart-leaved moonseed, East Himlayan blueberry,Alu fruit,Jujube.
14.	Mizoram	Kothal, Tung, Eucalyptus spp. , Mulberry , Neem , Rubber tree, Imli, Silver Oak, Subabul, Mango, Guava, Coconut, Citrus, Areca nut
15.	Nagaland	Aam , Korei, Walnut, Neem , Alder, Manipur Sim, Kadam, Hollock , Khokan , Teak , Gamari
16	Odisha	Bada chakunda, Sana Chakunda, Jhaun, Sliver Oak, Patas/ Nilgiri , Sunajhari/Acacia, Subabul, Kaitha, Ambada, Batapi, Oau, Sajana, Karamanga, Sahada, Plam tree, Debadaru, Bhersunga, Gohira,

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

Note: Tree spp. marked in bold are preferred under agroforestry scheme in the states.

F. No. 10-2/2020-NRM-SMAF
Government of India
Ministry of Agriculture, Cooperation & Farmers Welfare
Department of Agriculture, Cooperation & Farmers Welfare
(Natural Resource Management Division– SMAF)

**State wise list of Trees Species free from Felling and Transit Regulations
growing on Non forest area /private land in following States and UTs as
received from MoEF & CC.**

S.No.	Name of States/UTs	Status
1.	Andaman n Nicobar Islands	<ul style="list-style-type: none"> Transit Permit is required for transit of forest produce in A & N Islands and no exemption for any sps. has been provided in the Regulation.
2.	Assam	<ul style="list-style-type: none"> No Felling Permission (FP) is required for home grown bamboo. No Transit Pass (TP) is required. Certificate from Gram Panchayat is required.
3.	Andhra Pradesh	<ul style="list-style-type: none"> NO FP. All spp exempted. NO TP, All spp exempted.
4.	Arunachal Pradesh	<ul style="list-style-type: none"> No FP is for bonafide use except commercial use No TP is required except commercial and other use
5.	Bihar	<ul style="list-style-type: none"> Tree sps currently exempted from Transit Regulations (as on 27.02.2009) <p>Poplar, Eucalyptus, Kadamb, Gamhar, Mango, Litchi, Toddy palm, Khajur, Bamboo sps (Except <i>Dandrocalamus strictus</i>), Semul.</p> <ul style="list-style-type: none"> Some more sps are in process to be exempted.
6.	Chandigarh	<ul style="list-style-type: none"> No interstate transit permit is being issued by Forest Department as no forest check posts have been established. The permission for felling of trees on private /non forest land is given only in two cases, i.e either for any development work or trees are dangerous to human life or property. As such no tree sps. is exempted under this.
7.	Chhattisgarh	<ul style="list-style-type: none"> Timber Sps that have been exempted from transit regulations are Poplar, Casuarina, Su-babul, Israili babul, Vilayati babul, Manzium , Nilgiri
8.	Delhi	<ul style="list-style-type: none"> Since land is premium commodity in Delhi, farmers generally do not practice agroforestry here. Sps. like

584491/2021/O/o AC(NRM)

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7.	Chhattisgarh	<ul style="list-style-type: none"> Timber Sps that have been exempted from transit regulations are Poplar, Casuarina, Su-babul, Israili babul, Vilayati babul, Manzium , Nilgiri
8.	Delhi	<ul style="list-style-type: none"> Since land is premium commodity in Delhi, farmers generally do not practice agroforestry here. Sps. like

		<p>Poplar, Kikar and Eucalyptus have been proposed for exemption. So FP is required</p> <ul style="list-style-type: none"> There is no transit rules in Delhi for transportation of timber.
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9.	Goa	<ul style="list-style-type: none"> • No FP. Omitted Bamboo from the definition of tree. • NO TP. All types of bamboo grown in private areas (non forest areas) will not fall under the purview of forest produce and hence transit permit for bamboo felled from private areas are exempted
10.	Gujarat	<ul style="list-style-type: none"> • Nilgiri, Subabul, Saru, Champa, Laxmanfal , Ramfal, Sitafal, Asopalav, Pendula, Nagkesar, Nagchampha, Falsa, Ingorio/Angarea, Kamrakh, Kadhipatta, Limbu, Chikotru, Bijoru/Turanj, Narangi, Mausambi, Maharuk, Rukhdo, Motoarduso, Limdo, Neem, Bakan, Bakan, nim, Irani nim, Nimbara, Limbara, Mahanim, Mahogany, Bordi, Bor, Khati bor, Ghulbor, Liehi, Lilchi, Aritha, Aritha, Amba, Kadvo Saragavo, Saragavo , Agathin, Segto, Agastin, Desi Baval, Goras amllli, 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, Poplar, Golden cane palm, Oilplam
11.	Himachal Pradesh	<ul style="list-style-type: none"> • Kala Siris/Ohi/Srisis, Kachnar/ Karial, Safeda, Kimu/ Chirmu, /Shahtoot/Tut/Mulberry, Poplar, Indian Willow/Bluns, Kuth, Kala Zira, Japanese Shehoot/paper mulberry, Paik, /Koi,/ Kosh/Kunis/ Kunish/Nyun, Khirk/ Khadki, Darark/Bakin, Fagoora/ Phagoora/Tiamble/timia/ timal/anjiri/cluster fig/ goolar, Toon, Jamun, Teak/Sagun/Sagwan, Arjun,

		<p>Semal, Shalmaltas, Bihul/ Beul/ Bhimal/ Bhiunal/Dhaman, Paza/ Padam, Kamala/ Raini/Rohan/Rohini/ Sinduri, Aam(Mango wild variety), Rishtak/Ritha/Dode</p>
12.	Haryana	<ul style="list-style-type: none"> • Some sps are exempted from regulations under Punjab Land Preservation Act, 1900. These are Eucalyptas, Poplar, Allanthas , and Acacia tortillis. There is no transit rules applied for timber sps.
13.	Jharkhand	<ul style="list-style-type: none"> • Eucalyptus (Safeda), Poplar, Casuarina, Maha Neem, Baken Kadmb, Subabool, Silver Oak, Israeli Babool Vilayati Babool, Babool, Plam, Ber, Munga, Mulberry Guava, Nimboo, Santra, Mussambi, Ashok,

		<p>Karakily/Kalpine, Kulamavu/ Kulirmavu/Ooravu, Pali/Palendinjan, Thellipine/Undapine, Kulavu, Red Cedar, Poon/Punna/Punnappa, Veditlavu/Mullampalli, Charu, Pothundi/Perunthondi, Cheeni, Nedunar, Vallabham/Varangu, Chorapine, Chemmaram, Champakam, Cherukonna, Mulliam, Neeramruthu, Peenary, Kumbil, Veembu, Gnavel, Kattunelli, Vakka, Thavala</p> <ul style="list-style-type: none"> • Species for Matchwood :Aspin/Kanala/Nasakam, Elavu/Poola, Pala/Mukkampala, • Species for Bobbin wood : Vellakil, Manjakdambu, Species for pencil wood : Venkotta, Perumtholi/Poochakadmbu, Attuthekkku/Cadambu, • Species for packing wood: Kara/ Bhadraksham, Amazham,Aval, Arayanjill, Kalaveppu/Malaveppu, Vatta/Uppathi,
14.	Jammu & Kashmir	<ul style="list-style-type: none"> • Kikar, Bel, Siris, Champ, Neem, Malugarh, Kakrad, Palas, Amaltus/ Karangal, Sisoo/Tali, Dhamman, Nill Gulmohar, Akhrot(khod), Kehbal jhingar, Baronkal, Bilati Kikar, Safeda, Poplar, Robin, Chitta banddha, Rondu banddha, Sagwan, Arjun, Beheda, Tun/Toon, Bana, Dhol
15.	Karnataka	<ul style="list-style-type: none"> • Acacia hybrid, Acacia manglum, Tree of Heaven, Rain tree, All Cassias except Golden Rain tree, Cashew, Christmas tree, Arecanut, Casuarina, India Beef wood, Lemon, Ornage, Coconut, Coffee, Mayflower, Indian coral tree, Eucalyptus, Glyceridia/ Quick stick, Silver Oak, Rubber, Jacaranda, Sausage tree , Subabul, Umbrella tree, Sapota/Chikoo fruit, Melia, Indian Cork tree, Drumstick, Mulberry , Curry leaf tree, Peltoform, Purple bauhinia, Pagoda tree, False Ashoka, Guava, Sesbania, Hummingbrid tree, Paradise tree, African tulip , Tabebula, Trumpet tree
16.	Kerala	<ul style="list-style-type: none"> • Species for Ply wood: Vellappine,Kurangandi/Narivenga/Mundani,

		<p>Karakily/Kalpine, Kulamavu/ Kulirmavu/Ooravu, Pali/Palendinjan, Thellipine/Undapine, Kulavu, Red Cedar, Poon/Punna/Punnappa, Veditlavu/Mullampalli, Charu, Pothundi/Perunthondi, Cheeni, Nedunar, Vallabham/Varangu, Chorapine, Chemmaram, Champakam, Cherukonna, Mulliam, Neeramruthu, Peenary, Kumbil, Veembu, Gnavel, Kattunelli, Vakka, Thavala</p>
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17	Lakshadweep	<ul style="list-style-type: none"> • NO FP. IFA or any Forest Act is not enforced in Lakshadweep. Also, Bamboo is not grown anywhere in Lakshadweep. Therefore amendment in IFA or any Forest Act does not arise in this state. • No TP
18.	Madhya Pradesh	<ul style="list-style-type: none"> • Neelgiri, Casuarina, Poplar, Subabul, Israilli Babul, Vilayati Babul, Australian Babul, Babul, Khamer, Maharukh, Kadamb, Cassia Siamea, Gulmohar,
		<p>Jacaranda, Silver oak, Flam, Ber, Mulberry, Katahal, Amrood, Nimbu, Santra, Mussambi, Munga, Moishri, Ashok, Putranjiva, Imli, Jamun, Mango, Saptarni, Kaitha, Jungle Jalebi, Pettaphorum, Neem, Bakain, Sissoo, Karanj, Palash, Safed Sirus, Pipal, Bargad, Gular, Rubber, Semal, Kapok, Chirol, Gliricidea, Rimjha, melthi Neem, Gurhal, , Jasoun, Conifers, Imported Timber Species</p>
19.	Maharashtra	<ul style="list-style-type: none"> • Nilgiri trees, Babhul, Subabhul, Prosopis, Ashok, Drumstick, Sindi, Orange, Chiku, Bhendli, Acacia, Poplar, Lac, Casuarina equisetifolia, Rubberwood
20.	Meghalaya	<ul style="list-style-type: none"> • Meghalaya being a Hilly state, there is no Agroforestry at all, since percentage of states land covered by agriculture is very small.If any blank inter-state movement of timber is permitted, state will lose meagre resource of forests under control of the State Government.
21.	Mizoram	<ul style="list-style-type: none"> • Kothal, Tung, Eucalyptus spp. ,Mulberry, Neem, Rubber tree, Imli, Silver Oak, Subabul, Mango, Guava, Coconut, Citrus, Areca nut
22.	Manipur	<ul style="list-style-type: none"> • No Felling Permission (FP) is required • No Transit Pass (TP) is required for home grown within state. • TP is required outside state
23.	Nagaland	<ul style="list-style-type: none"> • Aam, Korei, Walnut, Neem, Alder, Manipur Sim, Kadam, Hollock, Khokan, Teak, Gamari

24.	Odisha	<ul style="list-style-type: none"> Bada chakunda, Sana Chakunda, Jhaun, Silver Oak, Patas/Nilgiri, Sunajhari/Acacia, Subabul, Kaitha, Ambada, Batapl, Oau, Sajana, Karamanga, Sahada, Plam tree, Debadaru, Bhersunga, Gohira, Giliricidia, Paladhua, Coconut
25.	Punjab	<ul style="list-style-type: none"> "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 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 any other species declared by the State/ authorised agency as agro-forestry species from time to time.
26.	Rajasthan	<ul style="list-style-type: none"> Casuarina, Australian babul, Khamer, Cassia Siamea, Gulmohar, Jaccaranda, Silver oak, Plam, Ber, Mulberry, Katahal, Amrood, Sehjana, Molshri, Ashok, Putranjiva, Imli, Jamun, Saptarni, Kaitha, Jungle Jalebi, Petaphorum, Bakain, Karanj, Safed Sirus, Semal, Kapok, Churel, Mithi neem
27.	Sikkim	<ul style="list-style-type: none"> No permission for felling of trees on any private or Forest land has been granted. If anyone wishes, he have to apply to Block Officer.
28.	TamilNadu	<ul style="list-style-type: none"> Mesquite, Casuarina, Subabul, Palmyrah, Dadops, Umbrella thom, White Back Acacia/ Panicked Acacia, Maharuch, Maharukh/East India Walnut/Siris, Cashew, Kadam, Jack, Neem/Margosa, Red silk cotton/ Kapok, Sappan, Cassia, white silk cotton tree/kapok, Sissoo, Coral tree, Eucalyptus, Gamari, Rubber, Sea Hibiscus, Mohua, Mango, Persian Lilac, Malabar Neem, Morinda /Suranji, Manila/ Tamarind, Pongam/ Indian Beach, Rain tree, Mahogeny, Jamun/Indian cherry, Tamarind, Esperanaza, Indian Portia tree/Indian Tulip, Red Cedar/Toon, Silver Oak.

29.	Telagana	<ul style="list-style-type: none"> (i) Eucalyptus, Neelagiri,Jama oil (ii) Casurina, Sarugudu, Sarvi, Saru(iii) Poplar(iv) Subabul (v) Israeli Babool (vi) Seema,Thumma(viii) <i>Australian babul</i>(viii) <i>Gummaadi teak</i> (ix) <i>Poddamaru</i> (x) <i>Kadamb</i>, (xi) Seema/ Tangedu (xii) Jacaranda (xiii) Silver oak (xiv) Regu, Ber(xv) Mulberry (xvi) Jama, Guava (xvii) Orange and related species,(xviii) Munga (xix) Ashok/ Naramamidi (xx) Mahaputrajiv/Putrajeevi (xxi) Edakulapala (xxii) Turakavepa(xxiii) Kanuga (xxiv) Rubber / Seemamarri (XXV) Tella Tumma (xxvi) Gliricidea/Seema/Kanuga(xxvii) Tella Tumma (xxviii) Kalvepaku (xxix)Mandara (xxx) Conifers(chir, Kail, Deodar, Pine species) (xxxi) Tati, Tadi, Palmyrah (xxxii) Sapota (xxxiii)Coconut, Kobbari, Tenkai, (xxxiv) Cashew , Jeedimamidi (xxxv) Semma, Chinta, ((xxxvi) Raint ree, Nidragannreru, (xxxviii) Mango,Mamidi(xxix) Panasa, Jackfruit
30.	Tripura	<ul style="list-style-type: none"> Tree species like Mango, Litchi, Drumstick, Guava, Rubber and bamboo are exempted from extraction from private land. Bamboo sps. have been exempted from transit permits both from Private and Forest land. Transport of Timber is also permitted .
31.	U.P.	<ul style="list-style-type: none"> Aru, Casuarina, Jangal Jalebi, Poplar, Babool, Vilayati Babool, Rabania, Siris, Su-babool, Kathber, Jamun, Eucalyptus, Dhak Palas, Paper Mulberry, Ber, Sainjana, Shah toot, Mango (Desi, Tukhmi or Kaimi)

32.	Uttarakhand	<ul style="list-style-type: none"> 27 tree species have been exempted from the provision of Tree protection Act, 1976. This includes fodder and small timber species that are being used
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		<p>in small scale industries, animal husbandry, agricultural implements and allied activity. Other 07 tree species like Walnut , Neem, Oak , Ficus (Peepal and Banyan) and Deodar have been placed in the restricted category and felling permission can be granted only in case of dead or dangerous trees.</p>
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Guidance Document on Quality Control Orders (QCOs)

About this Guidance Document:

This guidance document provides for easy comprehension of Quality Control Orders (QCOs) and explains various requirements specified in QCOs for better understanding towards implementation by the stakeholders.

BUREAU OF INDIAN STANDARDS Manak Bhawan, 9, Bahadur Shah Zafar Marg

New Delhi – 110002 www.bis.gov.in

QUALITY CONTROL ORDERS

1. Overview of QCO

1.1 Bureau of Indian Standards (BIS), the National Standards Body of India is engaged in the activities of Standardization, Conformity Assessment and Quality Assurance of goods, articles, processes, systems and services. The Indian Standards established by BIS forms the basis for the Product Certification Schemes, which provides Third Party Assurance of Quality, Safety and Reliability of products to consumers.

1.2 Thrust on Mandatory Certification

1.2.1 BIS certification scheme is basically voluntary in nature. However, for a number of products compliance to Indian Standards is made compulsory by the Central Government under various considerations viz. public interest, protection of human, animal or plant health, safety of environment, prevention of unfair trade practices and national security. For such products, the Central Government directs mandatory use of Standard Mark under a Licence or Certificate of Conformity (CoC) from BIS through issuance of QCOs.

2. Provisions of the BIS Act

2.1 The Central Government, after consulting BIS, publishes QCOs in exercise of the powers conferred by sub-sections (1) and (2) of section 16 read in conjunction with section 17 and sub-section (3) of section 25 of the BIS Act, 2016 thereby bringing the products under BIS Mandatory Certification.

3 Conformity to Indian Standard and Compulsory use of Standard Mark

3.1 The products under QCOs shall conform to corresponding Indian Standard(s) mentioned in the QCO and shall bear the Standard Mark under a Licence or CoC from BIS as per the relevant Scheme of BIS (Conformity Assessment) Regulations, 2018 as notified in the Order.

4. Date of commencement

4.1 QCOs are issued by various Line Ministries (Regulators) under the Central Government depending upon the product(s)/ product categories being regulated through the Order, after having stakeholder consultations.

4.2 The date of commencement of the QCO is clearly emphasized in the Order itself so that the stakeholders are well aware of the timelines for its implementation in terms of necessary manufacturing and testing infrastructure and compliance of the product to the requirements of the relevant Indian Standard.

5. Prohibition Orders

5.1 After the date of commencement of the QCO, no person shall manufacture, import, distribute, sell, hire, lease, store or exhibit for sale any product(s) covered under the QCO without a Standard Mark except under a valid Licence or CoC from BIS.

6. Applicability on Imported Goods

6.1 Domestic Laws / Rules / Orders / Regulations applicable to domestically produced goods shall apply, mutatis mutandis, to imports, unless specifically exempted. If domestic product(s) are subjected to mandatory compliance with Indian Standards, such product(s) if imported

would also need to comply with Indian Standards compulsorily. Thus, for these products, the manufacturer in foreign country will be required to obtain a Licence or CoC from BIS under the Foreign Manufacturers Certification Scheme (FMCS) of BIS.

7. Penalty for contravention of the provisions of QCO

7.1 Any person who contravenes the provisions of the Order shall be punishable under the provisions of sub-section (3) of section 29 of the BIS Act, 2016 with imprisonment or with fine or with both.

8. Exemptions from applicability of the Order

8.1 Any exemptions like non-applicability of the Order on specific product(s), product(s) meant for export etc. come under the purview of the Line Ministry (Regulator) who has issued the QCO. Wherever exemptions are permitted, these are clearly brought out in respective QCO itself.

9. Amendment / Revision of Indian Standards covered under QCO

9.1 The latest version of Indian Standards including the amendments issued thereof shall apply for implementing the provisions of QCOs. Whenever any amendment or revision is made to an Indian Standard covered under the QCO, such amendment or revision shall apply to the provisions of the QCO with effect from the date notified by BIS.

9.2 In such cases, BIS provides sufficient period for concurrent running of both the versions of Indian Standard (existing as well as revised). The licensee manufacturer shall changeover to the revised version of Indian Standard within the timelines notified by BIS from time to time.

10. Clarifications on QCO

10.1 If any person is having issues/queries/clarifications related to applicability of QCO on a particular product or implementation of QCO or any matters connected therewith or incidental thereto like extension in the date of implementation of QCO, exemptions, stock-in-hand as on the date of implementation of the Order etc., they may approach the concerned Line Ministry/Department of the Central Government that has issued the QCO.

10.2 If any person is having queries/clarifications related to coverage of any product under Indian Standard covered under QCO, they may approach BIS.

11. Role of BIS in implementation of QCOs

11.1 For the purpose of facilitating the Central Government in issuance of QCOs, BIS regularly interacts with Line Ministries/ Departments and provides technical inputs related to Indian Standards, appropriate Conformity Assessment Scheme etc. and also participates in stakeholder's consultation meeting.

11.2 Further, for implementation of the provisions of QCO, BIS acts as the Certification Authority and grants Licence or CoC to manufacturers as per relevant Conformity Assessment Scheme. BIS also acts as the Enforcement Authority for the products specified in the QCO.

12. Information on QCOs

12.1 The information on QCOs issued by the Central Government can be obtained from BIS website under the following link [Conformity Assessment -> Product Certification -> Products under Compulsory Certification](#).

MINISTRY OF COMMERCE AND INDUSTRY
(Department for Promotion of Industry and Internal Trade)

ORDER
New Delhi, the 10th August, 2023

S.O. 3604(E).—In exercise of the powers conferred by sub-section (1) and (2) of section 16 read with section 17 and sub-section (3) of section 25 of the Bureau of Indian Standards Act, 2016 (11 of 2016), the Central Government, after consulting the Bureau of Indian Standards, is of the opinion that it is necessary or expedient so to do in the public interest, hereby makes the following Order, namely:-

1. Short title and commencement.—(1) This Order may be called the Wood Based Boards (Quality Control) Order, 2023.

(2) It shall come into force with effect from six months from the date of notification.

(3) Provided that for Small Enterprises as defined under the Micro, Small, and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from nine months from the date of publication of this notification.

(4) Provided that for Micro Enterprises as defined under the Micro, Small, and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from twelve months from the date of publication of this notification.

3. Certification and enforcement authority. —The Bureau shall be the certifying and enforcing authority for the goods or articles specified in column (1) of the said Table.

4. Penalty for contravention. —Any person who contravenes the provisions of this Order shall be punishable under the provisions of the Bureau of Indian Standards Act, 2016.

Compulsory use of Standard Mark.—Goods or articles specified in column (1) of the Table below shall conform to the corresponding Indian Standard mentioned in column (2) of the said Table and shall bear the Standard Mark under a licence from the Bureau as per Scheme-I of Schedule-II of the Bureau of Indian Standards (Conformity Assessment) Regulations, 2018:

Provided that nothing in this Order shall apply to goods or articles manufactured domestically for export.

Goods or articles	Indian Standard	Title of Indian Standard
(1)	(2)	(3)
Wood Based Boards	1659:2004	Block boards
	12823:2015	Prelaminated particle boards from wood and other Lignocellulosic material
	3087:2005	Particle boards of wood and other lignocellulosic materials (medium density) for general purposes
	12406:2021	Medium density fibre boards for general purpose
	3097:2006	Veneered particle boards

Note : For the purposes of this Table, the latest version of Indian Standards including the amendments issued thereof, as notified by the Bureau of Indian Standards from time to time, shall apply from the date of such notification.

[F. No. P-14031/21/2023-CI]

SANJIV, Jt. Secy.

MINISTRY OF COMMERCE AND INDUSTRY
(Department for Promotion of Industry & Internal Trade)

ORDER

New Delhi, the 29th August, 2023

S.O. 3841(E).—In exercise of the powers conferred by section 16 of the Bureau of Indian Standards Act, 2016 (11 of 2016), the Central Government, after consulting the Bureau of Indian Standards, is of the opinion that it is necessary or expedient so to do in the public interest, hereby makes the following Order, namely:-

1. Short title and commencement. – (1) This Order may be called the Plywood and Wooden flush door shutters (Quality Control) Order, 2023.

(2) It shall come into force with effect from six months from the date of notification.

(3) Provided that for Small Enterprises as defined under the Micro, Small, and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from nine months from the date of publication of this notification.

(4) Provided that for Micro Enterprises as defined under the Micro, Small, and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from twelve months from the date of publication of this notification.

2. Compulsory use of Standard Mark. – Goods or articles specified in column (1) of the Table shall conform to the corresponding Indian Standard specified in column (2) of the Table and shall bear the Standard Mark under a license from the Bureau of Indian Standard as per Scheme-I of Schedule-II to the Bureau of Indian Standards (Conformity Assessment) Regulations, 2018:

Provided that nothing in this Order shall apply to goods or articles manufactured domestically for export.

3. Certification and enforcement authority. –The Bureau of Indian Standard shall be the certifying and enforcing authority for the goods or articles specified in the said Table.

4. Penalty for contravention. –Any person who contravenes the provisions of this Order shall be punishable under the provisions of the Bureau of Indian Standards Act, 2016.

Goods or articles	Indian Standard	Title of Indian Standard
(1)	(2)	(3)
Plywood and Wooden flush door shutters	303:1989	Plywood for general purposes
	2202 (Part 1):1999	Wooden flush door shutters (solid core type) - Plywood face panels
	710:2010	Marine plywood
	5509:2021	Fire retardant plywood
	1328:1996	Veneered decorative plywood
	2191 (Part 2):2022	Wooden flush door shutters (cellular and hollow core type) - Particle board and hardboard face panels
	2191 (Part 1):2022	Wooden flush door shutters (cellular and hollow core type) - Plywood face panels
	2202(Part 2): 2022	Wooden Flush Door Shutters (Solid core type) — Particle Board, High Density Fibre Board, Medium Density Fibre Board and Fibre Hardboard Face Panels
	4990: 2011	Plywood for concrete shuttering works - Specification
10701: 2012	Structural plywood - Specification	

Note: For the purposes of this Table, the latest version of Indian Standards including the amendments thereof, as notified by the Bureau of Indian Standards from time to time, shall apply.

[F. No. P-14031/9/2023-CI]

SANJIV, Jt. Secy.

MINISTRY OF COMMERCE AND INDUSTRY
(Department For Promotion of Industry and Internal Trade)

ORDER
New Delhi, the 29th February, 2024

S.O. 1018(E).—In exercise of the powers conferred by section 16 read with section 17 and sub-section (3) of section 25 of the Bureau of Indian Standards Act, 2016 (11 of 2016) and in supersession of the Resin treated compressed wood laminates (Quality Control) Order, 2023, except as respects things done or omitted to be done before such supersession, the Central Government, is of the opinion that it is necessary or expedient so to do in the public interest, hereby makes the following Order, namely:-

1. **Short title and commencement.** - (1) This Order may be called the Resin Treated Compressed Wood Laminates (Quality Control) Order, 2024.

(2) It shall come into force with effect from the 14th January, 2025:

Provided that in respect of small enterprises, as defined under the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from the 14th April, 2025:

3 Provided further that in respect of micro enterprises, as defined under the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006), it shall come into force with effect from the 14th July, 2025.

2. **Compulsory use of Standard Marks.**- Goods or articles specified in column (1) of the Table shall conform to the corresponding Indian Standard specified in column (2) of the Table and shall bear the Standard Mark under a licence from the Bureau as per Scheme-1 of Schedule-II of the Bureau of Indian Standards (Conformity Assessment) Regulations, 2018:

(2) Provided that nothing in this Order shall apply to goods or articles manufactured domestically meant for export :

3. **Certification and enforcing authority.**- The Bureau shall be the certifying and enforcing authority for the goods or articles specified in column (1) of the Table.

4. **Penalty for contravention.** - Any person who contravenes the provisions of this Order shall be punishable under the provisions of the Bureau of Indian Standards Act, 2016.

TABLE

Goods or articles	Indian Standard	Title of Indian Standard
(1)	(2)	(3)
Resin treated compressed wood laminates	3513 (Part 1):1989	Resin treated compressed wood laminates (compregs) - For electrical purposes
	3513 (Part 2):1989	Resin treated compressed wood laminates (compregs) - For chemical purposes
	3513 (Part 3):1989	Resin treated compressed wood laminates (compregs) - For general purposes

Note:- For the purposes of this Table, the latest version of Indian Standards including the amendments thereof, as notified by the Bureau from time to time shall apply from the date of such notification.

[F. No. P-14031/33/2023-CI]

SANJIV, Jt. Secy.

Annexure 3

Estimated number of stems in Agroforestry systems in India (ISFR, 2013)			
Species	Main product	Number in '000	%
Acacia arabica/ Acacia nilotica/indica	Timber	152668	4.09
Acacia catechu	NTFP	48711	1.31
Acacia lenticularis/ leucophlaea	NTFP	67914	1.82
Albizzia species	Timber	25266	0.68
Anacardium occidentale	NTFP	46050	1.23
Areca catechu	NTFP	271002	7.26
Artocarpus integrifolia (Jackfruit)	NTFP	46647	1.25
Azadirachta indica	NTFP	208466	5.59
Bombax ceiba/malabaricum/	Timber	21206	0.57
Borassus flabelliformis (palm, toddy/wine palm)	NTFP	94237	2.53
Butea monosperma	NTFP	131976	3.54
Cedrela toona/Toona ciliate	Timber	5581	0.15
Cocos nucifera	NTFP	211762	5.68
Dalbergia sissoo	Timber	53829	1.44
Eucalyptus species	Timber	118919	3.19
Ficus bengalensis	NTFP	4466	0.12
Ficus racemosa (Ficus glomerata)	NTFP	8274	0.22
Ficus religiosa	NTFP	5310	0.14
Ficus species	NTFP	14826	0.40
Gmelina arborea	Timber	19730	0.53
Grevillea robusta	Timber	54631	1.46
Grewia oppositifolia /Grewia optiva	Timber	42391	1.14
Hevea brasiliensis	NTFP	57120	1.53
Holoptelea integrifolia	Timber	16387	0.44
Madhuca latifolia/m.indica(Old) Bassia latifolia	NTFP	24586	0.66
Mangifera indica	NTFP	345054	9.25
Phoenix sylvestris	NTFP	27394	0.73
Pinus kasya/insularis	Timber	45146	1.21
Pinus roxburghii/longifolia	NTFP	116484	3.12
Populus species	Timber	45495	1.22
Prosopis ceneraria	Timber	28021	0.75
Quercus incana	Timber	33592	0.90
Shorea robusta	Timber	50062	1.34
Eugenia jambolana (Jamun)	NTFP	46156	1.24
Tamarindus indica	NTFP	14084	0.38
Tectona grandis	Timber	75194	2.02

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Terminalia arjuna	NTFP	13252	0.36
Terminalia belerica	NTFP	5176	0.14
Terminalia crenulata/tomentosa	NTFP	19038	0.51
Zizyphus jujuba	NTFP	45192	1.21
Other spp.		1070111	28.68
		3731406	100
	NTFP	1868711	50.08
	Timber	792584	21.24
	Others	1070111	28.68

Annexure 4

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION

New Delhi, the 26th June, 2023

S.O. 2779(E).—Whereas, Government of India introduced ‘LiFE’— ‘Lifestyle for Environment’, as a grass- root, mass movement for combating climate change, enhancing environment actions to propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, and for sustainable and environment-friendly development.

And whereas, an innovative market-based mechanism is required to promote the LiFE movement which aims at encouraging sustainable lifestyles by driving consumer/community towards behavioural changes to incentivize environment friendly practices.

And whereas, to enable this, a Green Credit Programme is proposed to be launched at national level to leverage a competitive market-based approach for Green Credits thereby incentivising voluntary environmental actions of various stakeholders. Apart from incentivizing individual/community behaviour, the Green Credit Programme will encourage private sector industries and companies as well as other entities to meet their existing obligations, stemming from other legal frameworks, by taking actions which are able to converge with activities relevant for generating or buying Green Credits.

And whereas, Green Credits will arise from a range of sectors and entities, ranging from small-scale ones— such as, individuals, Farmer Producer Organisations, cooperatives, forestry enterprises and sustainable agriculture enterprises; to those being developed at the level of Urban and Rural Local Bodies, private sectors, industries and organisations. Green Credits will be tradable outcomes and will act as incentives. In the beginning, Green Credits will be made available to individual and entities, engaged in selected activities and who undertake environmental interventions. These Green Credits will be made available for trading on a domestic market platform.

And whereas, an environmental activity generating Green Credits may have climate co-benefits such as reduction or removal of carbon emissions. An activity generating Green Credits under Green Credit Programme may also get Carbon Credits from the same activity under carbon market.

Now, therefore, in exercise of power conferred by sub-section 2(iii) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government has decided to institute a domestic voluntary market mechanism -- the Green Credit Programme. The Central Government has now proposed a notification for ‘draft Green Credit Programme Implementation Rules 2023’ for the information of the public likely to be affected thereby and notice is hereby given that the said notification will be taken into consideration on or after the expiry of a period of sixty (60) days from the date of publication of the draft in the official Gazette;

The objections or suggestions, which may be received from any person with respect to the said Notification within the period specified above, will be taken into consideration by the Central Government;

Objections or suggestions, if any, may be addressed to the Joint Secretary, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh road, New Delhi - 110003, and may be sent to e-mail id: sohsm-d-mef@gov.in

1. Short Title and Commencement – (1) These Rules may be called the Green Credit Programme Implementation Rules, 2023.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Objectives of the Green Credit Programme – (1) The main objectives of the Green Credit Programme (herein after referred as ‘Programme’) are as follows: -

- a. Create a market based mechanism for providing incentives in the form of Green Credits to individuals, Farmer Producer Organisations, cooperatives, forestry enterprises, sustainable agriculture enterprises, Urban and Rural Local Bodies, private sectors, industries and organisations for environment positive actions;
- b. Create mass movement around environment positive actions and realise the vision of "Mission LiFE" through pro-planet-people and entities.

3. **Definitions** – (1) In this framework, unless the context otherwise requires, the following definitions shall apply -

- a. Accredited Green Credit Verifier means an entity accredited and authorized by the Green Credit Programme Administrator to carry out verification activities in respect of the Programme;
- b. Act means the Environment (Protection) Act, 1986 (29 of 1986), as amended from time to time;
- c. Green Credit means a singular unit of an incentive provided for a specified activity, delivering a positive impact on the environment;
- d. Registered Entity means any entity, registered for generation of Green Credits;
- e. Registry means an electronic database system maintained by Green Credit Programme Administrator or its accredited agency to record issuance and exchange of Green Credits;
- f. Third-party certifiers means an entity that certifies an activity for its registration;
- g. Verification means an independent evaluation of the green credit activity by the accredited Green Credits Verifier for acquiring Green Credits;
- h. Empanelled Auditors means an entity empanelled by the Central Government for auditing the entire system of the Programme.

(2) Words and expressions used in this rules and not defined herein but defined in the Environment (Protection) Act, 1986 or any other rules or regulations issued under the said Act, shall have the same meaning as assigned to them respectively in the Act, or such other rules or regulations.

4. **Implementation Mechanism of the Green Credit Programme** – (1) A phased and iterative approach for implementation of the Programme will be adopted. In the initial phase, two to three activities from the sectors indicated in clause (2) will be considered for designing and piloting the Programme. More activities will be added from the selected sectors in subsequent phases. More sectors can also be added with the approval of the Central Government.

(2) Sectors identified for the Programme with respective objectives are as follows:

- i. **Tree Plantation-based Green Credit:** To promote activities for increasing the green cover across the country through tree plantation and related activities.
- ii. **Water-based Green Credit:** To promote water conservation, water harvesting and water use efficiency/savings, including treatment and reuse of wastewater.
- iii. **Sustainable Agriculture based Green Credit:** To promote natural and regenerative agricultural practices and land restoration to improve productivity, soil health and nutritional value of food produced.
- iv. **Waste Management based Green Credit:** To promote sustainable and improved practices for waste management, including collection, segregation and treatment.
- v. **Air Pollution Reduction based Green Credit:** To promote measures for reducing air pollution and other pollution abatement activities.
- vi. **Mangrove Conservation and Restoration based Green Credit:** To promote measures for conservation and restoration of mangroves.
- vii. **Ecomark based Green Credit:** To encourage manufacturers to obtain Ecomark label for their goods and services.
- viii. **Sustainable building and infrastructure based Green Credit:** To encourage the construction of buildings and other infrastructure using sustainable technologies and materials.

(3) Methodology of generating Green Credits:

- i. Thresholds and benchmarks will be developed for each Green Credit activity for generating and issuance of Green Credits. In case of any obligation under any law, the thresholds and benchmarks will be aligned with that obligation.
- ii. To maintain fungibility across sectors, the environmental outcome, achievable by any Green Credit activity, will be based on equivalence of resource requirement, parity of scale, scope, size and other relevant parameters, and will be considered for allocation of one unit of Green Credit in respect of each activity.
- iii. Digital processes will be developed and established for the Programme including self-assessments of eligible Green Credit activities, registration of activities, issuance of Green Credits, monitoring of performance and other relevant processes.

5. Steering Committee and its functions – (1) The governance of the Programme for its effective implementation shall vest in the Steering Committee. The Steering Committee will comprise of representatives from the concerned Ministries/Departments, domain experts, industry associations and other relevant stakeholders.

(2) Steering Committee shall have the following functions:

- i. Grant approvals in respect of the following:
 - a. procedures, guidelines and processes in respect of implementation of the Programme;
 - b. guidelines for Measurement, Reporting and Verification;
 - c. other relevant matters in respect of implementation of the Programme.
- ii. Make recommendations to the Central Government in respect of following:
 - a. activities and sectors to be included in the Programme;
 - b. measures to create demand for the Programme.
 - c. any matter referred by the Central Government.
- iii. Review and monitoring of the implementation of Programme;
- iv. Any other function as may be assigned by the Central Government.

6. Green Credit Programme Administrator and its functions – (1) The Green Credit Programme Administrator (herein after referred as ‘_Administrator’) shall be responsible for implementation of the Programme including its management, monitoring and operation.

(2) The Indian Council of Forestry Research and Education shall be the Administrator of the Programme.

(3) The responsibilities of the Administrator shall include the following:

- i. Develop guidelines, processes and procedures for implementation of the Programme;
- ii. Constitute Technical or Sectoral committees for each activity to facilitate in developing methodologies and processes for registration of Green Credit activities and issuance of Green Credits;
- iii. Develop methodologies, standards, registration process and associated Measurement, Reporting and Verification mechanisms;
- iv. Establish methodologies and processes for equivalence of Green Credits generated from each identified activity;
- v. Develop guidelines for establishment and operation of Green Credit Registry and trading platform, for issuance of digital Green Credits for each activity, for self-certification of Green Credits, and for accreditation of Green Credit Registry, third-party certifiers, Green Credit Verifiers, for grant of Green Credits, and for auditing of the Green Credit Programme;
- vi. Accredite the Green Credit Registry, third-party certifiers, Green Credit Verifiers and Trading Service Provider in accordance with the approved guidelines;
- vii. Register the Green Credit Registry, third-party certifiers, Green Credit Verifiers and Trading Service Provider;
- viii. Accredite agency for establishing Knowledge and Data platform required for the Programme;
- ix. Develop guidelines and protocols for the Programme portal as well as knowledge and data platform, and for collection of fees from registered entities;

- x. Develop guidelines for filing of annual returns and progress reports of certification agency, third- party certifiers, Green Credit Verifiers and Trading Service Provider;
- xi. Issue digital Green Credits as per the approved guidelines;
- xii. Collect fees from Registered Entity as per the approved guidelines;
- xiii. Develop guidelines for establishment and operation of trading platform and market stability mechanism (if required) for trading of Green Credits;
- xiv. Conduct capacity building, media and outreach activities for the stakeholders;
- xv. Compile the annual returns and progress reports submitted by the certification agency, third-party verifiers, Green Credit Verifiers and Trading Service Provider;
- xvi. Any other function assigned by the Steering Committee or Central Government.

7. Technical Committee and its functions - (1) The Administrator may constitute technical or sectoral committees for each activity for developing methodologies, standards and processes for registration of Green Credit activities and grant of Green Credits;

(2) Each Technical Committee shall comprise of members from concerned Ministries/ Departments as well as organisations and subject matter experts;

(3) Technical Committee shall develop and make recommendations to the Administrator which will inter-alia include:

- i. Methodologies for allocation of one unit of Green Credit on the basis of environmental action in case of each activity ensuring fungibility and equivalence of Green Credits;
- ii. Mechanism for Measurement, Reporting and Verification process in respect of each activity;

(4) Technical Committee shall advise on any other technical matter referred by the Administrator.

8. Green Credit Registry and its functions – (1) The Administrator or its accredited agency shall establish and maintain the registry for the Programme. The Green Credit registry will be in the form of a standardized electronic database which contains inter-alia common data elements relevant to the issuance, holding, transfer and acquisition of Green Credits. The structure and data formats of the Green Credit Registry shall conform to the prescribed technical standards as per the approved guidelines.

(2) The Green Credit Registry shall discharge the following functions, in the manner, as may be specified in the relevant guidelines from time to time which will inter-alia include:

- i. Registration of entity and grant and recording of Green Credits;
- ii. Ensure accurate accounting of the issuance, holding, transfer and acquisition of green credits by the stakeholders;
- iii. Maintain secure database with all required and essential security protocols;
- iv. Maintain records of all transactions;
- v. Indemnify registered entities in case of any loss caused to such entity due to security breach in the database, not attributable to such registered entity;
- vi. Establish linkages with other National and International registries;
- vii. Comply with the directions issued by the Steering Committee;
- viii. Any other function assigned in the relevant guidelines.

9. Trading Platform – (1) The guidelines for the establishment and operation of the Trading Platform shall be issued by the Administrator with the approval of Steering Committee.

(2) The trading platform for the exchange of Green Credits shall be established by the Trading Service Provider accredited by the Administrator in accordance with the approved guidelines.

(3) The trading service provider shall perform functions regarding the trading of Green Credits, in accordance with the approved guidelines.

10. **Knowledge and Data Platform** - (1) The knowledge and data platform, will be an online platform developed for providing transparency on the various types of activities being undertaken and for reporting sectoral progress under the Programme;

(2) This platform may collate key data points generated from Green Credit Registry and other information such as sectoral achievements, best practices, information on capacity building, etc.

11. **Accredited Green Credit Verifiers** – (1) The Administrator will accredit the entities to act as Accredited Green Credit Verifiers in accordance with the approved guidelines;

(2) Accredited Green Credit Verifiers shall conduct verification and submit reports to the Administrator for grant of Green Credits in accordance with provisions of the guidelines;

(3) Accredited Green Credit Verifiers shall file annual returns to the Administrator in accordance with the guidelines;

12. **Demand Generation for Green Credits** -(1) The Green Credit Programme shall be based on voluntary participation of all stakeholders.

(2) Steering Committee shall recommend measures to generate voluntary demand for Green Credits in the country.

(3) All entities registered for Accredited Compensatory Afforestation under the guidelines issued by MoEFCC vide No.FC-11/159/2022-FC dated 24th January, 2023 shall register with the Green Credit Registry under the Programme. The Accredited Compensatory Afforestation will be eligible for consideration as Compensatory Afforestation for diversion of forest land under these guidelines subject to qualification and allocation of Green Credits under the Programme.

13. **Empanelled Auditors**- (1) The Central Government may empanel auditors for audit of the entire system of the Programme functioning and administration from time to time.

[F. No. 12/24/2023-HSM]

NAMEETA PRASAD, Jt. Secy.

Annexure 4 a

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION

New Delhi, the 12th October, 2023

S.O. 4458 (E).—WHEREAS a Green Credit programme is being launched at national level to leverage a competitive market-based approach for green credit for incentivising environmental actions of various stakeholders;

AND WHEREAS the Government of India has introduced ‘LiFE’-‘Lifestyle for Environment’, as a grass-root, mass movement, for protection and conservation of environment and for other environmental and climate gains, by enhancing environmental actions that propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, and for sustainable and environment-friendly development

AND WHEREAS an innovative market-based mechanism to incentivise environment positive actions will help promote the LiFE movement, which aims at encouraging sustainable lifestyles by driving consumer and community towards behavioural changes that promote environment friendly actions;

AND WHEREAS the Green Credit programme is independent of the carbon credit under the Carbon Credit Trading Scheme, 2023 made under the Energy Conservation Act, 2001 (52 of 2001), an environmental activity generating green credit may have climate co-benefits, such as reduction or removal of carbon emissions and an activity generating green credit under Green Credit programme may also get carbon credit from the same activity under the said Scheme;

AND WHEREAS the draft Green Credit Programme Implementation Rules, 2023 was published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), *vide* notification number S.O. 2779(E), dated the 26th June 2023 inviting objections and suggestions from all persons;

AND WHEREAS all the objections and suggestions received have been duly considered by the Central Government;

NOW, THEREFORE, in exercise of the powers conferred by section 3, section 6 and section 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules, namely:—

1. Short title and commencement.— (1) These rules may be called the Green Credit Rules, 2023. (2) They shall come into force on the date of their publication in the Official Gazette.

2. Objectives of Green Credit programme.— (1) The green credit programme shall incentivise environmental positive actions through market-based mechanism and generate green credit, which shall be tradable and made available for trading on a domestic market platform.

(2) The green credit will arise from taking measures by a person of any environment activities referred to in sub-rule (2) of rule 4.

(3) The green credit programme shall encourage industries, companies and other entities to meet their existing obligations or other obligations under any law for the time being in force, and encourage other persons and entities, to undertake voluntary environmental measures referred to in rule 4 by generating or buying green credit:

Provided that the green credit generated or procured to fulfil any obligation in compliance of any law for the time being in force shall not be tradable.

3. Definitions.— (1) In these rules, unless the context otherwise requires,—

(a) —Administrator means the Administrator referred to in rule 7;

(b) —designated agency^l means an entity designated as such under rule 13;

(c) —Green Credit^l means a singular unit of an incentive provided for a specified activity, delivering a positive impact on the environment;

(d) —Registry^l means the Green Credit Registry established under rule 10.

(2) Words and expressions used in these rules and not defined herein but defined in the Environment (Protection) Act, 1986, shall have the same meaning as assigned to them in the Act.

4. Green Credit programme.— (1) Any person or entity may take any measure specified under sub-rule (2) for the purposes of protection, preservation, or conservation of the environment.

(2) The measures referred to in sub-rule (1) may include the following activities, namely:—

(i) tree plantation—to promote activities for increasing the green cover across the country;

(ii) water management—to promote water conservation, water harvesting and water use efficiency or water savings, including treatment and reuse of wastewater;

(iii) sustainable agriculture—to promote natural and regenerative agricultural practices and land restoration to improve productivity, soil health and nutritional value of food produced;

(iv) waste management—to promote circularity, sustainable and improved practices for waste management, including collection, segregation, and environmentally sound management;

(v) air pollution reduction—to promote measures for reducing air pollution and other pollution abatement activities;

(vi) mangrove conservation and restoration—to promote measures for conservation and restoration of mangroves;

(vi) ecomark label development—to encourage manufacturers to obtain ecomark label for their goods and services;

(vii) sustainable building and infrastructure—to encourage the construction of sustainable buildings and other infrastructure using environment friendly technologies and materials.

(3) A person or entity desirous of obtaining green credit shall register the activity with the Administrator for any activity referred to in sub-rule (2) undertaken by him for grant of green credit.

(4) An application for registration under sub-rule (3) shall be made to the Administrator electronically through a website established by the Central Government for that purpose.

(5) On receipt of the application under sub-rule (4), the Administrator shall cause the activity to be verified by a designated agency.

(6) The designated agency shall, after making such verification and inquiry as it may deem necessary, in accordance with the guideline made in this behalf, submit a report to the Administrator verifying the activities undertaken by the applicant.

(7) On receipt of the report under sub-rule (6) verifying the activities undertaken by the applicant, the Administrator shall grant the applicant a certificate of green credit.

5. Methodology of generating green credit.—(1) The methodology for calculating the green credit in respect of any activity undertaken shall be such as may be notified by the Central Government on the recommendation of the Administrator.

(2) The calculation of green credit in respect of any activity undertaken shall be based on equivalence of resource requirement, parity of scale, scope, size and other relevant parameters required to achieve the desired environmental outcome.

6. Procedure for generation of green credit.— (1) The methodology for evaluation and verification of the activities undertaken for the purpose of calculation of green credit shall be such as may be determined by the Administrator.

(2) The manner of registration of the activities and the details required for such registration shall be determined by the Administrator.

(3) The Administrator shall develop the website for registration of activities, evaluation and verification of activities undertaken and award of green credit in respect of such verified activities, electronically.

7. Administrator.— (1) The Indian Council of Forestry Research and Education, a Society registered under the Societies Registration Act, 1860 (21 of 1860) vide Registration No.596/1990-91, dated the 12th March, 1991 and an autonomous body as declared by the then Ministry of Environment and Forests, Government of India vide Resolution No.1-8/89-RT, dated the 22nd June, 1990, shall be the Administrator under these rules.

(2) The Administrator shall be responsible for the effective implementation of the Green Credit programme, including its management and operation under these rules.

(3) The responsibilities of the Administrator shall include the following, namely:—

(a) develop guidelines, processes and procedures for the implementation of the green credit programme under these rules;

(b) develop methodologies, registration process, guidelines and associated measurement, reporting and verification mechanism;

(c) establish methodologies and processes for issuance of green credit (including issuance of digital green credit), and equivalence of green credit generated from each identified activity;

(d) develop guidelines for the establishment and operation of the Green Credit Registry and trading platform; for self-certification or third-party certification for the registration of an activity for issuance of green credits and its inspection and verification by designated agency, for empanelment of auditors and audit by such auditors;

(e) establish or designate the Green Credit Registry, and trading platform service provider in accordance with the approved guidelines;

(f) develop guidelines for the green credit programme portal, the knowledge and data platform, and for the fees from the registered entities;

(g) develop guidelines for filing of annual returns and progress reports by designated agency, Registry, trading platform and knowledge and data platform;

(h) develop guidelines for the market stability mechanism for trading of green credit.

(i) regulate matters relating to trading of green credit certificates and to safeguard interest of sellers and buyers; and take preventive and corrective actions to prevent fraud or mistrust.

(4) The Administrator shall seek approval of the Central Government for guidelines and methodologies under sub-rule (3).

8. Steering Committee.— (1) A Steering Committee to be constituted by the Central Government shall be responsible for the monitoring of the implementation of the Green Credit programme under these rules.

(2) The Steering Committee shall comprise of representatives from the Ministries or Departments, experts from the field of environment, industry associations and other relevant stakeholders as the Central Government may consider appropriate.

(3) The Steering Committee shall, from time to time, review the Green Credit programme under these rules and make recommendations to the Central Government in respect of following, namely:—

- (a) activities and sectors to be included in the Green Credit programme; and
- (b) any matter referred to it by the Central Government.

9. Technical Committee.— (1) The Central Government, based on the recommendations of the Administrator, may constitute Technical Committees for each activity which shall assist the Administrator in implementation of the Green Credit programme under these rules.

(2) Each Technical Committee shall comprise of members from the Ministries and Departments, organisations and experts having the knowledge and experience in the field related to the activity;

(3) Technical Committee shall develop and make recommendations to the Administrator which will inter alia include—

- (a) methodology for calculation of one unit of Green Credit, on the basis of equivalence of resource requirement, parity of scale, scope, size and other relevant parameters required to achieve the desired environmental outcome;
- (b) mechanism for registration, verification, evaluation, measurement and reporting process in respect of each activity.
- (4) The Technical Committee shall advise on any other technical matter referred to it by the Administrator.

10. Green Credit Registry.— (1) The Administrator or designated agency shall establish and maintain a Green Credit Registry for the registration and issuance of each Green Credit.

(2) The Registry shall be an electronic database, which, inter alia, shall contain common data elements relevant to the registration and issuance of green credit.

(3) The Registry shall discharge the following functions, namely:—

- (a) registration of activities and issuance of green credit;
- (b) ensure accurate accounting of the issuance of green credit;
- (c) maintain secure database with all required and essential security protocols; (d) any other function assigned to it by the Administrator.

11. Trading platform.— (1) The Administrator shall establish and maintain a trading platform with the approval of the Central Government.

(2) The trading platform shall perform functions regarding the trading of green credit, in accordance with the guidelines made by the Administrator with the approval of the Central Government.

12. Knowledge and data platform.— (1) The Administrator shall develop and maintain a knowledge and data platform, with approval of the Central Government, for providing transparency on various activities being undertaken and for reporting sectoral progress under these rules.

(2) The knowledge and data platform may collate key data points generated from the Registry and other information, such as sectoral achievements, best practices, information on capacity building, etc.

13. Designated agency.— (1) The Administrator shall designate such entities to act as designated agency in accordance with the guidelines approved by the Central Government.

(2) The designated agency shall conduct verification and submit reports to the Administrator in accordance with the guidelines as regard to the verification of the activities undertaken by an applicant for issuance of green credit under these rules.;

(3) The designated agency shall file annual returns to the Administrator in accordance with the guidelines.

14. Demand generation for green credit.— (1) The participation to the Green Credit programme under these rules shall be based on voluntary participation.

(2) The Steering Committee shall recommend measures to generate demand for green credit in the country.

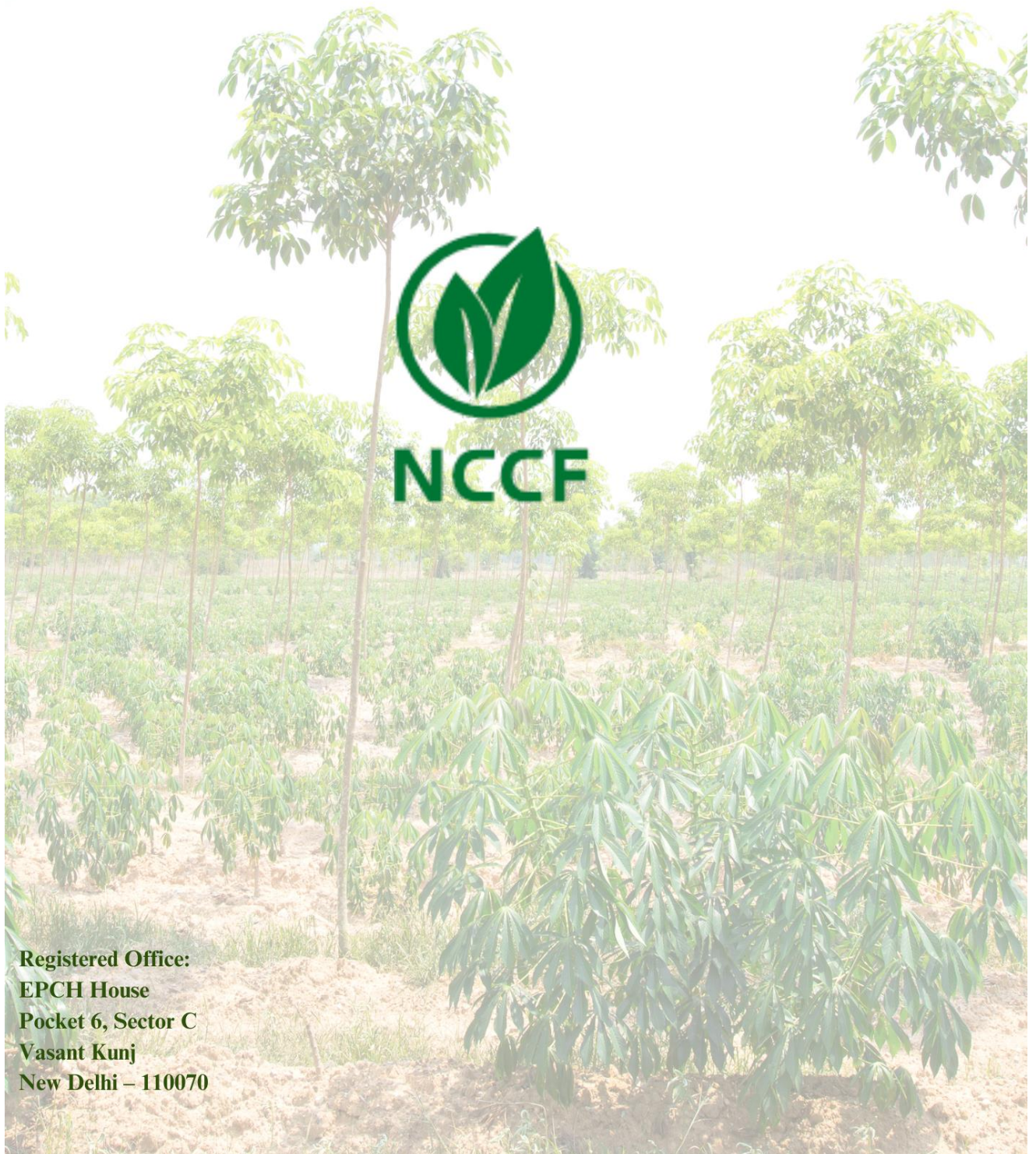
15. Auditors.— (1) The activities of the Administrator, designated agency, Registry, trading platform and knowledge and data platform shall be audited within a period of one year at the end of every third financial year by independent auditors to be appointed by the Central Government on the recommendation of the Steering Committee.

(2) The auditor referred to in sub-rule (1) shall submit its audit report to the Administrator.

(3) The Administrator shall submit an action taken report on the audit report to the Central Government within a period of six months from the date of the receipt of the audit report.

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