BUT IS INDIA DOING ENOUGH TO MEET ITS PRESENT AND FUTURE NEEDS?

A status report by Centre for Science and Environment

CSE

WOOD IS GOOD

BUT IS INDIA DOING ENOUGH TO MEET ITS PRESENT AND FUTURE NEEDS?

A status report by Centre for Science and Environment

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SOUJANYA SHRIVASTAVA / CSE

WOOD BALANCE OF INDIA

Wood is an important natural resource. In a developing country like India, on the one end of the spectrum, fuelwood continues to be the primary source of energy for millions of (mostly rural) citizens, while on other end of the spectrum, a healthy GDP growth rate ensures that a bourgeoning middle class craved for the most modern of wooden utilities, from modular kitchens to the latest designs in furniture.

Indian forests cannot douse this hunger for wood. A report by World Wide Fund for Nature (WWF) and Planning Commission of India,[1] making use of International Tropical Timber Organization (ITTO)'s analysis,[2] has projected a severe shortage in the supply of timber by 2020 from both domestic as well as international sources.

To cater to the rising demand, India requires to make sustainable use of its vast and underutilized land resources, available in the form of cultivable wastelands, fallow lands and much of the agricultural land available with the farmers for farm forestry. The productivity of Indian forests is already much lower than the world average,[3] owing to deterioration of forest lands over the decades due to myriad anthropogenic factors. The potential of TOF is also severely underutilized in terms of timber production.

LAND DISTRIBUTION

Areas in million ha

305.94 (100%)
Reporting area for land utilization statistics

70.01 (22.9%)
Total forest cover*

139.93 (45.7%)
Net area sown

25.98 (8.5%)
Other uncultivated land (excluding fallow land)

- **10.24** Permanent pasture and other grazing land
- **3.16** Land under miscellaneous tree crops and groves not included in net area sown
- **12.58** Culturable wasteland

26.28 (8.6%)
Total fallow land (including current fallows)

- **11** Fallow lands other than current fallows
- **15.28** Current fallows

43.74 (14.3%)
Not available for cultivation

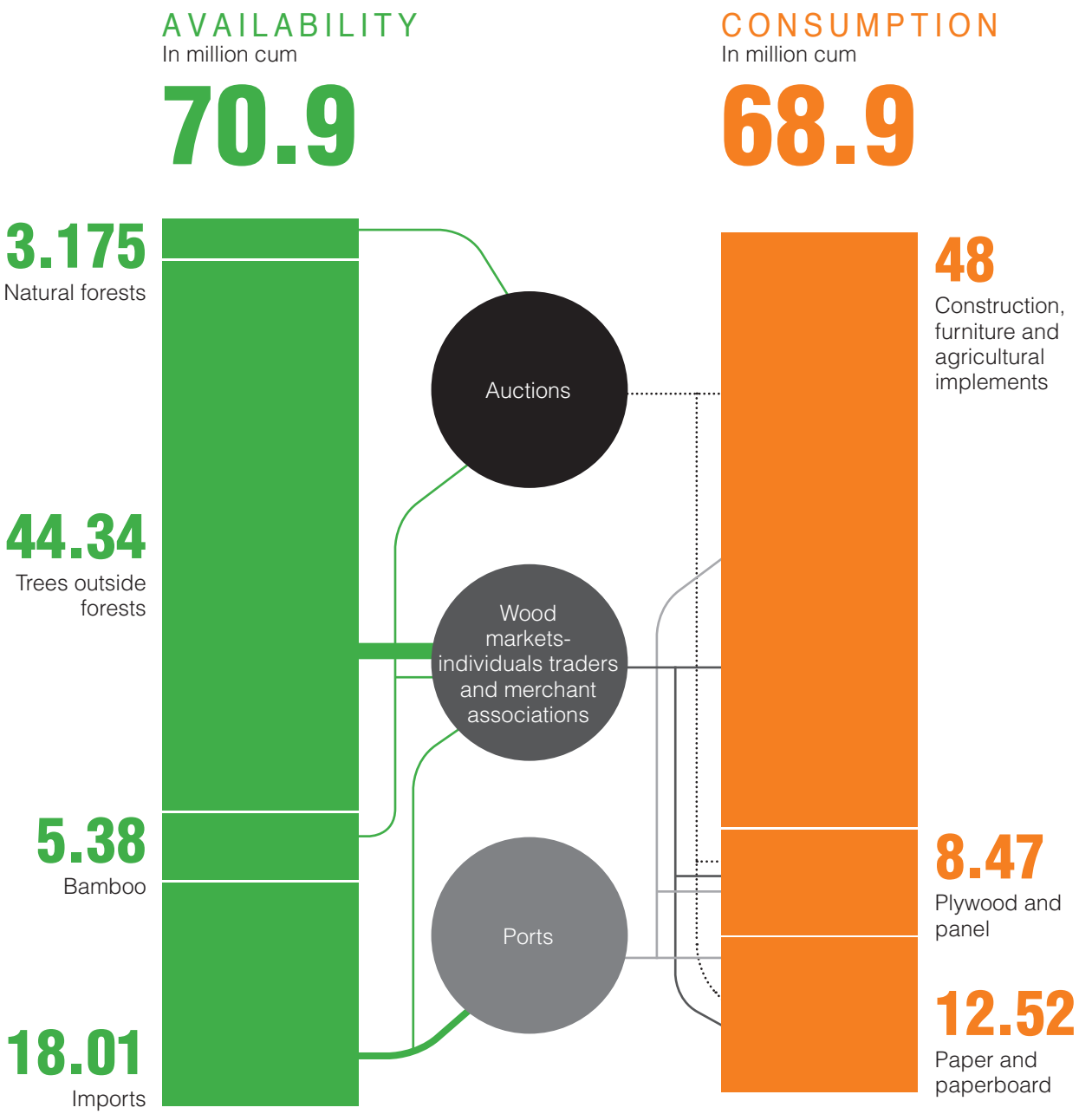
- **26.45** Area under non-agricultural use
- **17.28** Barren and unculturable land

328.73
Total geographic area (TGA)

Source: Compendium of Environmental Statistics, Ministry of Statistics and Programme Implementation, 2015
*The Compendium of Environmental Statistics' figure on forest area given here is marginally lower than FSI's estimate of the forest cover presented in its 2015 report (70.17 million ha, which is 21.34 per cent its total geographic area or TGA). Please note that the FSI has calculated the total forest cover with respect to the TGA while the MoS&PI has calculated with respect to the total reporting area for land utilization in India.

TOTAL WOOD AND BAMBOO BALANCE

Flow diagram of annual timber availability and consumption in India



WOOD PRODUCTION

The growing stock of TOF has remained almost static across recent decades, so it can be assumed that timber production from TOF has also remained static or grown marginally—considering a marginal growth of 25 million cum in the 2015 assessment over the 2011 assessment (TOF growing stock in 2015 was 1,573 million cum).[4 & 5]

Timber production from TOF is almost 14 times that from forests nearly two-thirds of which come from Forest Development Corporations (FDCs). In addition, we have 5.38 million cum of annual bamboo production, which is also used as a substitute for timber and in the cottage industry.[6]

According to the FAO's 2015 report on Global Forest Assessment, the total wood extracted in India in 2011 was 434.77 million cum, out of which the fuelwood volume was 385.25 million cum or 231.15 million tonnes.[7]

Annual estimated wood production in India (In million cum)

1.205
Estimated production of timber from forests (excluding FDCs)[a]

1.97
Timber production from Forest Development Corporations (FDCs)[b]

44.34
Annual production of timber from TOF[c]

5.38
Bamboo production in India[d]

18.01
Imports (All timber and allied products in 2015)[e]

385.25
Fuelwood production[f]

456.15
Total wood production

70.9
Total timber production (excluding fuelwood)

Sources: a) ISFR, FSI, 2011 (b) Puzzle of Forest Productivity, CSE, 2016 (c) FSRI, (ICFRE), 2010 (d) National Bamboo Mission, (e) International Trade Centre/UN COMTRADE, 2016 (f) Global Forest Resources Assessment,(FAO), 2015

IMPORTS (TIMBER AND ALLIED PRODUCTS)

India is a net importer of timber and allied products.[8] In 2015, India imported an estimated 18.01 million cum of timber, pulpwood and allied products worth US $6,701.3 million, which included wood logs, panel and plywood, pulpwood, paper, furniture and other wooden products. Under all categories of timber, wood logs and paper constitute the major part of Indian wood imports.

Indian imports of timber and allied products (2001–15)

Year	Wood logs (industrial roundwood)	Pulp	Paper	Furniture	All others*	Total
2001	511 (2.55)	276 (1.96)	468 (0.86)	11.7 (0.01)	42.4 (0.08)	1,309 (5.46)
2002	378 (1.66)	335 (2.37)	411 (0.99)	15.8 (0.01)	37.9 (0.08)	1,177 (5.11)
2003	582 (2.7)	397 (2.69)	571 (1.39)	28.8 (0.01)	44.9 (0.1)	1,623 (6.89)
2004	803 (3.33)	469 (2.78)	706 (1.41)	50 (0.02)	71 (0.13)	2,098 (7.67)
2005	843 (3.3)	556 (3.13)	879 (1.46)	86 (0.03)	114 (0.22)	2,473 (8.14)
2006	820 (3.18)	604 (3.31)	1,135 (1.72)	143 (0.05)	149 (0.27)	2,850 (8.52)
2007	1,115 (3.92)	746 (3.35)	1,243 (1.88)	202 (0.07)	210 (0.46)	3,516 (9.67)
2008	1,281 (4.08)	866 (3.37)	1,847 (2.42)	250 (0.08)	193 (0.28)	4,438 (10.22)
2009	1,137 (4.98)	769 (4.16)	1,367 (2.01)	170 (0.06)	230 (0.46)	3,675 (11.67)
2010	1,337 (4.79)	1,107 (3.98)	1,888 (2.81)	250 (0.09)	358 (0.69)	4,940 (12.37)
2011	1,837 (4.7)	1,305 (4.38)	2,455 (3.47)	341 (0.13)	573 (1.23)	6,510 (13.91)
2012	2,011 (6.39)	1,285 (4.9)	2,267 (3.43)	331 (0.13)	594 (1.41)	6,488 (16.27)
2013	2,033 (6.23)	1,370 (5.3)	2,365 (3.78)	312 (0.12)	606 (1.33)	6,686 (16.76)
2014	2,007 (6.24)	1,658 (6.47)	2,610 (3.97)	289 (0.11)	631 (1.16)	7,194 (17.95)
2015	1,564 (5.69)	1,609 (6.47)	2,424 (4.22)	305 (0.11)	800 (1.53)	6,701 (18.01)

Source: International Trade Centre/UN COMTRADE, 2016
Note: Figures in million US $. Figures in brackets in million cubic metres.
* Includes plywood, sawnwood, veneer, fibreboard, particleboard and various other items made of wood excluding railway sleepers and fuelwood

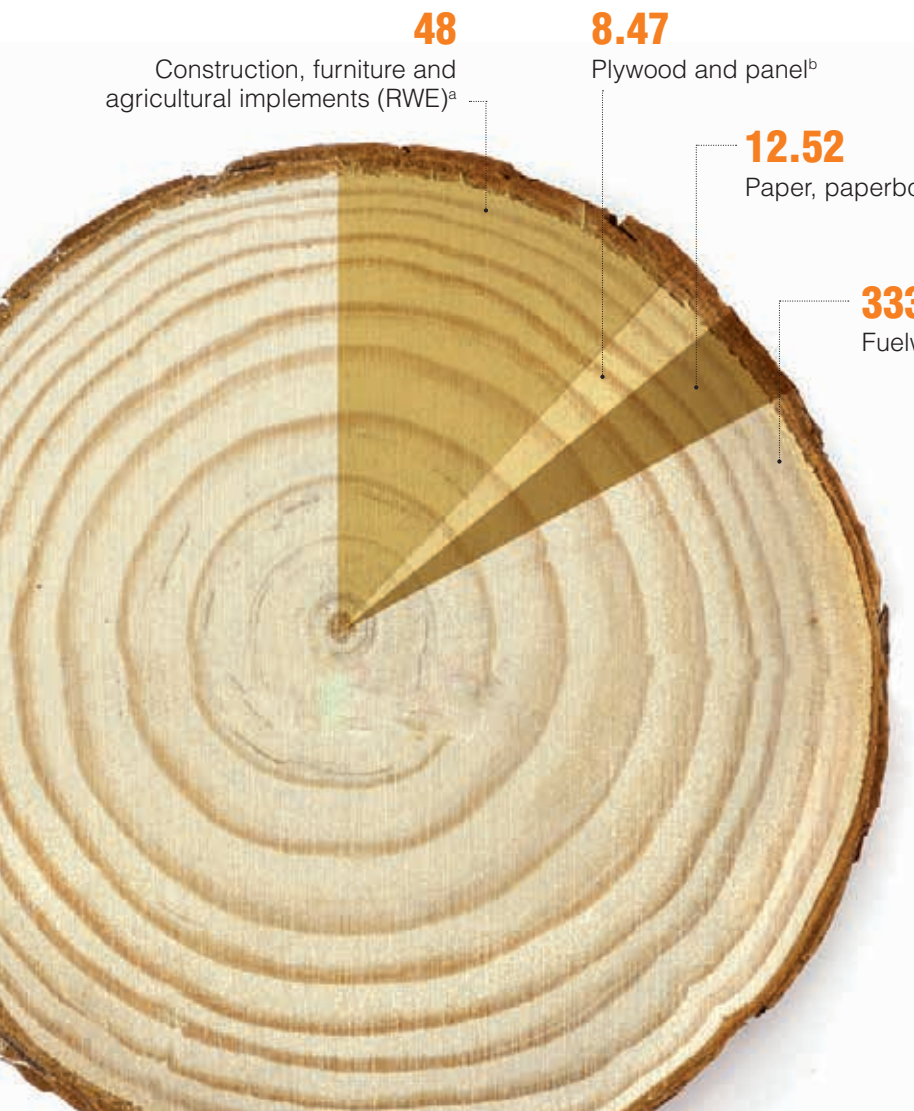
WOOD CONSUMPTION

In its 2011 assessment, FSI has provided the estimates of consumption of timber in only three sectors (in non-fuelwood categories)—housing, furniture and agricultural implements.[9]

Adding all categories, the total estimated wood consumption (excluding fuelwood) in India comes to about 69 million cum per year. This may be a gross underestimation, considering that a large share of wood markets, especially panel and plywood, and furniture markets, are fairly unorganized, and no official estimates are available for the same.

Fuelwood alone amounts to approximately 90 per cent total wood production in India.[10] It is still the dominant energy source in rural India, which indicates the paucity of alternatives in the countryside.

Annual estimated wood consumption in India (In million cum)



Sources: (a) & (d) ISFR, FSI, 2011
(b) Association of Furniture Manufacturer & Traders, 2016
(c) CPPRI, 2016

EXPORTS (TIMBER AND ALLIED PRODUCTS)

Paper and paperboard, and furniture are the categories in which India exports most of its timber products. Indian exports of wood logs from 2001 to 2015 have been extremely low in comparison with its imports under the same category, except in 2015, when India imported over two million cum of confiscated Red Sanders wood worth $80 million.

Indian exports of timber and allied products (2001–15)

Year	Wood logs (industrial roundwood)	Pulp	Paper	Furniture	All others*	Total
2001	1.09 (0.03)	1.87 (0.01)	183 (0.33)	34.56 (0.02)	29.16 (0.04)	250 (0.4)
2002	2.13 (0.01)	0.24 (0.003)	248 (0.45)	43.8 (0.02)	40.44 (0.06)	334 (0.5)
2003	2.92 (0.01)	0.71 (0.001)	241 (0.41)	81 (0.04)	46.78 (0.07)	372 (0.5)
2004	1.64 (0.004)	1.19 (0.003)	307 (0.5)	165 (0.07)	81 (0.1)	556 (0.7)
2005	2.19 (0.01)	1.28 (0.004)	418 (0.66)	206 (0.09)	97 (0.13)	724 (0.9)
2006	4.36 (0.02)	1.08 (0.003)	435 (0.65)	248 (0.11)	116 (0.09)	804 (0.9)
2007	2.15 (0.02)	2.78 (0.01)	449 (0.62)	319 (0.16)	147 (0.14)	921 (0.9)
2008	2.98 (0.01)	1.71 (0.01)	573 (0.78)	301 (0.13)	174 (0.19)	1,052 (1.1)
2009	1.76 (0.03)	1.71 (0.004)	538 (0.73)	225 (0.07)	145 (0.34)	911 (1.2)
2010	1.62 (0.004)	1.06 (0.004)	784 (0.19)	311 (0.1)	162 (0.1)	1,260 (0.4)
2011	2.54 (0.01)	1.02 (0.0005)	907 (1.39)	372 (0.14)	218 (0.2)	1,501 (1.7)
2012	1.92 (0.02)	2.83 (0.01)	930 (1.15)	432 (0.27)	256 (0.22)	1,623 (1.7)
2013	2.11 (0.01)	0.16 (0.0002)	1,1340 (1.34)	494 (0.16)	348 (0.27)	1,985 (1.8)
2014	4.70 (0.01)	4.71 (0.01)	1,116 (1.36)	467 (0.14)	349 (0.28)	1,941 (1.8)
2015	82 (2.17)	10.93 (0.02)	1,128 (1.41)	467 (0.13)	344 (0.22)	2,032 (3.9)

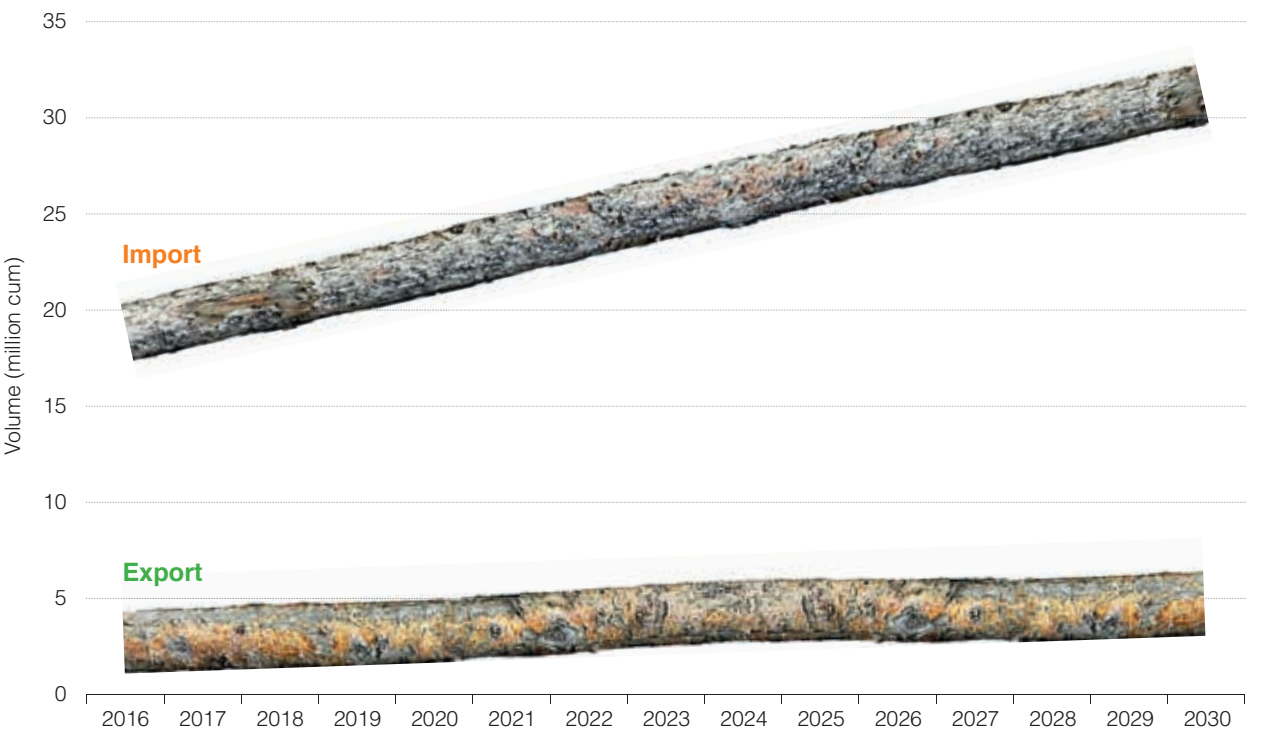
Source: International Trade Centre/UN COMTRADE, 2016
Note: Figures in million US $. Figures in brackets in million cubic metres.
* Includes plywood, sawnwood, veneer, fibreboard, particleboard and various other items made of wood excluding railway sleepers and fuelwood

PROJECTIONS OF FUTURE GROWTH

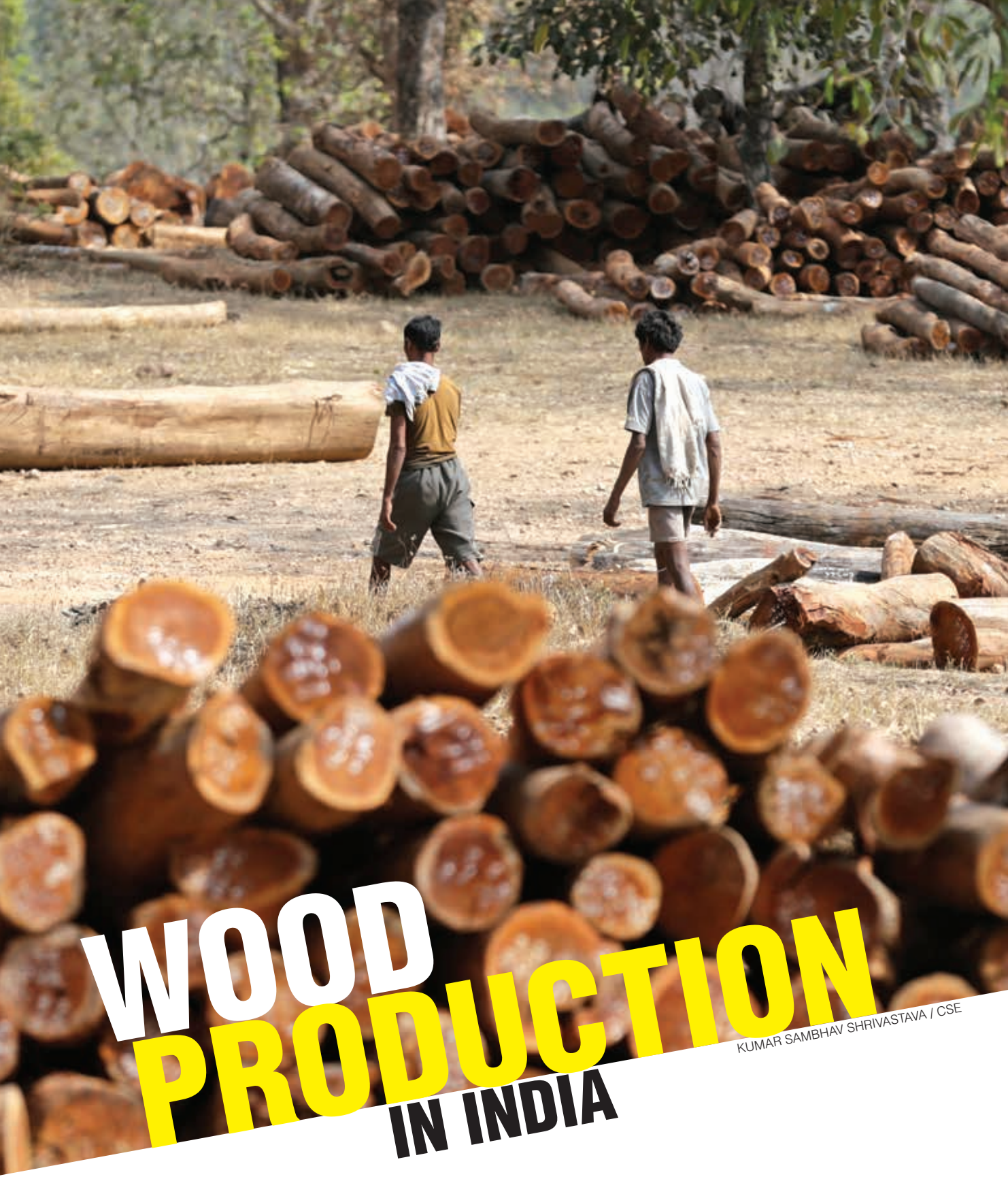
From 2001 to 2015, the total imports of timber by India has steadily increased by an average of 0.9 million cum. If the imports increase at the same rate for the next 15 years, India's imports in 2020, 2025 and 2030 are projected to be 22.51, 27.01 and 31.5 million cum, respectively.

Indian exports of timber have also increased marginally by an average of just 0.11 million cum per year from 2001 to 2014. Exports in 2015 have been discounted from the calculation of the average because of the large scale exports of the confiscated Red Sanders in the same year, which doesn't give a true picture of Indian exports. Therefore, considering the average Indian exports of timber under all categories at 0.11 million cum per annum, Indian timber exports are projected to reach 2.35, 2.9 and 3.45 million cum in 2020, 2025 and 2030 respectively.

Projected timber imports and exports by India



Source: CSE analysis



WOOD PRODUCTION IN INDIA

KUMAR SAMBHAV SHRIVASTAVA / CSE

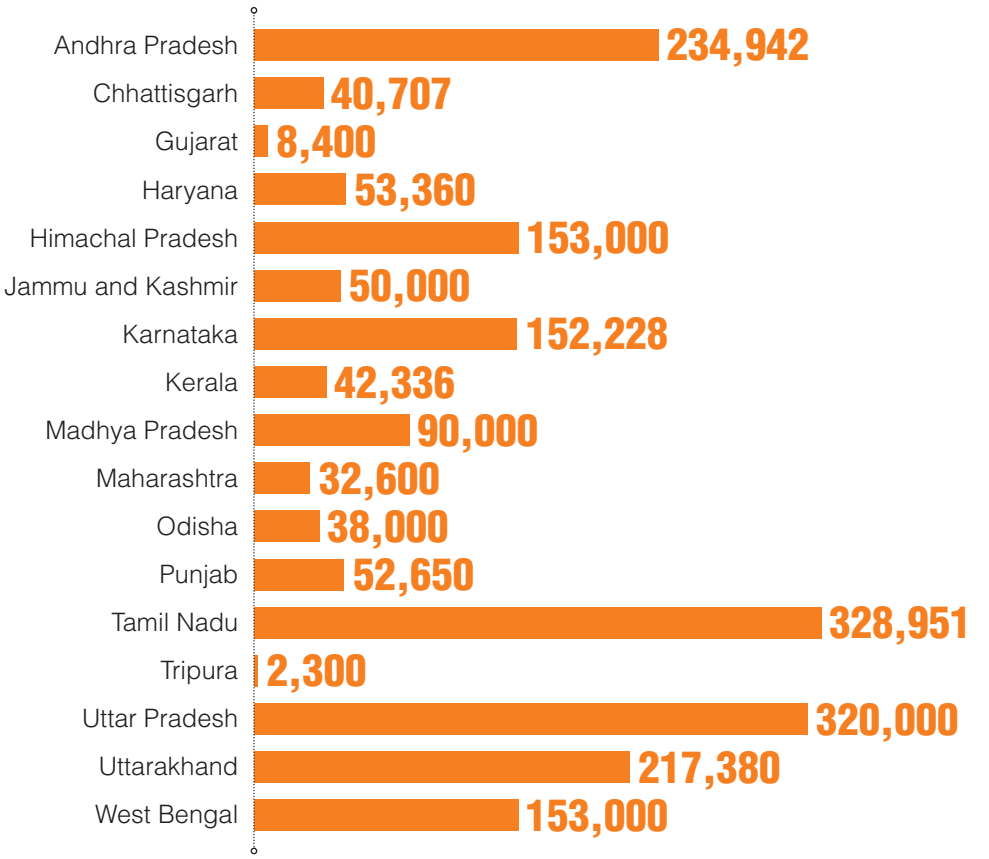
TIMBER PRODUCTION FROM FORESTS

Indian forests are vulnerable to fires, illegal grazing and overexploitation. Changing land use patterns are nibbling away at their already fragile edges. A 1996 Supreme Court judgment banning felling may have been necessary, but led to further decline in forest productivity.[1] At only 0.045 cum per hectare a year, the productivity of Indian forests is paltry compared to the world average of 2.1 cum per year.[2&3] To make matters worse, India only has 0.06 ha per capita forest area, while the world average is 0.6 ha.[4]

The average annual production of timber by Forest Development Corporations (FDCs) is 1.97 million cum, and makes up a significant part of the total from forests (3.175 million cum). FDCs have not been able to fulfil the dream of raising the productivity of Indian forests. At 0.77 cum per ha, their annual productivity does not compare with that of TOF (3.06 cum per ha).[5]

Wood production from state FDCs

Average volume of wood produced/harvested (in cum per year)



TOTAL PRODUCTION

1,969,854

Source: Puzzle of Forest Productivity, Centre for Science and Environment, 2016

TIMBER PRODUCTION FROM TOF

State-wise annual production of timber from forests and TOF

A. States/UT	B. Recorded Forest Area (Sq Km)	C. Volume of Growing Stock (million cum)			D. Annual Production of timber from Forests (thousand cum)	E. Annual production of timber from TOF (thousand cum)	F. Total Annual Timber production (thousand cum) (D + E)
		In Forests	In TOF	Total			
Andhra Pradesh + Telangana	64,162	206	102	307	138	2,360	2,498
Arunachal Pradesh	51,407	413	89	502	64	810	874
Assam	26,832	144	33	177	25	810	835
Bihar	6,493	29	37	67	7	2,180	2,187
Chhattisgarh	59,772	363	82	445	397	2,060	2,457
Delhi	102	-	-	-	-	0	0
Goa	1,225	9	4	13	-	20	20
Gujarat	21,647	52	113	165	99	4,920	5,019
Haryana	1,559	5	15	21	108	1,900	2,008
Himachal Pradesh	37,033	318	21	339	231	670	901
Jammu and Kashmir	20,230	237	147	384	55	840	895
Jharkhand	23,605	123	61	184	13	1,510	1,523
Karnataka	38,284	297	87	384	49	2,090	2,139
Kerala	11,309	155	49	204	68	1,010	1,078
Madhya Pradesh	94,689	277	92	369	397	2,680	3,077
Maharashtra	61,579	227	156	383	203	3,530	3,733

In India, TOF are defined as 'all trees growing outside recorded forest areas'. TOF provide the meat of India's timber needs, and agroforestry and farm forestry are the backbone of TOF. In 2010, 44.34 million cum of wood was available from TOF in India.

Manipur	17,418	51	9	60	124*	200	200
Meghalaya	9,496	40	19	59		490	490
Mizoram	5,641	21	49	70		310	310
Nagaland	9,222	37	12	49		290	290
Odisha	58,136	244	80	324	29	1,710	1,739
Punjab	3,084	13	18	31	90	2,120	2,210
Rajasthan	32,737	38	85	123	57	3,550	3,607
Sikkim	5,841	25	2	27	0	30	30
Tamil Nadu	22,877	123	63	186	13	870	883
Tripura	6,294	23	7	30	0	260	260
Uttar Pradesh	16,582	140	80	220	425	5,190	5,615
Uttarakhand	38,000	441	20	460	250	680	930
West Bengal	11,879	84	38	122	317	1,220	1,537
Chandigarh	35	-	-	-	12**	0	0
Andaman and Nicobar Islands	7,171	0	0	0		10	10
Dadra & Nagar Haveli	204	61§	3§	64§		10	10
Daman & Diu	8					0	0
Lakshadweep	0					0	0
Puducherry	13					10	10
India	**764,566**	**4,195**	**1,573**	**5,768**	**3,175**	**44,340**	**47,375**

Source: B) and C) India State of Forest Report, FSI, 2015
D) India State of Forest Report, FSI, 2011
E) Forest Sector Report India, ICFRE, 2010
* Estimated wood production from all northeastern states.
** Estimated wood production from all Union Territories
§ Estimate for all Union Territories

AGROFORESTRY AND FARM FORESTRY

As per a 2013 estimate by FSI, the total tree cover under agroforestry systems is 111,554 km^2, i.e., 3.39 per cent of the TGA of India.[6] In terms of volume, the major species under agroforestry systems in India are *Mangifera indica,* followed by *Azadirachta indica, Borassus flabelliformis, Madhuca latifolia* and *Cocos nucifera*.[7] In terms of geographical spread, the major species of trees are Teak and Eucalyptus, Poplar, Casuarina and *Leucaena leucocephala*.[8]

The agroforestry sector has been fulfilling most of the wood as well as fuelwood demands in India (Plywood: 80 per cent, Paper: 60 per cent).[9]

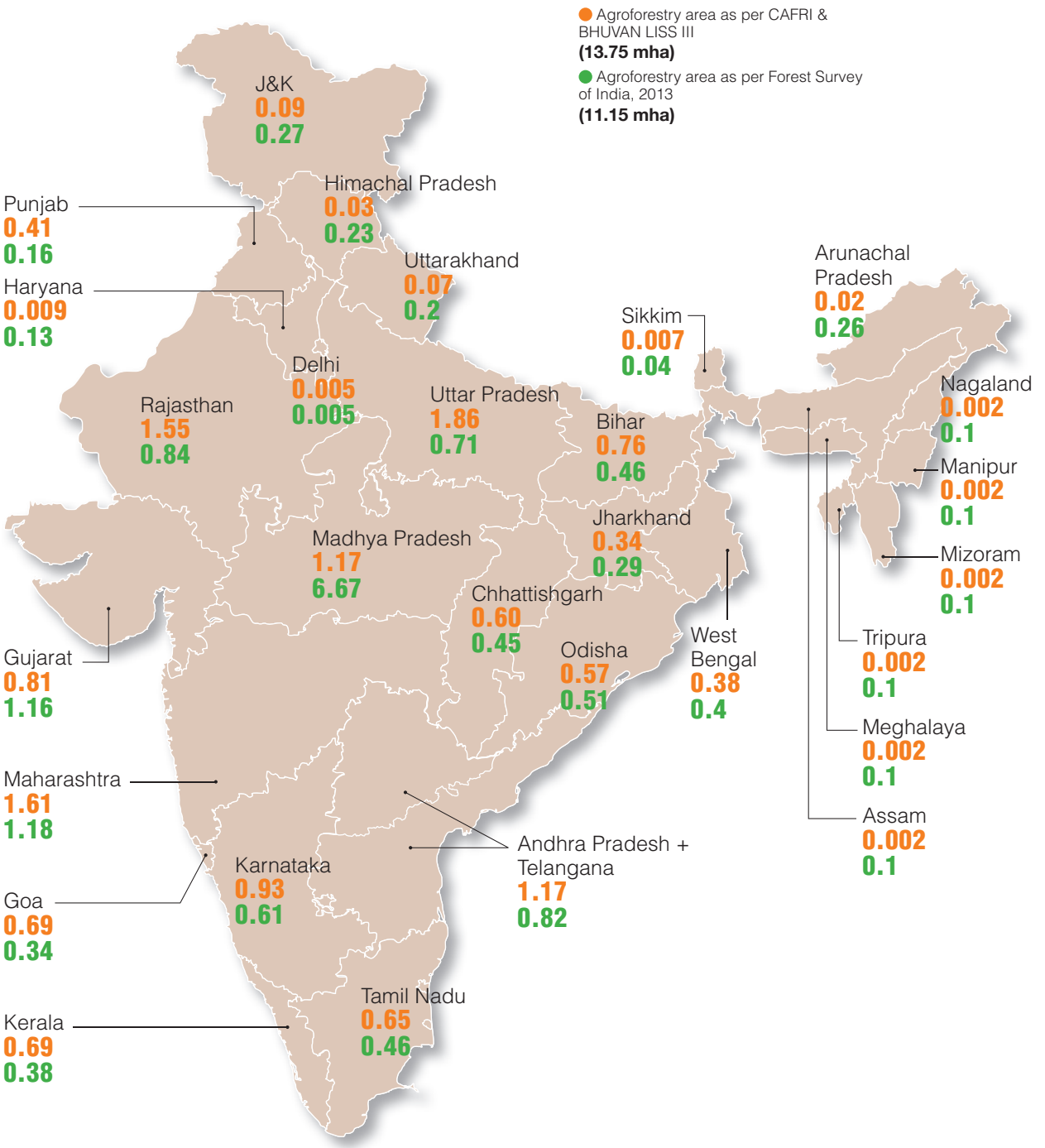
Over the decades, market saturation, farmers not being paid remunerative prices by the paper mills, and legal restrictions on the transport and sale of wood have doused the initial enthusiasm.[10 &11] If farm forestry is to be revived to feed the growing timber hunger of Indian industry, dishonest middlemen need to be weeded out and the legal processes involved in the growing, sale and transport of wood need to be smoothened.

Species-wise volume of trees and number of stems under agroforestry systems in India

Species-wise volume of trees under agro-forestry systems in India			Species-wise number of stems under agroforestry system in India (number in thousand)				
Species	Total volume (in million cum)	Percentage	Diameter class (cm)				Percentage
			10–30	30–50	50 +	Total	
Mangifera indica	149	13.3	255,815	60,917	28,323	345,055	9.2
Azadirachta indica	76	6.8	176,671	27,952	3,844	208,467	5.6
Borassus flabelliformis	64	5.7	18,551	74,411	1,276	94,238	2.5
Madhuca longifolia	64	5.7	6,573	6,467	11,546	24,586	0.7
Cocos nucifera	60	5.3	168,423	43,238	101	211,762	5.7
Rest of the species	711	63.2	2,526,692	267,703	52,867	2,847,262	76
Total	**1,124**	**100**	**3,152,725**	**480,688**	**97,957**	**3,731,370**	**100**

Source: India State of Forest Report, FSI, 2013

Agroforestry areas in India (in million ha)



Source: Chavan et al (2015), CAFRI, Jhansi, Indian Council of Agricultural Research.

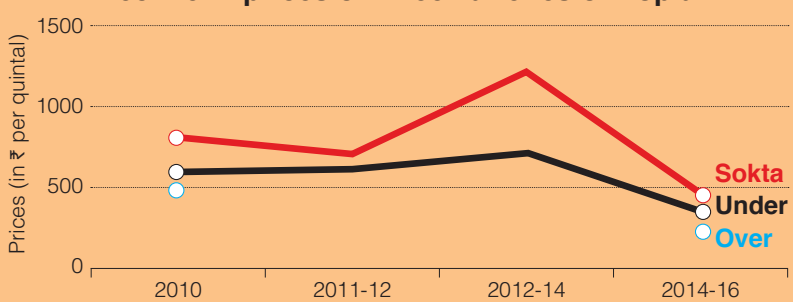
FALL OF POPLAR IN YAMUNANAGAR

Around 5,000 small, medium and large wood-based units have been set up in Yamuna Nagar, which produce almost 50 per cent of India's plywood

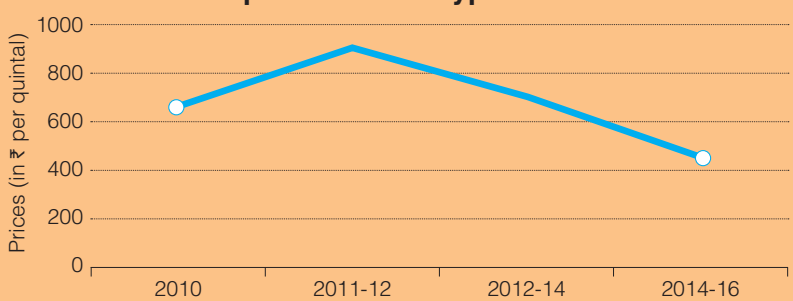
The Yamuna Nagar timber market is the largest for pulpwood and timber in Asia. About 2.6 million tonnes of wood is supplied annually to it from Haryana and other adjoining states, having 65 per cent share among those states. The district accounts for 80 per cent soft timber production in India, with an annual turnover of more than ₹2,500 crore. Around 5,000 small, medium and large wood-based units have been set up in Yamuna Nagar, which produce almost 50 per cent of India's plywood, and employ around 50,000 people.[12]

According to local stakeholders, poplar alone has 95 per cent share in the Yamuna Nagar timber market. In the last few years, farmers and the timber merchants have been facing problems due to steep decline in the prices of poplar and eucalyptus. The reasons for this decline are many, non-issuance of new licenses, use of Chinese-made peeling machines, which can peel thinner slices, reducing the rotation period, and lack of government-run sawmills, which gives private saw-mill owners monopoly and power to determine prices.

Decline in prices of three varieties of Poplar



Decline in prices of Eucalyptus



Source: Manakpur timber market, Yamunanagar

KUMAR SAMBHAV SHRIVASTAVA / CSE

BAMBOO

Bamboo is a valuable forest resource with immense potential as it grows fast and supports local economies. India has great potential to bend it like bamboo, but is held back by problems, including those in its value chains, regulatory and legislative barriers to cultivation and harvesting of bamboo, difficulties in its procurement, lack of technical knowledge among the primary users of bamboo, and insufficient market linkages. In addition, different regulatory bodies do not seem to have a unified view on whether bamboo is a 'tree' or a 'minor forest produce'. Better definitions, and smoother laws, can help India spread a prosperous canvas over its flourishing tall bamboo.

BAMBOO FACTS

23,297
Number of culms in India

79%
Green sound

16%
Dry sound

5%
Decayed[a]

3.23MT
Annual production[b]

5.38MILLION CUM
in volume (density 600 kg/m3)

15.4%
Bamboo growing on private lands[c]

Source: (a) ISFR, FSI, 2011 (b) National Bamboo Mission (c) A. Baksy, 2013, Centre for Civil Society, New Delhi

RAMAKANT DEY / CSE

WOOD CONSUMPTION IN INDIA

FUELWOOD

Almost nine-tenths of all wood produced in India is consumed as fuelwood.[1] Wood is a major source of energy for cooking in Indian households, mainly in rural areas, and meets around 60 per cent of all domestic energy needs of the country.[2]

The annual consumption of fuelwood in India is 332.95 million cum (216.42 million tonnes) (per capita about 17.7 kg in rural and 6.3 kg in urban areas). About 853.87 million Indians make use of this source of energy. Out of this, about 200 million people source nearly 90.4 million cum (58.75 million tonnes) of fuelwood from forests alone.[3]

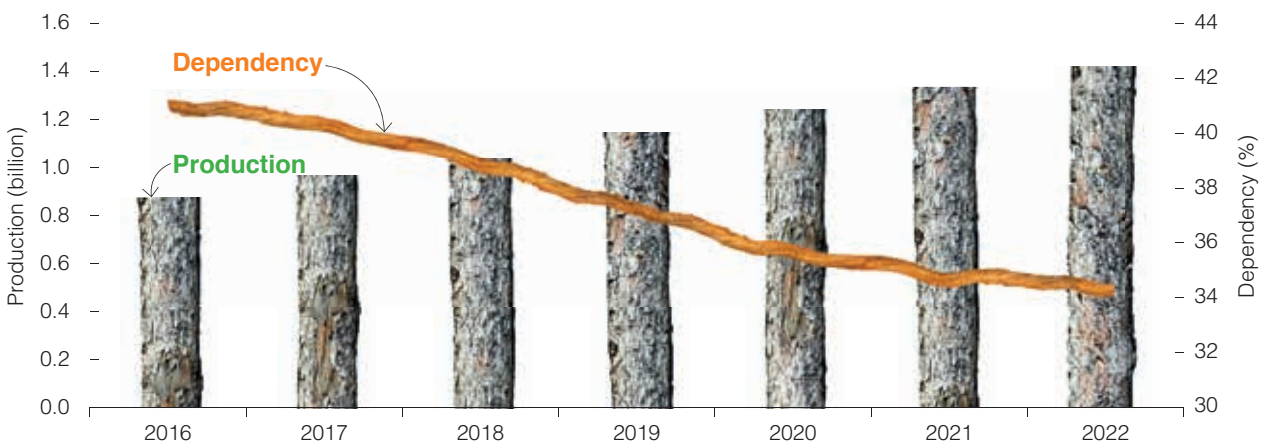
In recent years, the number of people dependent on fuelwood has been increasing at a rate slower than the rate of population growth.[4] This provides a golden opportunity to the government to promote alternative sources of energy in the rural landscape.

State-wise annual fuelwood consumption

State/ Union Territory	Total fuelwood (million tonnes)	Fuelwood from forests (million tonnes)	Fuelwood from TOF (million tonnes)
Andhra Pradesh + Telangana	24.3	3	21.3
Arunachal Pradesh	0.4	0.3	0.1
Assam	11.4	2.5	8.9
Bihar	11.5	0.5	11
Chhattisgarh	4.4	1.4	3
Gujarat	9.7	2.2	7.5
Haryana	1.5	0	1.5
Himachal Pradesh	1.2	1.2	0.1
Jammu and Kashmir	1.4	1	0.4
Jharkhand	4.8	2.9	2
Karnataka	21	5.8	15.2
Kerala	14.5	2.2	12.4
Madhya Pradesh	13.7	7.2	6.5
Maharashtra	9.5	4.5	5
Odisha	8.9	3	5.9
Punjab	3.4	0	3.3
Rajasthan	18.8	3.7	15.1
Tamil Nadu	12.4	2.6	9.8
Uttar Pradesh	19.1	1.3	17.8
Uttarakhand	2.6	2.1	0.4
West Bengal	14.2	6.4	7.8
Northeastern states	5.3	3.8	1.5
Union Territories	2.6	1.3	1.4
Total	**216.4**	**58.8**	**157.7**
Percentage	**100**	**27**	**73**

Source: India State of Forest Report, FSI, 2011

Declining dependence of Indian population on forests



Source: India Forestry Outlook Study by FAO, 2009

TIMBER

Currently, the best estimates of state-wise wood consumption under non-fuelwood category are available only for three industrial sectors: housing, furniture and agricultural implements. The combined annual consumption of timber in the three categories, is 33.61 million cum, the roundwood equivalent (RWE) of which is 48 million cum.[5] These calculations are made assuming a wood lifespan of 20 years in construction, 15 years in household furniture, 10 years in commercial furniture, and five years in agricultural implements.[6]

Consumption of timber under three major categories*

State/ Union Territory	House construction	Furniture	Agricultural implements	Total	Percentage
Andhra Pradesh	23.4	3.2	2.1	28.6	6.8
Arunachal Pradesh	0.7	0.1	0	0.8	0.2
Assam	7.7	2.8	0.5	11	2.6
Bihar	9.2	3.0	0.3	12.5	3
Chhattisgarh	12.0	0.9	0.9	13.8	3.3
Gujarat	27.5	2.4	0.3	30.2	7.2
Haryana	5.9	1.5	0.5	7.9	1.9
Himachal Pradesh	5.7	0.5	0.1	6.3	1.5
Jammu and Kashmir	5.3	1.1	0.1	6.4	1.5
Jharkhand	4.9	0.9	0.3	6.1	1.5
Karnataka	17.9	1.9	2.6	22.5	5.3
Kerala	15.2	3.3	NA	18.5	4.4
Madhya Pradesh	26.3	1.8	1.8	29.8	7.1
Maharashtra	55.6	4.6	5.1	65.3	15.5
Odisha	7.1	1.3	0.4	8.8	2.1
Punjab	9.2	3.4	0.8	13.4	3.2
Rajasthan	10.4	1.6	0.7	12.6	3.0
Tamil Nadu	18.5	2.5	0.2	21.1	5.0
Uttar Pradesh	42	15.1	4.3	61.4	14.6
Uttarakhand	4.8	0.5	0.1	5.4	1.3
West Bengal	14.6	4.1	0.5	19.2	4.6
Northeastern states	5	1.1	0.0	6.1	1.5
Union Territories	11.6	0.9	0.0	12.6	3.0
Total	**340.2**	**58.5**	**21.6**	**420.3**	**100**

Source: India State of Forest Report, FSI, 2011
*Figures in this table do not represent annual consumption

FURNITURE

Booming real estate and housing, growth in tourism and hospitality sector, and changing demographics have been the key drivers of the furniture market in India. With a market size of approximately ₹65,000 crore, the industry employs around 500,000 workers.[7] There are 1,420 registered furniture factories in the country, out of which 1,157 are in operation.[8] Unorganized sector constitutes approximately 85 per cent of the market,[9] but the share of the organized sector is increasing.

Wood-based furniture dominates the market with a 65 per cent share worth ₹468 billion; teakwood being the most popular raw material, particularly in western and southern regions.[10] However, cheaper cane and bamboo is becoming a favourite as well.

The future of the furniture industry of India is bright, with a huge growth in demand, but poor business models within the unorganized sector discourage competiveness. The procurement of raw material presents its own set of problems.

Furniture market by type of material

Furniture material	2010–11 (₹ crores)	2014–15 (₹ crores)	2019–20 (₹ crores)	CAGR (projected) 2014–20 (%)
Wood	281	468	936	14.9
Plastic	33	65	136	16
Cane and bamboo	13	29	91	25.9
Metal	72	122	272	17.3
Others*	21	36	75	15.8
Total	**420**	**720**	**1510**	**16**

Source: MCG estimate, 2016

Timber species used in the Indian furniture industry

50%
Teak

30%
Mahogany, cedar, sheesham, mango, etc.

20%
Sal and deodar

Source: KPMG-IBEF, 2015

PLYWOOD AND PANEL

The Indian plywood and panel market is largely unorganized. The organized sector is estimated to be worth ₹4,500 crore (US$ 672 million), the total market being worth ₹15,000 crore (US$ 2.24 billion).[11] Two companies—Century Plyboards and Greenply Industries—dominate the organized sector, together constituting around 50 per cent of the market share.[12] Other key players in the market are National Plywood Industries Ltd, Kitply Industries Ltd, Sarda Plywood Industries Ltd and Mayur Plywood.

Most of the manufactured plywood and panel ends up in the furniture, modular kitchen, and wood flooring markets. There has been a boom in these markets in the last 15–20 years due to growth in the real estate sector.[13]

SUNITA NARAIN / CSE

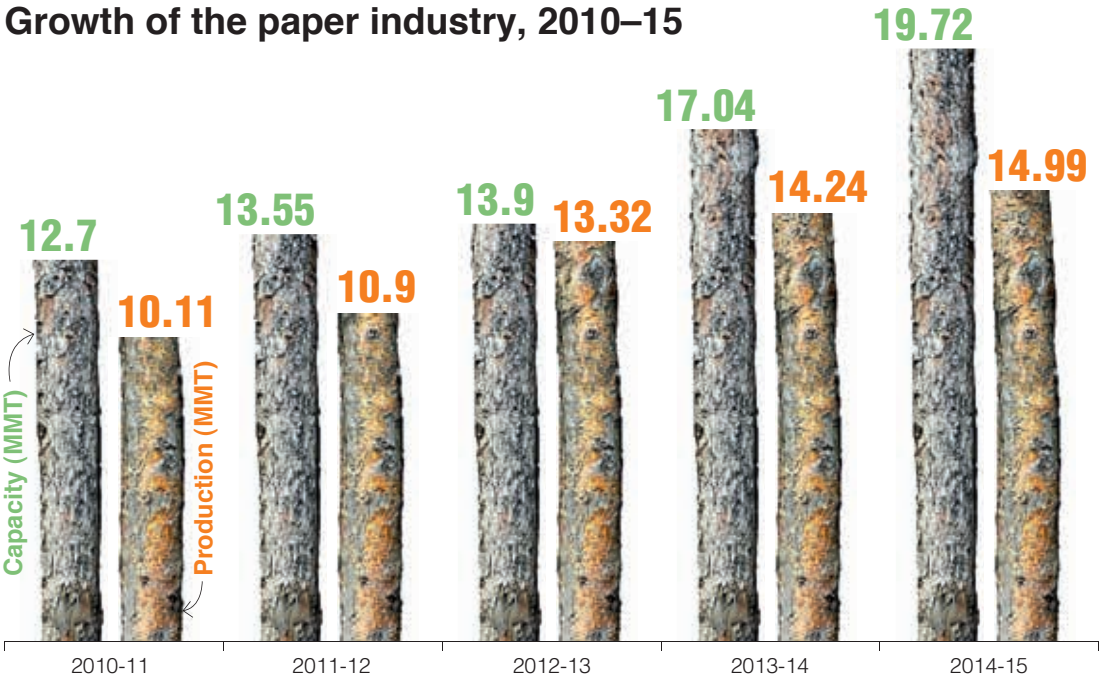
PAPER AND PULP

With the rise in demand steadying at around 8 per cent, India is considered the fastest growing paper market in the world.[14] The annual per capita consumption of paper is projected to increase to 17 kg by 2020, from the current per capita consumption of 13.2 kg.[15]

Indian paper industry is fragmented, consisting of 813 small, medium and large paper mills having capacities ranging from 10 to 1,500 tonnes per day (tpd). Of them, only 31 are reported to be using wood-based raw material, the rest use agricultural by-products and recycled waste paper and fibre.[16] Large integrated papermills have a production share of around 26 per cent. The industry produces 14.99 million tonnes of paper annually, which is 3.7 per cent world's production, and consumes 29.64 million tonnes of wood-, agriculture- and recycled fibre-based raw material.[17]

The paper industry has strong backward linkages and has established a system for sourcing 60 per cent of the raw material from agroforestry and social forestry. Yet, availability of quality raw material remains a challenge because India is a fibre-deficient country. There is not enough land for captive pulpwood plantations, and gestation periods are long. Some of these issues can be resolved by making use of cultivable wastelands (12.65 million ha) and total fallow lands (24.58 million ha), which can provide much more than what the industry seeks, if proper supply channels for wood are established between the industry and the farm and agroforesters.[18]

Growth of the paper industry, 2010–15

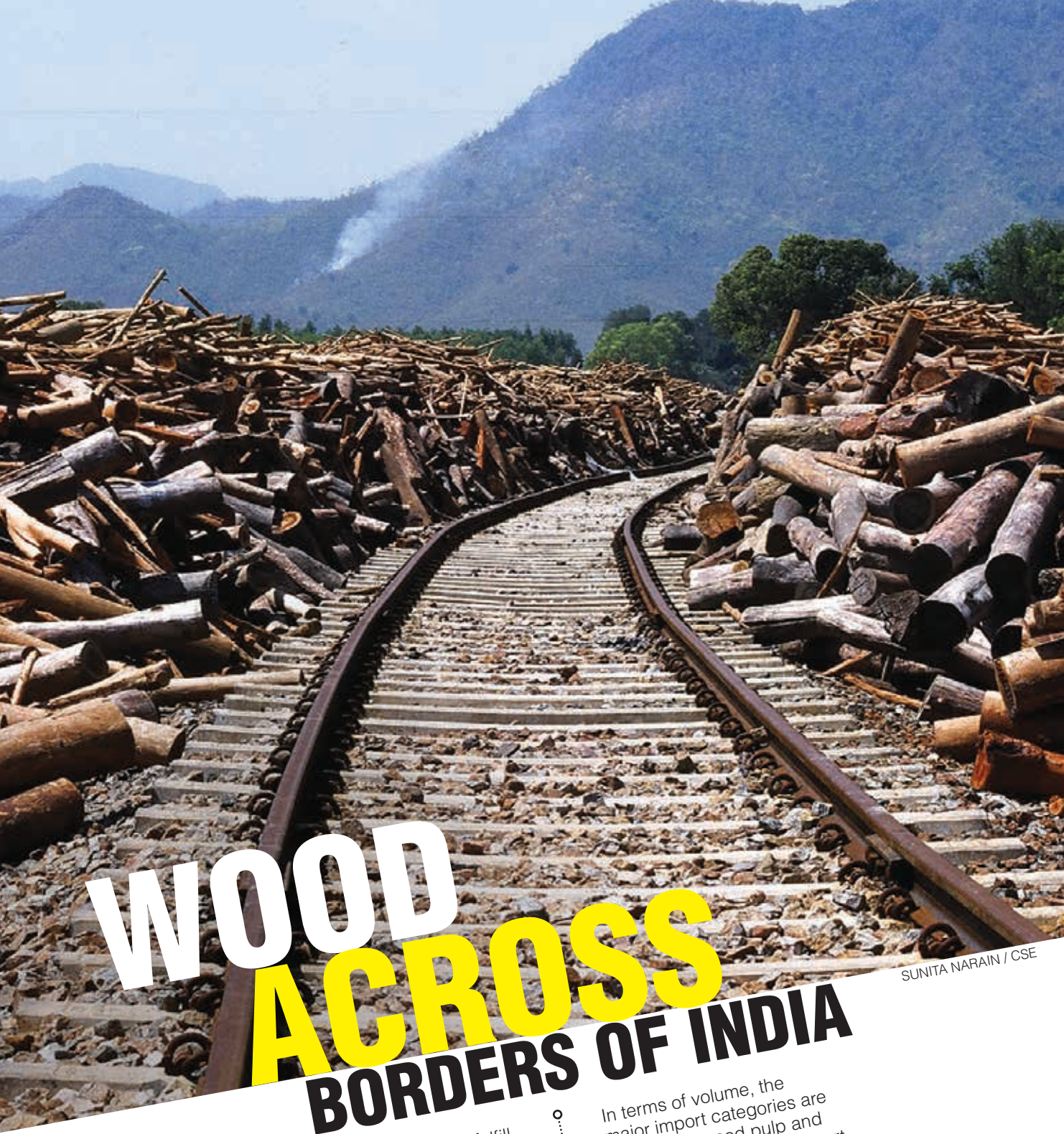


Source: CPPRI, 2016

Varieties of paper made from different raw materials

Type of mills	No. of mills	Raw material	Consumption (million tonnes)	Production (million tonnes)		
Wood-based (large integrated)	31	Wood pulp	8.7	Writing/ printing grade	2.67	3.54
				Packaging grade	0.85	
				Newsprint grade	0.02	
Agro-based (medium-scale)	135	Bagasse	5.8	Writing/ printing Grade	0.54	1.61
				Packaging grade	1.07	
		Wheat straw	2.6	Newsprint grade	0	
Recycled fibre-based (medium- and small-scale)	647	Waste paper	12.5	Writing/ printing Grade	2	9.84
				Packaging grade	6.37	
				Newsprint grade	1.47	
Total	**813**		**29.6**	**14.99**		

Source: CPPRI, 2016



SUNITA NARAIN / CSE

WOOD ACROSS BORDERS OF INDIA

India is heavily dependent on imports to fulfill its wood requirements. Since 2011, the annual contribution of imported timber to the total availability has been in the range of 19 to 26 per cent. Exports of timber are much lower than imports. While the average annual timber imports from 2001 to 2015 were 11.2 million cum, average timber exports during the same period were just 1.2 million cum.*

In terms of volume, the major import categories are wood logs, wood pulp and paper, while the major export categories are paper and furniture. In fact, furniture is the only category in which Indian exports exceed its imports

* As analysed by CSE using data sourced from International Trade Centre / UN COMTRADE, 2016

Composition of timber imports and exports in 2015

Timber	Per cent imports		Per cent exports	
	By value	By quantity	By value	By quantity
Plywood (HS Code: 4412)	1	0.5	0.8	1.4
Wood logs (Industrial roundwood) (HS Code: 4403)	29.6	37.8	0.7	12.8*
Sawn wood (HS Code: 4407)	2.0	1.1	1.4	1.5
Veneer (HS Code: 4408)	0.9	0.8	1.3	1.3
Fibreboard (HS Code: 4411)	1.2	1.4	0.7	1.1
Particleboard (HS Code: 4410)	0.8	1.0	0.2	0.3
Wood pulp (HS Code: 47)	21.6	34.8	0.2	0.4
Paper and paperboard (HS Code: 48)	36.7	21.2	57.8	64.6
Wooden furniture (HS Code: 94; sub-codes: 9401 and 9403)	4.5	0.6	25.6	8.9
All others (except fuelwood and railway sleepers) (HS Codes: 4418, 4421, 4409, 4415, 4402, 4413, 4416, 4417, 4405, 4420, 4419, 4414 and 4404)	1.6	0.9	11.3	7.7

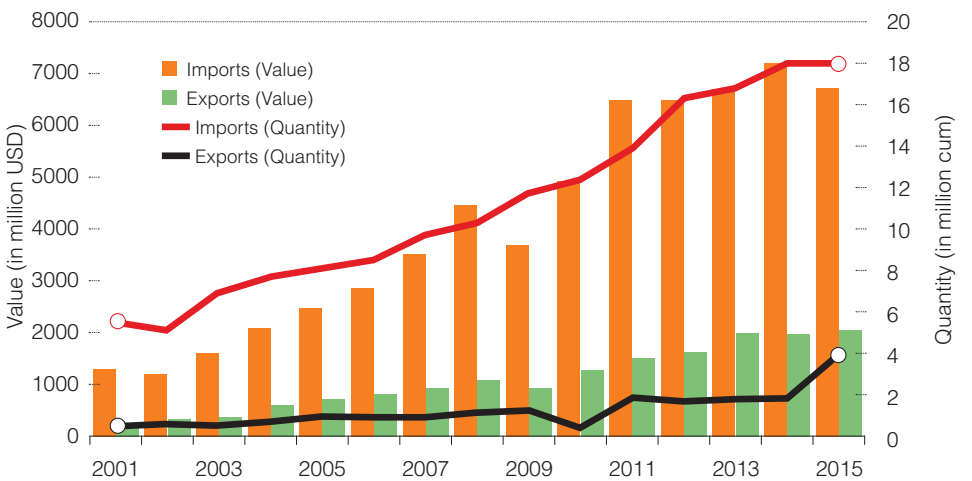
Source: International Trade Centre/UN COMTRADE; CSE Analysis, 2016
*High percentage of wood logs is an aberration here as in 2015 India exported huge volumes of confiscated Red Sanders wood, inflating the total and average of wood log export figures from 2001 to 2015.

Import status of forest products at the national level

In 2015, India imported an approximate 18.01 million cum (or 12.16 million tonnes) of timber and allied products worth US$ 6,701 million, and the import graph is steadily climbing over the past decade.

India imported an average of 11.24 million cum of timber and allied products from 2001 to 2015.

Import and export of timber by India from 2001 to 2015

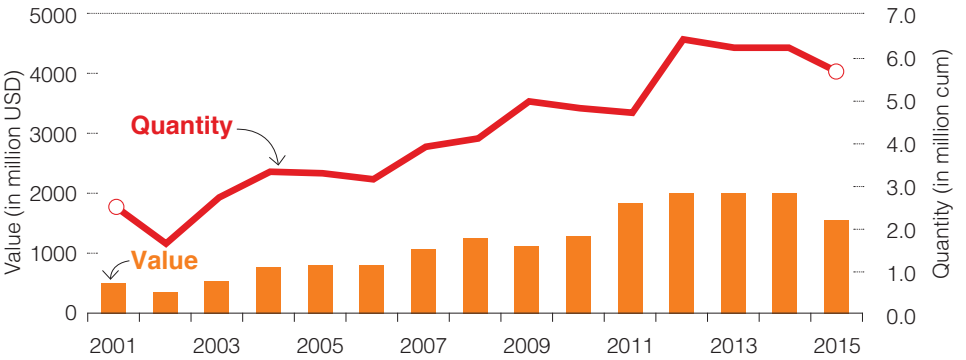


Source: International Trade Center/UN COMTRADE, 2016

WOOD LOG

India and China dominate the trade in tropical roundwood. Imports declined in 2015 due to the ban on felling of tropical forests and wood log export by Myanmar.[1]

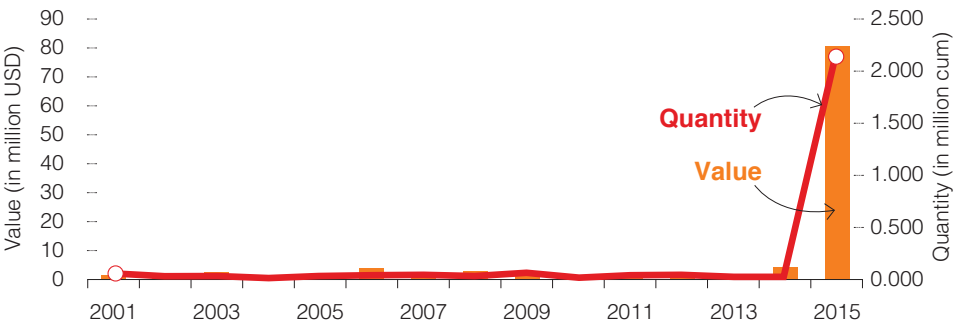
Imports of wood logs (industrial roundwood) from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

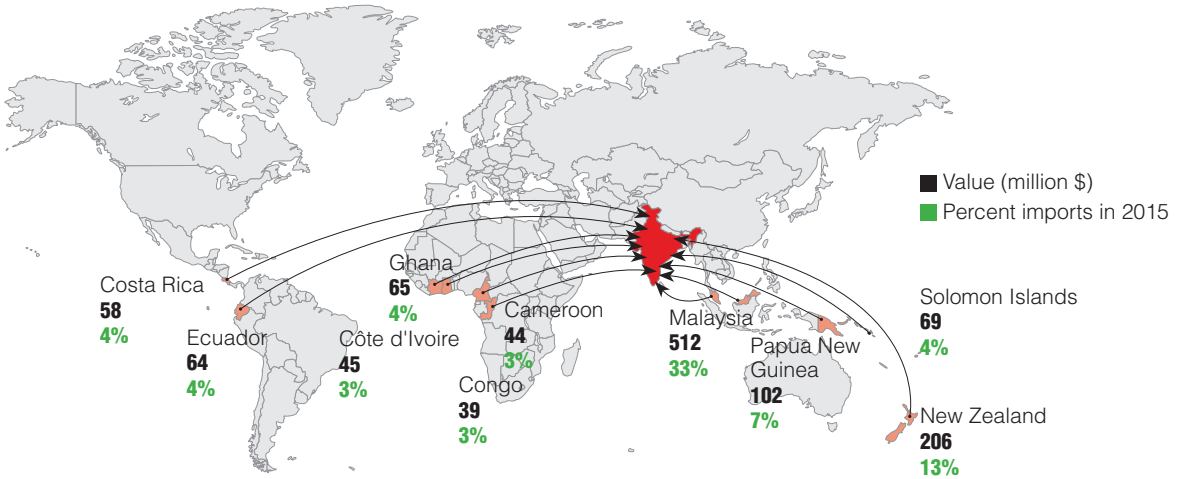
The spike in 2015 is a result of the export of confiscated stocks of Red Sanders wood, worth US$ 81.2 million.

Exports of wood logs (industrial roundwood) from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

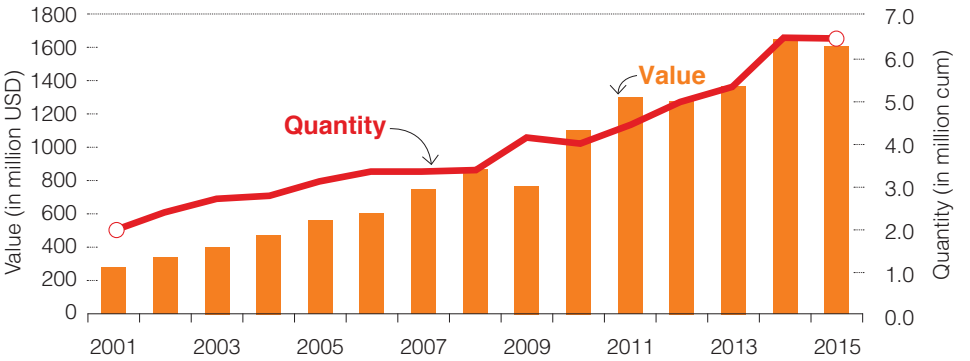
Top ten countries exporting wood logs to India in 2015



Source: International Trade Center/UN COMTRADE, 2016

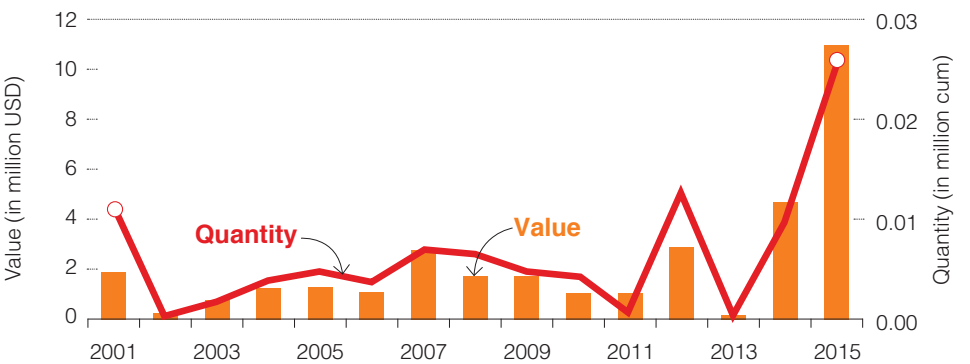
WOOD PULP

Imports of wood pulp from 2001 to 2015



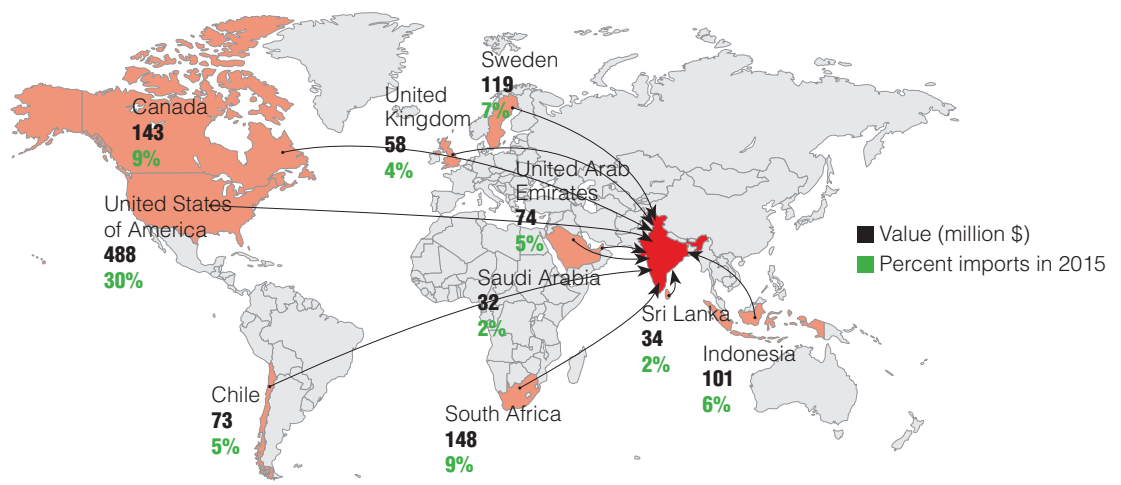
Source: International Trade Center/UN COMTRADE, 2016

Exports of wood pulp from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

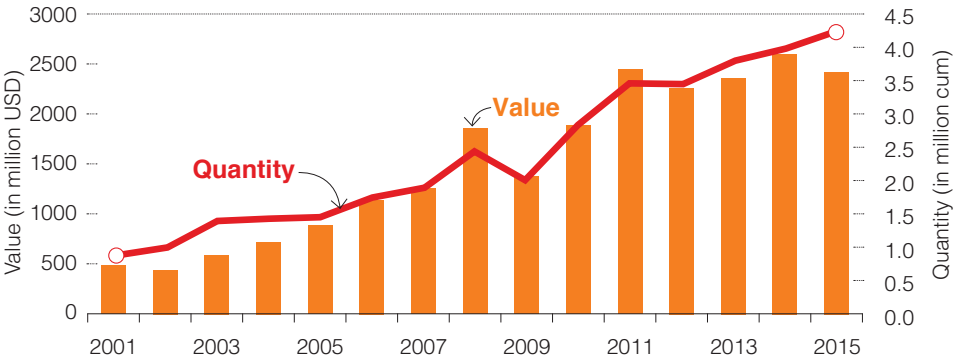
Top ten countries exporting wood pulp to India in 2015



Source: International Trade Center/UN COMTRADE, 2016

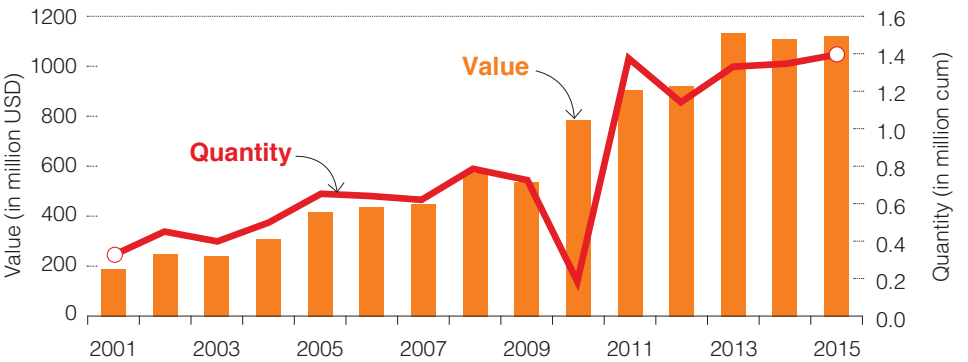
PAPER AND PAPERBOARD

Imports of paper and paperboard from 2001 to 2015



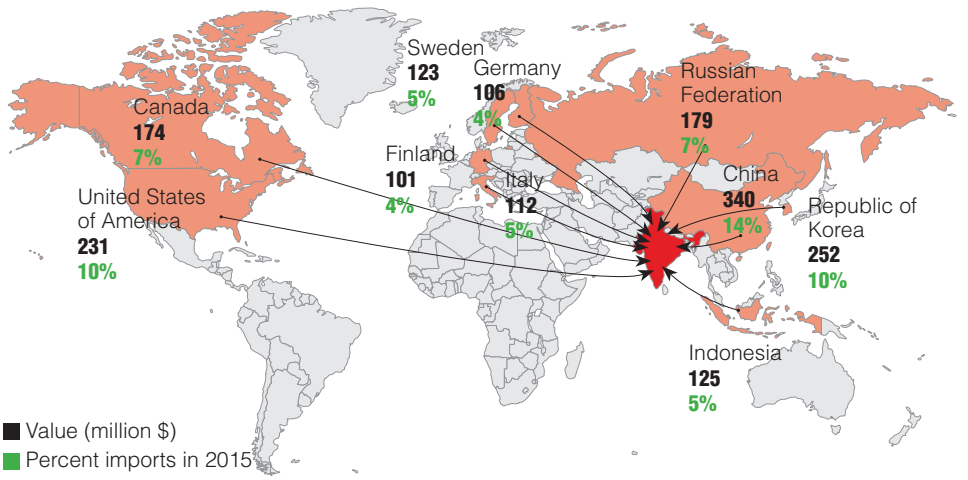
Source: International Trade Center/UN COMTRADE, 2016

Exports of paper and paperboard from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

Top ten countries exporting paper and paperboard to India in 2015

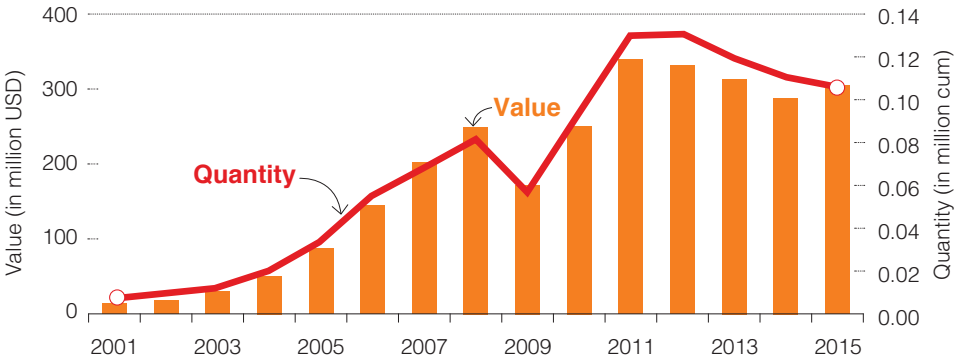


Source: International Trade Center/UN COMTRADE, 2016

WOODEN FURNITURE

China and Malaysia are the major exporters of low-cost wooden furniture to India. Around 58 per cent imported furniture is from China.

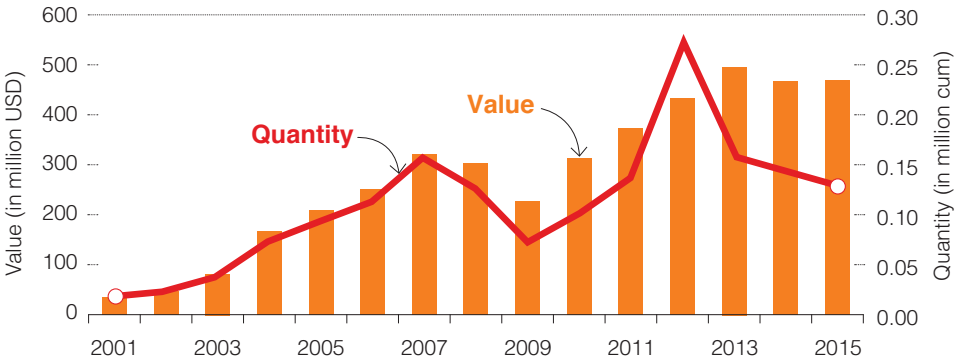
Imports of wooden furniture from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

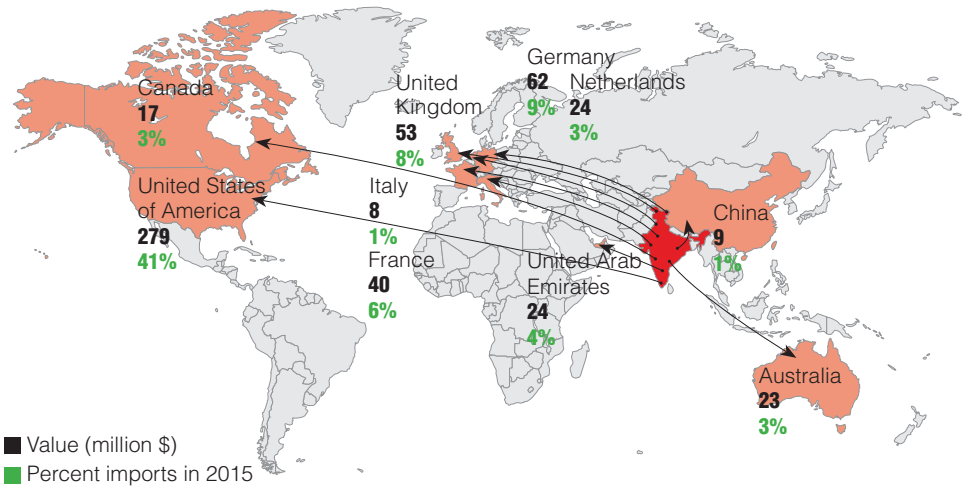
Major export destinations for Indian wooden furniture are USA, Germany, France and UK.

Exports of wooden furniture from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

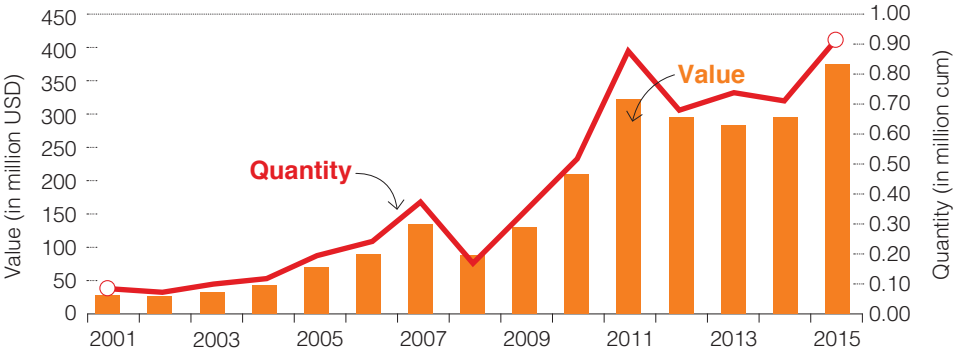
Top ten countries importing wooden furniture from India in 2015



Source: International Trade Center/UN COMTRADE, 2016

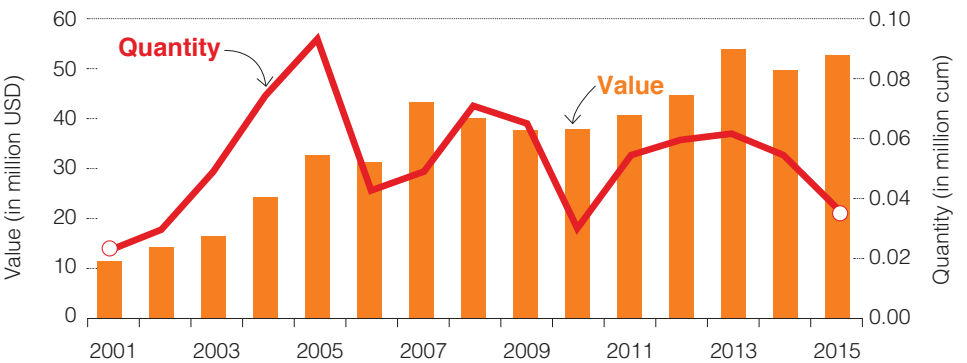
PLYWOOD AND PANEL

Imports of plywood and panel from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

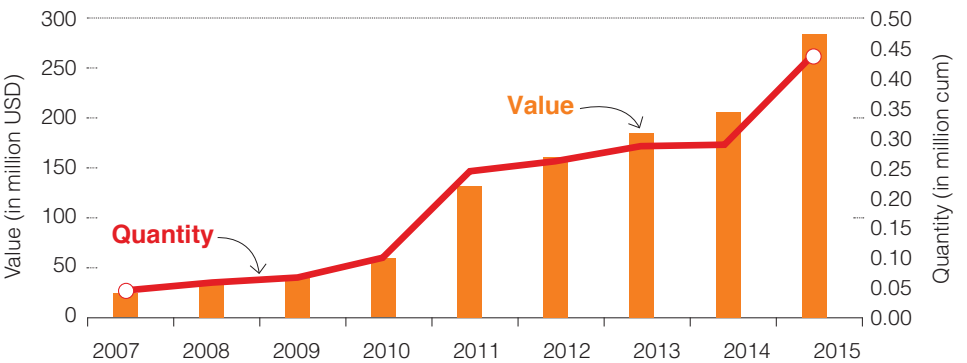
Exports of plywood and panel from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

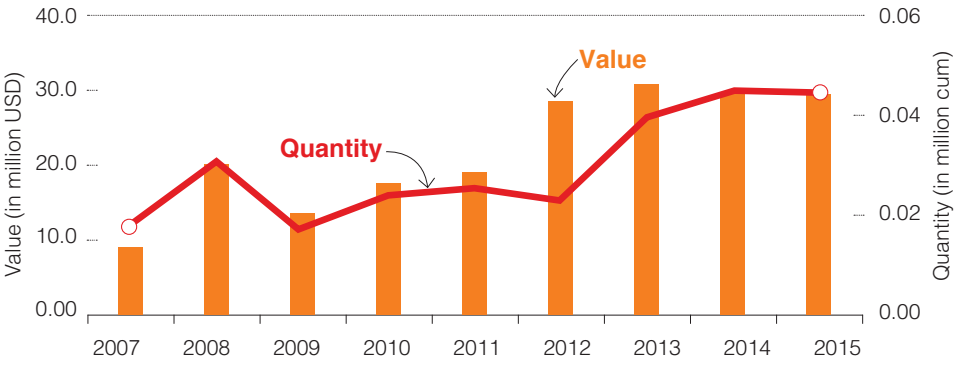
SAWNWOOD

Imports of sawnwood from 2007 to 2015



Source: International Trade Center/UN COMTRADE, 2016

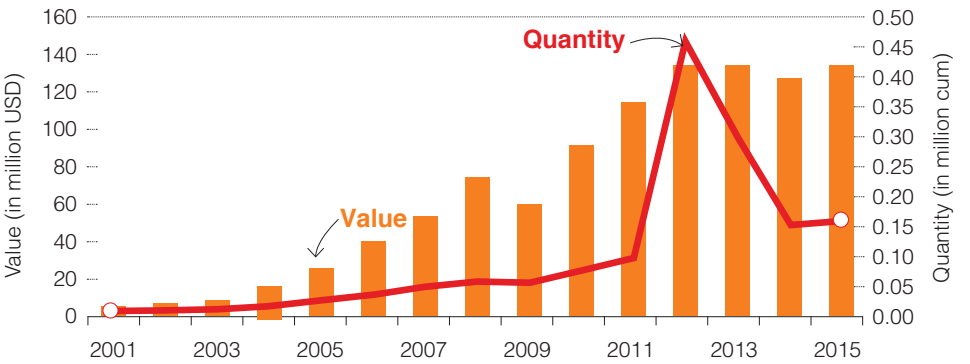
Exports of sawnwood from 2007 to 2015



Source: International Trade Center/UN COMTRADE, 2016

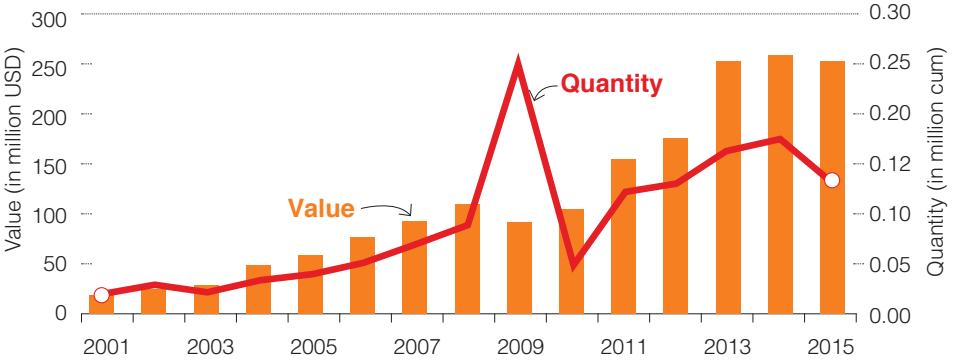
OTHER WOOD

Imports of all other wood (except fuelwood and railway sleepers) from 2001 to 2015



Source: International Trade Center/UN COMTRADE, 2016

Exports of all other wood (except fuelwood and railway sleepers) from 2001 to 2015

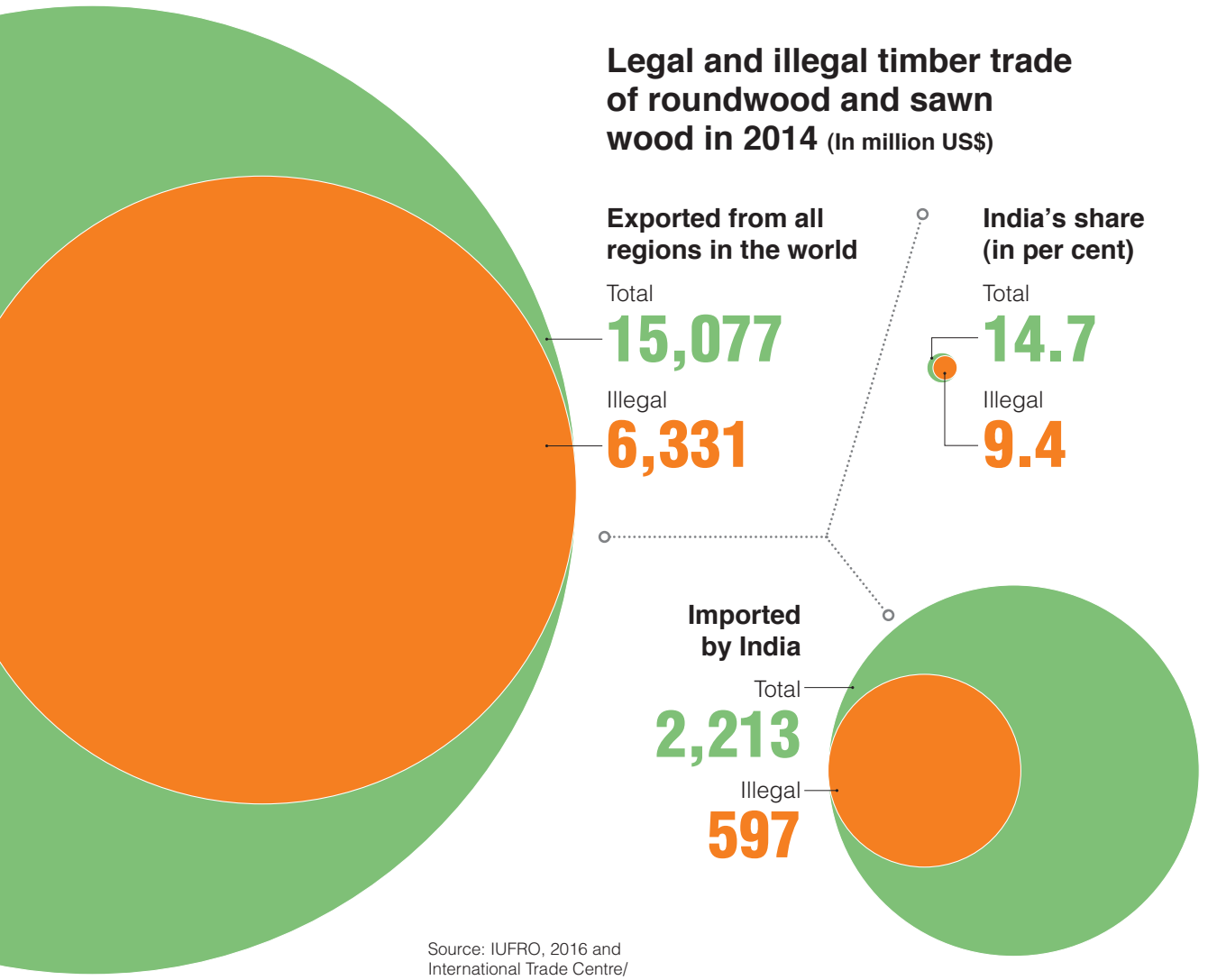


Source: International Trade Center/UN COMTRADE, 2016

ILLEGAL TRADE—INDIA IN THE BAD BOYS' CLUB

India has a 9.4 per cent share in illegal timber trade and is placed after China and Vietnam in this notorious list; together with the EU, Thailand and US, they make up 84 per cent of illegal imports of timber. China imports illegal timber from all tropical forest regions and Russia while the major source of illegal timber for India is Southeast Asia. Huge domestic markets and poor regulatory frameworks are considered the main culprits for this contraband trade.[2]

As India's timber market continues to grow rapidly, the country needs to introduce a better regulatory framework which includes stringent measures to control illegalities in its wood imports.



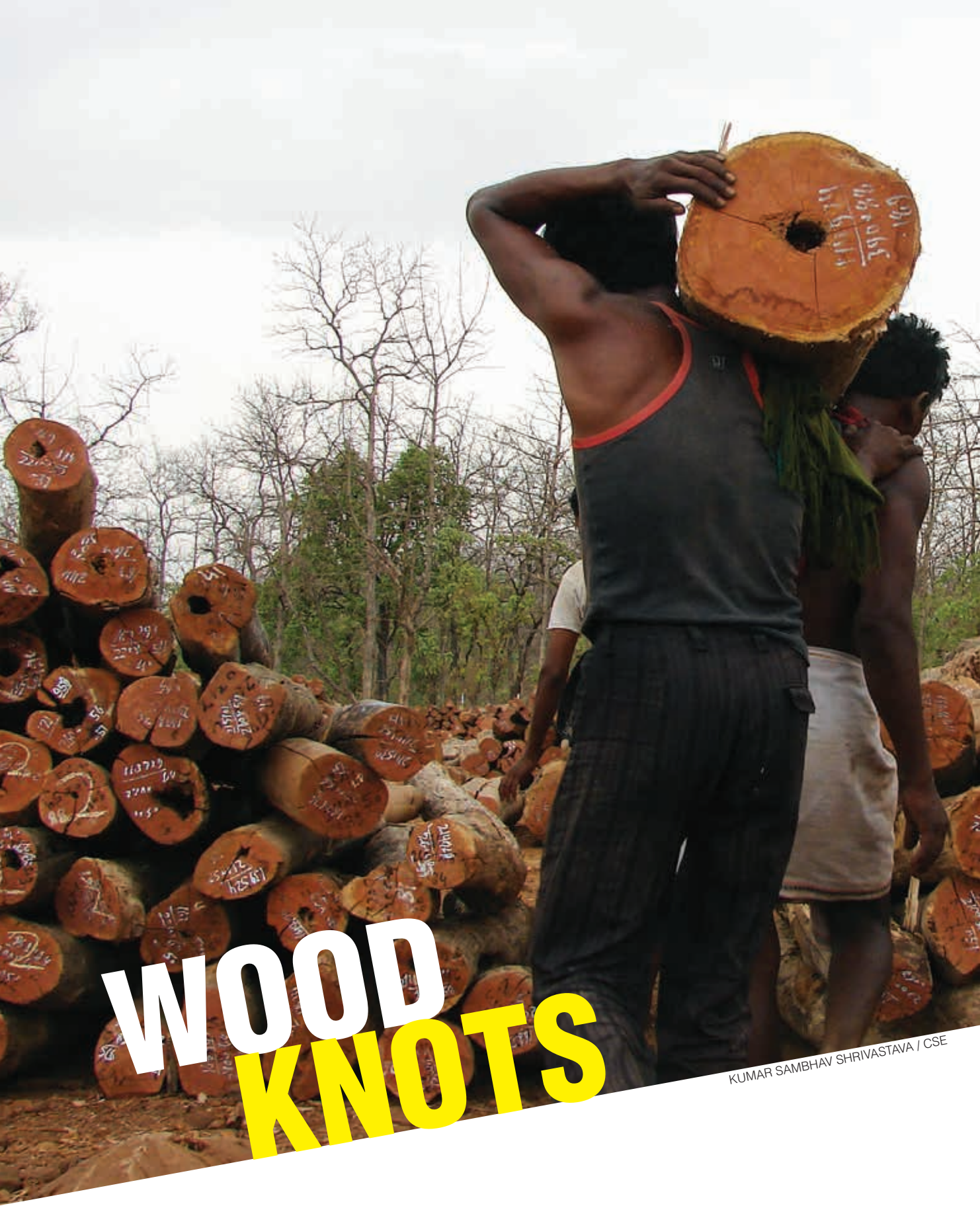
Source: IUFRO, 2016 and International Trade Centre/ UNCOMTRADE, 2016

KUMAR SAMBHAV SHRIVASTAVA / CSE

Global trade flows of roundwood and sawn wood at a high risk of illegality, 2014 (In million US$)

Importing countries	Source regions exporting illegal timber					Total illegal timber imports from all regions	Percentage on total illegal import from all source regions
	Russian Federation	South America	Congo basin	South east Asia	Oceania		
China	619.9	78.6	302	1730.6	564.7	3295.7	**52.1**
Vietnam	-	0.8	18.3	748.2		767.3	**12.1**
India	-	10.2	1.4	509.3	75.5	596.5	**9.4**
EU	239.4	55.2	113.7	45.6	-	453.9	**7.2**
Thailand	-	-	-	101.4	-	101.4	**1.6**
USA	-	75.6	12.6	-	-	88.2	**1.4**
South Korea	9.4	-	-	-	13	22.4	**0.4**
Japan	-	-	0.7	14.4	-	15.1	**0.2**
Malaysia	-	-	-	12.1	-	12.1	**0.2**
Australia	-	-	-	-	1.1	1.1	**0**
Others	396.9	166.7	72.7	309.7	30.9	976.9	**15.4**
Total illegal export from all source regions	1265.6	387.1	521.4	3471.3	685.2	6330.6	**100**
Percentage on total illegal export from all source regions	**20**	**6.1**	**8.2**	**54.8**	**10.8**	**100**	

Source: IUFRO, 2016



WOOD KNOTS

KUMAR SAMBHAV SHRIVASTAVA / CSE

TROY IMPORTED A WOODEN HORSE

India's timber imports comprise 19 to 26 per cent of total annual timber availability and have been growing at a rate of 9.3 per cent since 2001*. Imports are bound to rise in the future as well, as there is no indication that domestic production of timber is keeping up with the pace of increasing demand.

There is a unanimous perception of shortage in supply in the timber and pulpwood-based industries, causing them to make an outcry for captive plantations on forestlands.

Despite being more than capable of producing all the wood that it requires, owing to its rich soils and availability of vast land resources, the gap between the policies and their implementation is large. The growing dependence on imports also means more illegal trade, and a question mark on the nation's integrity.

RED TAPE WOUND OVER WOOD

India has been living under a regulatory regime that makes growing timber on private lands, farms and forests a very difficult task. Moreover, huge costs involved in transporting local timber are as much a culprit in this as any. Due to the non-availability of wood and high transportation costs, mills are increasingly exploring other options to source wood at cheaper rates, including importing logs or wood chips, jeopardizing the local wood economy and foregoing the immense wood production potential of Indian lands.

STICK TO THE PRODUCERS OF WOOD

The lack of adequately-sized timber markets for farmers and price support mechanisms are also limiting growth in this sector. Farmers are finding it difficult to adopt timber-based agroforestry and farm forestry because the returns are low and the points of sale are far off.

Plywood industry's monopoly over the market in many regions has constrained farmers, making them feel that they have been deprived of equity in the wood trade, to a point where they are made to feel as if they are not the owners of their produce.

* CSE analysis

SOUJANYA SHRIVASTAVA / CSE

AGROFORESTRY MARKET–FARM DISCONNECT IN BUNDELKHAND (UP) AND MP

Mr Umakant Sahu, a local farmer with a large landholding of over 160 acres (~65 hectares) planted 60,000 eucalyptus saplings in 2011 on 33 acres (13.35 ha) of his land, in his small native village of Doarra in Jhansi district of UP. He adopted agro-forestry with a hope that it will give him good returns on his investment, and now over 60 per cent of his eucalyptus tree crop is ready for harvesting. However, due to lack of any markets for his tree crop in the region, he is clueless about its future.

He is aware that the current price for eucalyptus is around ₹500 per quintal (100 kg), therefore, he turned down offers of many middlemen from unknown markets who had approached him, and offered rates as low as Rs 3 to 4 per kg. In a timber market like Yamuna Nagar, he could have sold his tree crop for around ₹5.5–5.7 per kg. He goes on to say that markets are heavily inclined in favour of bigger players and factory-owners, and the middlemen, and the farmers are barely able to recover their costs of production.

Still, Mr Sahu is optimistic that agroforestry and farm forestry can expand, if markets where farmers can sell their produce are close at hand. By his calculations, a farmer who has 5 acres land, will be able to plant around a 1,000 trees with a space of 10 feet between a tree and the next. If the average weight attained by a mature tree (after a five–six year's rotation cycle) reaches 150 kg, the farmer will be able to earn approximately ₹6 lakh from the total produce.

RANGA PLANTATION—A PRIVATE FOREST REVIVING NARMADA'S LOST GLORY IN JABALPUR

Mr Narsingh Ranga is an old man living in Jabalpur district in Madhya Pradesh. He has been in the business of timber since long as it has been a family business from generations. Mr Ranga and his family members started the work of planting trees in 1992 on the banks of Narmada to conserve its riverine ecology and soil which was being lost due to erosion as its forests were fast degrading. He kept purchasing more land along the river's banks and planting trees and bamboo. After years of hard work, he has a private forest spread over 1,000 acres (~405 ha). The prominent species he has planted are teak, khamer, eucalyptus (planted on 200 acres each), and bamboo on 400 acres. His plantation is known as the Ranga plantation. It is entirely on wasteland and not on agricultural land. He was supported by forest officials and scientists from TFRI in his plantation programme.

SOUJANYA SHRIVASTAVA / CSE

Mr Ranga and his son, who has taken charge of the business, have traveled extensively across India to find customers. Having earned a reputation for the plantation, buyers are aplenty and come from near and far, and pay good prices, unburdening the owners of the need to have a local market. Mr Ranga sells teak trees from his plantations at rates as high as ₹8–9 per kg. He says he is not perturbed by the falling prices of timber, as the demand for timber is increasing and there is not enough supply.

IF A TREE FALLS IN THE FOREST...

Despite a quarter of the country's geographical area being under forests, wood availability from them is extremely low. Most of the domestic wood production in the country is from resources outside forests. Therefore, it is important to realize the potential of TOF and promote it.

Wastelands are also a contentious problem in India, as some of them are not really 'waste' lands but are 'wasted' lands, thanks to the apathy of administration and policy, both at the regional as well as Central level. In the absence of suitable plantation technology and paucity of investments, precious land is being degraded and lost.

Even the growing stock from the land under TOF is not being utilized up to anywhere its real potential. Forests can further add to wood production, if appropriate silvicultural systems are applied with sustainable forest management framework. An analysis by CSE shows that more than 98 million cum of wood can be produced from available lands in India. This will easily meet the domestic wood demand in the country, rendering the current monumental wood imports from outside unnecessary.

Wood production capacity in India

Wood Production Sources	Area (million ha)	Annual Production Capacity (million cum)	Assumed or average annual wood productivity (cum per ha per year)
Natural Forests*	68.89	3.12	0.045
FDCs	1.28	15.02	11.74
Agroforestry + Farm Forestry	13.50	41.31	3.06
Cultivable Wasteland	12.58	12.58	1
Total Fallow Land	26.28	26.28	1
Total		**98.31**	

Source: CSE analysis
*Natural forest cover, excluding forest land leased by FDCs.

TO NOT MISS THE FOREST FOR THE TREE

This report relies heavily on secondary sources for data on timber, fuelwood, bamboo, and imported wood. The data varies from one source to another, as do the timelines.

A large chunk of the total production of timber and fuelwood is not recorded due to illegal felling of trees.[1] There is lack of data on illegal tree felling and consequent loss of revenue. The revenue generated from seizure of illegal material is also not properly recorded by state forest departments. In addition, a significant amount of timber extraction still goes unrecorded.[2]

Moreover, the markets for wood-based industries, such as plywood and panel, and furniture, are highly unorganized, providing insufficient information on supply and consumption of wood within these sectors. Due to such gaps in the available information, the figures of production and consumption of wood in India are frequently under-reported.

To avoid confusion and to bring consistency in terms of information and data, the following information has been adopted and certain assumptions are made in this report:

1. As per ICFRE, TOF has been adopted. TOF is considered a larger subset and it includes agroforestry and farm forestry.
2. Therefore, all wood, including bamboo and excluding fuelwood, is considered 'timber' in this report, and not NTFP.
3. 'Orchards' are considered to be under agroforestry in this report.

There are certain assumptions/clarifications in the analysis of wood production capacity in India:

1. Average productivity of pulpwood plantations of 5 FDCs is 11.74 cum/ha/year, which is desirable for all FDCs.
2. Total area under natural forest (excluding FDC areas) which is producing nearly 3.12 million cum per year is assumed to continue producing at least this much of timber in future.
3. The annual timber production capacity from agroforestry and farm forestry is calculated to be 41.31 million cum assuming timber productivity of around 3.06 million cum of TOFs. It is assumed that some of the area under TOF is overlapped by the cultivable wasteland and total fallow land, hence the remaining TOF area is producing the rest of the timber i.e. 3.03 million cum.

The productivity of the cultivable wastelands and total fallow lands in India is assumed to be on a lower side with 1 cum per ha. If suitable reclamation technology and land use practices are applied, these unused lands can produce much more timber than this estimate.

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