Export and Import of Wood Products in India

Assessment of Demand and Supply of Timber, Fuel wood and Fodder in India (AICRP-12)Funding Agency: CAMPA, MoEF&CC, Govt. of India

National Project Coordinator: Dr. Rajiv Pandey
Principal Investigator: Dr. Shailendra Kumar
Co-Principal Investigator: Mr. Muthuprasad T.
Project Staff: Ms. Ankita Negi
Associate: Mr. Atul Kumar Saini

AICRP – 12 Working Paper Series – 1
Indian Council of Forestry Research & Education
(An Autonomous Body of Ministry of Environment, Forests and Climate Change)
Dehradun

Direction & Guidance

Director General, ICFRE
Deputy Director General (Admin), ICFRE
Assistant Director General (Admin), ICFRE

Scientific team

National Project Coordinator: Dr. Rajiv Pandey
Principal Investigator: Dr. Shailendra Kumar
Co-Principal Investigator: Mr. Muthuprasad T.
Project Staff: Ms. Ankita Negi
Associate: Mr. Atul Kumar Saini

Citation: Pandey, R., Kumar, S., Thiyaharajan, M., Negi, A., and Saini, A. K. (2024). *Export and Import of Wood Products in India.* AICRP-12 Working Paper Series-1. Indian Council of Forestry Research & Education (ICFRE), Dehradun, India

All India Coordinated Project

on

Export and Import of Wood Products in India

(AICRP-12 Working Paper Series-1)

Dr. Rajiv Pandey
(National Project Coordinator)

Indian Council of Forestry Research & Education
(An Autonomous Body under the Ministry of Environment, Forest and Climate Change)
Dehradun

2020-2025

Acknowledgements

We express our sincere thanks to Director General, ICFRE for her consistent motivation and guidance in bringing out the report on “Export and Import of wood products in India”.

The technical inputs and support of Deputy Director General (Administration) has facilitated to accomplish the report. The support of Assistant Director General (Administration) is also duly acknowledged. The project planning and critical inputs as per the evaluation of the project in the PEG meetings assisted us immensely in bringing out this report in a robust manner.

The technical support for conversion factor and uses of wood for various products by Dr Shailendra, Scientist – D, Forest Products Division, ICFRE-FRI, Dehradun is duly acknowledged. The modelling for import and export by Mr Muthuprasad T., Scientist – C, ICFRE is an important component of the report and is duly acknowledged. Data retrieval and tabulation and graphics support by Mr. Atul Kumar Saini and especially Mrs. Ankita Negi is notable and appreciable.

The data of international trade of the wood products in India is being compiled in the three Sections containing 99 Chapters of international trade commodities by Directorate General of Commercial Intelligence and Statistics (DGCIS). Details of quantity and value under trade for a total of 58 commodities of wood products from the seven chapters were extracted from the DGCIS for FY 2000-01 to FY 2021-22 and the support for secondary data is duly acknowledged.

The authors also acknowledge the support for funding to Compensatory Afforestation Fund Management and Planning Authority (CAMPA), Ministry of Environment, Forest and Climate Change (MoEFCC) for the Project titled “**Assessment of Demand and Supply of Timber, Fuelwood and Fodder in India (**AICRP-12)”.

We also whole heartedly acknowledge Mr. Anuj Tiwari and Mr. Rajeev for their support.

National Project Coordinator

Contents

List of Tables

List of Figure

List of Abbreviations & Symbols

$	:	Dollar
₹	:	Indian Rupees
ACF	:	Autocorrelation Function
AIC	:	Akaike Information Criterion
AICRP	:	All India Coordinated Research Project
AR	:	Autoregressive model
ARIMA	:	Autoregressive Integrated Moving Average Model
ARMA	:	Autoregressive Moving Average Model
B	:	Billion
BIC	:	Bayesian Information Criterion
CAGR	:	Compound Annual Growth Rate
CAMPA	:	Compensatory Afforestation Fund Management and Planning Authority
CIF	:	Cost, Insurance and Freight
Cr.	:	Crore
CUM	:	Cubic Meter
DGCIS	:	Directorate General of Commercial Intelligence and Statistics
ECM	:	Error Correction Model
FAO	:	Food and Agriculture Organization
FOB	:	Free on Board
FSI	:	Forest Survey of India
GDP	:	Gross Domestic Product
GoI	:	Government of India
HS Code	:	Harmonized System Code
IPIRTI	:	Indian Plywood Industries Research and Training Institute
IRW	:	Industrial roundwood
ITC	:	International Trade Classification or Indian Tariff Code
ITTO	:	International Tropical Timber Organization
kg	:	Kilogram
m	:	Million
MA	:	Moving Average Model
No.	:	Number
OEC	:	Organisation of Education Cooperation
PACF	:	Partial Autocorrelation Function
RWE	:	Round Wood Equivalent
ToF	:	Tree Outside Forests
UAE	:	United Arab Emirates
UNECE	:	United Nations Economic Commission for Europe
UNSD	:	United Nations Statistics Division
USDA	:	United States Department of Agriculture
WITS	:	World integrated Trade Solution

Executive Summary

- Goods for export and import in India have an eight-digit code called an Indian Trade Classification or Indian Tariff Code (ITC) termed as Harmonized System Code (HS code). The commodities wise details of export and import (quantity and value) are being managed by Directorate General of Commercial Intelligence and Statistics (DGCIS) in India.
- A total of 58 commodities of wood products distributed in seven chapters of HS Code are under import and export in India. These are Panels and Wooden Products (17 HS Code for Chapter 44: 4401- 4421); Pulpwood (04 HS Code for Chapter 47: 4703 - 4707); Paper & Paperboard (21 HS Code for Chapter 48: 4801- 4823); Printed Materials (08 HS Code for Chapter 49: 4901- 4911); Furniture (03 HS Code for Chapter 94: 9402- 9406); Sport Goods (03 HS Code for Chapter 95: 9503- 9506); and Miscellaneous (02 HS Code for Chapter 96: 9606 - 9609).
- The conversion factor for various wood products under trade was used to estimate the quantity of wood under trade in terms of Round Wood Equivalent (RWE). Conversion factor for various wood products under International trade in India for RWE was retrieved from the ITTO/FAO/UNECE conversion table. However, for the remaining wood products, which were not available, expert elicitation and quasi-theoretical constructs were used to derive the conversion factor.
- In FY 2021-22, the total quantity of approximately 60 Million CUM RWE of wood products was traded internationally with 46 m CUM RWE under import and 14 m CUM RWE under export.

  - Total quantity of India's import of wood products was 46 m CUM RWE in 2021-22.
  - Total quantity of India's export of wood products was 14 m CUM RWE in 2021-22.

- The import and export value for wood products in India during FY 2021-22 was ₹ 54730 Cr. and ₹ 36881 Cr., respectively, comprising of ₹ 91611 Cr. in international trade.
- The import and export value for wood products in India during FY 2021-22 was 7344 m US$ and 4948 m US$, comprising of 12292 m US$.

  - India's import of wood products was 7344 m US$ in FY 2021-22.
  - India's export of wood products was 4989 m US$ in FY 2021-22.

- The import quantity of wood products was increased from 0.6 m CUM RWE in FY 2000-01 to 46 m CUM RWE in FY 2021-22 with an increase in import value from ₹ 2123 Cr. in FY 2000-01 to ₹ 54730 Cr. and from 684 m US$ in FY 2000-01 to 7344 m US$ in FY 2021-22.
- The export quantity of wood products was increased from 0.1 m CUM RWE in FY 2000-01 to 14 m CUM RWE in FY 2021-22 with an increase in export value from ₹ 192 Cr. in FY 2000-01 to ₹ 36881 Cr. in and from 626 m US$ in FY 2000-01 to 4948 m US$ in FY 2021-22.
- The total exports from India were US$ 417.81 billion during FY 2021-22 with a surge of 43.18% and 33.33% in respect of exports during FY 2020-21 and FY 2019-20, respectively. However, the exports of the wood products were US$ 4.95 billion during 2021-22 with a surge of 54.29% and 55.35% in respect of FY 2020-21 and FY 2019-20, respectively.
- The total imports from India were US$ 610.22 billion during FY 2021-22with an increase of 54.71% and 28.55% in respect of exports during FY 2020-21 and FY 2019-20, respectively. However, the imports of the wood products were US$ 7.34 billion during 2021-22 with an increase of 48.25% and 7.16% in respect of FY 2020-21 and FY 2019-20, respectively.
- The trade deficit of the country was US$ 192.41 billion in FY 2021-22 with an increase of 87.48% in respect of FY 2020-21; however the trade deficit for the wood products was US$ 2.40 billion with an increase of 37.16% in respect of FY 2020-21.
- The proportions of exports of wood products with respect to total exports of the country are increasing with 1.18%; 1.10% and 1.02% in FY 2021-22; FY 2020-21 and FY 2019-2020, respectively.
- The proportions of imports of wood products with respect to total imports of the country are decreasing 1.20%; 1.26% and 1.44% in FY 2021-22; FY 2020-21 and FY 2019-2020.
- The international trade of wood products for both the import and export was inconsistent along the year during the last two decades.
- The increase in import of wood products was attributed to increase of import of pulpwood. However, in recent periods, the contribution of paper & paperboard and panels and wooden products has also been increased.
- In FY 2021-22, the major commodities of import of wood products were pulpwood (i.e. ₹ 25719 Cr. or 3451 m US$), paper & paperboard (i.e. ₹ 16883 Cr. or 2265 m US$), and panels and wooden products i.e. ₹ 9269 Cr. or 1244 m US$).

- The quantity of panels and wooden products imported was increased from 0.05 m CUM RWE in FY 2000-01 to 9 m CUM RWE in FY 2021-22.
- The quantity of pulpwood imported was increased from 0.4 m CUM RWE in FY 2000-01 to 30 m CUM RWE in FY 2021-22.
- The quantity of paper & paperboard imported was increased from 0.1 m CUM RWE in 2000-01 to 7 m CUM RWE in FY 2021-22.
- The increase in export of wood products was largely attributed to increase of export of paper & paperboard. However, in recent periods, the contribution of panels and wooden products, printing material and furniture have also been increased.
- In FY 2021-22, four major commodities of export of wood products were paper & paperboard (i.e. ₹ 23687 Cr. or 3179 m US$), furniture (₹ 7732 Cr. or 1045 m US$), printing material (₹ 2410 Cr. or 323 m US$), and panels and wooden products (i.e. ₹ 2360 Cr. or 316 m US$).
- The quantity of panels and wooden products exported was increased from 0.01 m CUM RWE in FY 2000-01 to 0.8 m CUM RWE in FY 2021-22.
- The quantity of printing material exported was increased from 0.002 m CUM RWE in FY 2000-01 to 0.5 m CUM RWE in FY 2021-22.
- The quantity of paper & paperboard export was increased from 0.1 m CUM RWE in FY 2000-01 to 13 m CUM RWE in FY 2021-22.
- The growth in terms of the quantity in RWE imported in FY 2021-22 was around 326% since FY 2005-06; around 211% since FY 2010-11 and 138% since FY 2015-16 and around 17% since FY 2020-21, however, the corresponding growth in terms of value (in ₹) was 471% since FY 2005-06; around 227% since FY 2010-11; 127% since FY 2015-16 and 148% since FY 2020-21.
- The growth in terms of the quantity in RWE exported in FY 2021-22 was around 919% since FY 2005-06; around 488% since FY 2010-11 and 393% since FY 2015-16 and around 142% since FY 2020-21, however, the corresponding growth in terms of value (in ₹) was 1063% since FY 2005-06; around 544% since FY 2010-11; 236% since FY 2015-16 and 161% since FY 2020-21.
- The annual decadal growth rate of quantity of import of wood products for FY 2021-22 with respect to FY 2010-11 was 11% with annual decadal growth rate in value (in ₹) was 12 % during the period.

- The annual decadal growth rate of export quantity of wood products for FY 2021-22 with respect to FY 2010-11 was 38% with annual decadal growth rate in value (in ₹) was 41 %.
- Trade deficit in term of quantity (in CUM RWE) and value (in ₹ Cr. and US$) was having increasing trend for FY 2000-01 to FY 2021-22 with reduced increase during later periods.
- The change in annual trade deficit for value was more or less consistent across the later period with range of increase or decrease to the tune of 10%.
- The trade deficit for quantity and value of wood products was 31.8 m CUM RWE and ₹ 23940 Cr. (2396 m US$) in FY 2021-22, respectively.

Annual decadal growth of India's export and import of wood products quantity was 38% and 11%, respectively during FY 2010-11 to FY 2020-21.

Abstract

- Wood products in international trade are distributed in nine chapters of three sections out of 21 sections containing 99 chapters of International trade commodities by DGCIS.
- Total of 58 major wood commodities are under international trade.

Wood products international trade in India is being compiled in the three Sections out of 21 sections containing 99 Chapters of international trade commodities by Directorate General of Commercial Intelligence and Statistics (DGCIS). The three sections containing wood products are distributed in seven chapters as Section IX dealing Wood and articles of wood charcoal, cork and articles of cork, manufactures of straw, of esparto or other plating material, basket ware and wickerwork under Chapter 44; Section X dealing Pulp of wood or of other fibrous cellulosic material recovered (waste and scrap) paper or paperboard, paper and paperboard and articles thereof under Chapter 47-49; and Section XX dealing Miscellaneous manufactured articles under Chapter 94-96. Details of quantity and value under trade for a total of 58 commodities of wood products from the seven chapters were extracted from the DGCIS for FY 2000-01 to FY 2021-22 for evaluation of import and export status and deficit. The unit of quantity for different wood products was in number of units, kg, ton and cubic meter depending upon the commodities. The value of wood products was reported in Indian Rupee (₹) and US$. The units of quantity of commodities were made uniform in terms of round wood equivalent (RWE) using conversion factors for each product. The conversion factors were primarily sourced from FAO/ITTO/UNECE publication, wherever available otherwise, for remaining commodities, the conversion factors were estimated based on either average size of the commodities or through peer learning or through quasi theoretical construct. The analysis resulted into the statistics of quantity and value for all considered wood products of all seven chapters under International trade in India for the year FY 2000-01 to FY 2021-22. The analysis results that the total quantity and value of wood products under International Trade for India are to the tune of 61.64 m CUM RWE and ₹ 91611 Cr., respectively with the import and export share of 76% and 24% for quantity; and 60% and 40% for FY 2021-22. The quantity of import of wood products in FY 2021-22 was 46.72 m CUM RWE with the worth of ₹ 54730 Cr. with export of 14.91 m

- Wood products are traded either in numbers or weight (kg or ton) or volume (in cum).
- Analysis of wood products is made in terms of round wood equivalent (RWE) using conversion factors for each product.

CUM RWE with the worth of ₹ 36880 Cr. The decadal growth of import from FY 2011-12 to FY 2021-22 was 212% for quantity (in m cum RWE) and 221% for the worth (value in ₹ Cr.) and the growth from FY 2015-16 to FY 2021-22 was 138% for quantity (in m CUM RWE) and 118% for the worth (value in ₹ Cr.). The decadal growth of export from FY 2011-12 to FY 2021-22 was 488% for quantity (in m CUM RWE) and 519% for the worth (value in ₹ Cr.) and from FY 2015-16 to FY 2021-22 was 393% for quantity (in m CUM RWE) and 236% for the worth (value in ₹ Cr.). The trade deficit for quantity of wood products in international trade was 31.81 m CUM RWE with an increasing trend during FY 2000-01 to FY 2021-22. However, the value deficit during the period for the trade was ₹ 23940 Cr. (2396 m US$). The increase in the imports of pulpwood along with the increase in paper & paperboard and panels and wooden products in recent period has led to a proportional increase in import of wood products directly. The increase in export of wood products was largely attributed to increase in the exports of paper & paperboard with increase in commodities of panels and wooden products, printing material and furniture during recent periods.

The decadal growth of international trade in India for the quantity (in m CUM RWE) of wood products was 212% and 488% for import and export, respectively during the FY 2011-12 to FY 2021-22.

Introduction

Natural landscapes are increasingly manipulated to meet the demand for timber and land use to accommodate increasing human population and expanding economies. Forest provides various valuable products apart from timber. Timber has direct use and indirect form (when products are sold after adding values to the timber) in various sector i.e. household, industrial, service and trade (export and import) sector. Timber production cannot keep pace with growing demand for timber in variety of end uses. Despite industrial and technological advancement for development of many new generation materials and products (like metals, plastics and cement), wood continues to be an indispensable material with several economically vital end use and applications. Wood is environmentally superior to other variants made from metals, plastics and cement because wood is recyclable, energy efficient and reduce greenhouse gases.

Wood is one the world´s most important renewable raw materials and being used in variety of purposes with new markets as wood construction, chemical industry and in textiles (FAO, 2022) with increasing use of wood resources by many industries as primary raw material (Hurmekoski, 2019). The demands lead to increasing the trade of wood products across globe to the tune of 143% between 1990 and 2019 largely due to economic growth (FAO, 2021). Moreover, wood products were the world's 17th most traded product out of 21 most traded products, with a total trade of $140B (0.84%) with major commodities as sawn wood, rough wood, plywood, wood carpentry, wood fiberboard, particle board, fuel wood, other wooden articles, shaped wood and veneer sheets among others. The top exporters of wood products in the world were China, Canada, Germany, Russia and United States and the top importers were United States, China, Germany, Japan and United Kingdom. Moreover, trade of wood products decreased by 2.29%, from $143B to $140B between 2019 and 2020, OEC reports. Global Forest Products Model forecast that primary processed wood products consumption would be 3.1 billion m³ round wood equivalents (RWE) in 2050 by an increase of 37 %compared to 2020. The additional demand for wood products to substitute non-renewable materials (mass timber and man-made cellulose fiber) may increase by up to 272 million m³ with expected increasing industrial round wood (IRW) demand by 0.5 billion to 0.9 billion m³ by 2050 compared to IRW in 2020 besides 199 million m³ for substitute for non-renewable materials (FAO, 2022).

- Wood products were the world's 17th most traded product out of 21 most trade products.
- Top exporters of wood products are China, Canada and Germany.
- Top importers of wood products are United States, China and Germany.

According to OEC, India was the 6th (currently 5th) largest economy in the world in terms of GDP (current US$), 18th position in total exports, 12th in total imports and 158th economy in terms of GDP per capita (current US$) in 2020. The top export commodities were refined petroleum ($25.3B), packaged medicaments ($17.8B), diamonds ($16B), rice ($8.21B), and jewellery ($7.57B), and were exported to United States ($49.7B), China ($18.5B), United Arab Emirates ($18.1B), Hong Kong ($9.18B), and Germany ($8.8B). However, the top commodities being imported from India are crude petroleum ($59B), gold ($21.9B), coal briquettes ($20.9B), diamonds ($15.8B), and petroleum gas ($13.8B), importing mostly from China ($64.2B), United States ($26.6B), United Arab Emirates ($22.1B), Saudi Arabia ($16.8B), and Iraq ($14.4B) in 2020. The World Integrated Trade Solution (WITS), a body of the World Bank reported that the total value of exports (FOB) and the total value of imports (CIF) of India is US$ 275489 million and US$ 367980 million, respectively with 4417 products from 224 countries and 4332 products from 211 countries are exported and imported, respectively in 2020 (WITS, 2023).

- Top imported commodities in India are crude petroleum, gold, coal briquettes, diamonds, and petroleum gas.
- Top exported commodities in India are refined petroleum, packaged medicaments, diamonds, rice and jewellery.

Although India is one of the world's top producers of tropical logs, it is also one of the world's largest consumers of wood products. India is one of the major users of wood in the Asia – Pacific region and till recently had the privilege of having abundance quantity of timber from several tropical hardwood species. However, import of IRW and other wood products are having an increasing trend with annual growth rate of 21% for a decade 1991-2002 with further increase on the face of increasing demand and static domestic supply of timber (Bansal, 2004). However, with growing population and economy, India cannot meet its own demand for wood products with domestic supply and hence is one of the top most importing countries of tropical woods, reports Timber Trade Portal. The increased urbanization, renovation work and growth in housing sector laid the increasing demand of wood and wood-based products in India. The increasing demand is being met through import besides the domestic production of wood (IPIRTI, 2021). India is a potential market for imported wood products with increasing trend for wood imports dominated by logs, however, the import of logs has been reduced to 48% in 2018 from 83% in 2007 due to increasing demand of other wood products (USDA, 2019). Moreover, the share of import of wood and wood product consumption in the country is about 23% in 2017, reports The High-level Expert Group on Agriculture (IPIRTI, 2021). India is the

43rd largest exporter and 22nd largest importer of wood products in the world with wood being the 19th most exported product ($581M) and 16th most imported product ($1.49B) in 2020.

The fastest growing import markets in wood products for India between 2019 and 2020 were Uruguay ($48.7M), Australia ($2.95M), and Liberia ($1.98M). The major exporters were US ($252M), UAE ($34.4M), Bhutan ($30.8M), German ($25.5M), and Netherlands ($22.6M) and the major importer countries were China ($203M), Malaysia ($194 M), Indonesia ($124 M), New Zealand ($104 M), and Germany ($62.10 M), OEC reports. Sawn wood, veneer sheets and wood panels are having increasing growth in import owing to increase demand in various sectors and limited availability of wood from domestic market. Moreover, the major imported wood species are meranti, teak, and pine with domestic farm and plantation timber species of teak, eucalyptus, poplar, spruce, pine, and fir (USDA, 2019). India's forest cover is 7, 13,789 km^2, and tree cover is 95,748 km^2. The spread of total forest and tree cover of the country is on 24.62% of the geographical area of the country with an increase of 0.22% (1,540 km^2) forest cover and 0.76 % (721 km^2) tree cover. Forest cover in the hill and tribal districts are distributed in 2, 83,104 km^2 (40.17 %), and 4, 22,296 km^2 (37.53 %) respectively. The top five states with increasing forest cover are Andhra Pradesh (647 km^2), Telangana (632 km^2), Odisha (537 km^2), Karnataka (155 km^2) and Jharkhand (110 km^2) (IFSR, 2021). The total growing stock of wood in the country is 6,167.50 mm^3 with 4, 388.15 mm^3 inside forest areas and 1,779.35 mm^3 outside recorded forest areas. The major species inside the forest with maximum contribution in total volume are *Shorea robusta* (10.87%), *Tectona grandis* (4.37%), *Pinus roxburghii* (4.12%), and *Terminalia tomentosa* (3.88%), whereas, the major species outside forests with maximum contribution are *Mangifera indica* (12.94%), *Azadirachta indica* (6.78%), *Madhuca latifolia* (4.65%) and *Cocus nucifera* (4.51%). In India, the processing of wood is generally in "unorganized" sector, where the majority of wooden furniture, joinery, and other household products are made though larger design firms are also upcoming in good way to meet the demand of wood and wooden products specially to serve both the export and growing domestic market for wood furniture and wood interior items (USDA, 2019). Timber Trade Portal reports that India has a thriving range of industries for semi-processed and value-added timber products, including wooden handicrafts, pulp and paper, plywood and veneer and wooden furniture. Moreover, increasing tourism and hospitality industry and residential building

India is the 43rd largest exporter and 22nd largest importer of wood products in the world.

Major imported wood species are meranti, teak and pine with domestic farms and plantation timber species of teak, eucalyptus, poplar, and spruce, pine and fir.

construction with emerging sector as Indian wooden handicrafts and furniture manufacturing has catalases the demand of wood products in the country. Therefore, several initiatives are considered to bridge the demand and supply of timber in the country. However, export is restrictive due to increasing certification requirements, is driving Indian trade for viable alternative hardwood species not only for domestic furniture and interiors market, but also for re-exports of value added products (handicrafts and tools) (USDA, 2019). Exports of wooden handicrafts in particular are on the rise, reports Timber Trade Portal.

The Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata, under the Ministry of Commerce, Government of India, is the official organization for collection, compilation and dissemination of India's Trade Statistics and Commercial Information following the recommendations of the United Nations Statistical Division (UNSD). DGCIS reports that during 2020-21, total export and import of India was ₹21, 59,043 Cr. and ₹. 29, 15,958 Cr., respectively with a decline by 2.74% and 13.24%, respectively from 2019-20 leading to an improvement in the Balance of Merchandise Trade. Moreover, studies are reported an increase of 70% in demand of round wood in India from 57 m CUM in 2020 to 98 m CUM in 2030, driven largely by the construction sector and rely heavily on imports (Kant and Nautiyal, 2021). However, annual wood production was 45.95 m CUM in 2011 with 93% from tree outside forests (ToF) (FSI, 2011). Analysis of import and export of wood products has not been made succinctly rather various agencies are evaluating the trade depending upon their objectives. Therefore, the statistics of international trade differs with various evaluations. Primarily the evaluation revolves around the increasing interest in understanding the trends in import and export of wood-based products due to their intricate linkages with the overall economic activity of the forestry sector (IPIRTI, 2021).

Existing Information and Gap in Knowledge

The Directorate General of Commercial Intelligence and Statistics (DGCIS) is official organization for collection, compilation and dissemination of India's International Trade Statistics.

The non-availability of precise information on wood products is primarily due to the variety of wood products in terms of nature, shape, size and quality under the trade. The wood products include those all products which have been either made of wood only or contained wood as material and traded in variety of shapes and sizes. The wood products have been classified in the trade statistics precisely under various chapters of a few sections of HS code. However due

to huge diversity in commodities of wood products in terms of type, shape and sizes, the actual quantity of wood used in the commodities cannot be ascertained and therefore cannot be reported or obtained, succinctly. Moreover, the unit of measurements of wood products differs with respect to the commodities and majorities of commodities are being measured either in numbers or weight basis (kg and tones) and volume. Therefore, the commodities of wood products have two aspects as first deals with the nature, type, shape and size and second deals with unit of measurements. The huge diversity led to complexities for deriving the actual quantity and value of wood in trade. Moreover, segregation of value of a commodity which contains wood partially is again a complicated issue. The issues restrict the actual evaluation of quantity and value of wood required for the trade.

The other aspect for trade statistics of wood products dealt with the non-inclusion of all wood products, which has been allocated under various chapters of HS Code, while evaluating the export and import of the commodities due to a complex process of deriving the actual data from DGCIS. Moreover, sometimes identification and inclusion of wood products are also not characterized precisely. Therefore, most of studies on export and import are limited to the major wood products, which are easy in identification under the international trade. Similar concerned is recited by others such as Bansal (2022), who highlighted that demand and supply gap of timber in the country could not be ascertained due to non-availability of reliable data on production and consumption of industrial round wood (IRW) at national and sub-national levels. However, demand for wood in 2020 was estimated to be 153 m CUM RWE with an annual increase of 8.5%, with domestic supply to the tune of 60 – 110 m CUM RWE (GoI, 1998).

The estimated demand for wood was 153 m CUM RWE with an annual increase of 8.5%, with domestic supply to the tune of 60 – 110 m CUM RWE (GoI, 1998).

Moreover, long term evaluation is lacking thereby providing limited understanding about the dynamics of the trends of the international trade of the commodities besides evaluating the trade deficit in terms of quantity of round wood required and value of the wood products under trade. These limitations restrict the future forecast and appropriate long term policy planning for the growth of the commodities.

Objectives

The gap in estimation was attempted to resolve by resolving the following objectives:

1. Assigning conversion factors for all wood products under international trade in India
2. Evaluation of international trade of wood products in India
3. Evaluation of trade deficit of international trade of wood products in India
4. Forecasting of India's import and export of wood products in India

Data Source

The data on international trade of wood products is maintained by the Directorate General of Commercial Intelligence and Statistics (DGCIS). DGCIS is the official organization under the Ministry of Commerce, GoI, for dissemination of India's Trade Statistics and Commercial Information. The detailed export and import trade data of Principal commodities and Countries are available on monthly basis for the year. DGCIS also provides corresponding data for the previous periods on yearly basis. The trade statistics by DGCIS is being provided for quantity and valuation. Quantity is being provided as standard unit of measurement on *net of packing* basis as per Customs Tariff Classification, An 8-digit Harmonised System Code (HS Code). Valuation in terms of Indian Rupee and US Dollar is being provided on '*free on board*' (FOB) basis for export and *recorded cost, insurance & freight* (CIF) basis for import (DGCIS, 2023). At present, the trade data is compiled at 8-digit ITC (HS) level covering around eleven thousand products and data is disseminated in the form of Commodity wise, Country wise, Port wise, Commodity by country wise, Country by commodity wise, Commodity by port wise, Port by commodity wise, and Port by country wise. Foreign trade data are captured on the basis of movements of goods across the custom frontier of India. The foreign trade statistics are released in three phases i.e. monthly quick estimate on fifteenth of the following month; principal commodity level data within 30 days; and detailed 8- digit commodity level data within 60 days.

- The data on international trade of wood products is maintained by DGCIS in India.
- Currently, the trade data is compiled at 8-digit ITC (HS) level covering around eleven thousand products.
- The trade data is disseminated as Commodity wise, Country wise, Port wise, Commodity by country wise, Country by commodity wise, Commodity by port wise, Port by commodity wise, and Port by country wise.

The export and import data of all commodities has been classified into twenty-one sections distributed in ninety nine chapters as per HS Code of India trade classification, 2017 (DGCIS). International trade of commodities of the wood products in India is being dealt in three sections out of a total 21 Sections distributed in 99 chapters by DGCIS. The three sections have seven chapters which deal the wood products (Table 1).

Table 1: Section wise description of various commodities of international trade in India

Section	Description	Chapters
I	Live animals, Animal products	01-05
II	Vegetable products	06-14
III	Animal or vegetable fats and oils and their cleavage products, prepared edible fats, animal or vegetable waxes	15
IV	Prepared food stuffs, beverages, spirits and vinegar, tobacco and substitutes	16-24
V	Mineral products	25-27
VI	Products of the chemical or allied industries	28-38
VII	Plastics and articles thereof, rubber and articles thereof	39-40
VIII	Raw hides and skins, leather, fur skins and articles thereof, saddler and harness, travel goods, handbags and similar	41-43
IX	Wood and articles of wood charcoal, cork and articles of cork, manufactures of straw, of esparto or other plating material, basket ware and wickerwork	44-46
X	Pulp of wood or of other fibrous cellulosic material recovered (waste and scrap) paper or paperboard, paper and paperboard and articles thereof	47-49
XI	Textiles and textile articles	50-63
XII	Footwear, headgear, umbrellas, sun umbrellas, walking sticks, eat sticks, whips, riding-crops and parts thereof, prepared feathers and articles made therewith, artificial flowers, articles of human hair	64-67
XIII	Article of stone, plaster, cement, asbestos, mica or similar materials, ceramic products, glass and glassware	68-70
XIV	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal, article thereof, imitation jewellery, coin	71
XV	Base metals and articles of base metal	72-83
XVI	Machinery and mechanical appliances, electrical equipment, parts thereof, sound recorders and reproducers, television image and parts of accessories of such articles	84-85
XVII	Vehicles, aircraft vessels and associated transport equipment	86-89
XVIII	Optical photographic, cinematographic measuring checking, precision, medical or surgical instruments and apparatus; clocks and watches; musical instruments; parts and accessories thereof	90-92
XIX	Parts and ammunition; parts and accessories thereof	93
XX	Miscellaneous manufactured articles	94-96
XXI	Work of art, collector's pieces and antiques	97-99

The three sections are: Section IX dealing Wood and articles of wood charcoal, cork and articles of cork, manufactures of straw, of esparto or other plating material, basket ware and wickerwork under Chapter 44; Section X dealing Pulp of wood or of other fibrous cellulosic material recovered (waste and scrap) paper or paperboard, paper and paperboard and articles thereof under Chapter 47-49; and Section XX dealing Miscellaneous manufactured articles under Chapter 94-96 (Table 2). The total number of wood products were 58 items, which was made of wood (Table 2). Chapter 45 contains cork and articles of cork, which was generally made of other than wood therefore was not included in the analysis of wood products. Commodity 'Of bamboo' was not considered for analysis from various commodities of panels and wooden products; pulpwood; paper & paperboard; printing materials and furniture.

Table 2: Wood based product description in International trade in India

Chapter No.-Title (Number of HS Code) *(Short Title)* *Number of commodities*	**Commodities**	**Unit**
Chapter 44 - Wood and articles of wood; wood charcoal (Number of HS Code-17) *(Panels and Wooden products) (Number of commodities-99)*	Fuel wood in logs; Chips or particles (4401); Wood Charcoal (4402)	Ton (2)
	Wood in the rough (4403); Plywood (4412)	Cum (2)
	Hoop wood (4404); Railway sleepers (4406); Sawn wood (4407); Veneer sheet (4408);Wood planed, tongued and moulded (4409) Particle board, OSB (4410); Fiberboard (4411); Casks, barrels and other coopers products (4416); Building, joinery and carpentry of wood including panels (4418); Tableware and kitchenware (4419); Wood marequetry and inlaid wood (4420); Other articles of wood (4421)	Kg (12)
	Packing cases, boxes, crates (4415)	No (1)
Chapter 47 - Pulp of wood of other fibrous cellulosic material; recovered paper or paperboard and articles thereof (Number of HS Code – 04) *(Pulpwood) (Number of commodities- 19)*	Chemical wood pulp, soda or sulphate (4703); Chemical wood pulp, soda or sulphite (4704); Pulp of fibers derived from recovered paper(4706); Recovered paper (4707)	Kg (4)
Chapter 48 - Paper and Paperboard; Articles of Paper Pulp, of Paper or of Paperboard (Number of HS Code-21) *(Paper &Paperboard) (Number of commodities-189)*	Newsprint (4801); Uncoated paper (4802); Napkin stock (4803); Uncoated kraft paper (4804); Other uncoated paperboard (4805); Vegetable parchment (4806); Composite paper (4807); Paper board corrugated (4808); Carbon paper (4809); Paperboard coated with kaolin (4810); Cellulose wading and webs of cellulose fibers (4811); Cigarette paper (4813); Wallpaper (4814); Carbon paper (4816); Envelopes, letter, postcard (4817); Toilet paper (4818); Cartons (4819); Registers, note books (4820); Paper labels of all kinds (4821); Bobbins (4822); Others paper (4823)	Kg (21)
Chapter 49 - Printed books, Newspaper, pictures and other products of the printing industry (Number of HS Code-08) *(Printing Material) (Number of commodities- 19)*	Printed book, brochures, leaflets (4901 excluding 49019100, 49019900); Children's coloring books (4903); Unused postage (4907); Printed or illustrated postcards (4909); Calendars (4910); Other printed material (4911)	Kg (6)
	Printed books, leaflets (4901); Newspapers, journals and periodicals (4902)	No (2)
Chapter 94 - Furniture; Bedding, Mattresses, Mattress supports, cushions and similar stuffed furnishing; lamps and lighting fittings , illuminated signs, illuminated name plates and the like; prefabricated building (Number of HS Code –03) *(Furniture) (Number of commodities-14)*	Seats (other than those of heading 9402); Other furniture (9403); Prefabricated buildings of wood (9406)	No (3)
Chapter 95 - Toys, Games and sports requisites; Parts and accessories thereof (Number of HS Code –03) *(Sport Goods) (Number of commodities-12)*	Dolls, other toys (of wood) (9503); Accessories for billiards, playing cards, carom board (9504); Sailboards and other equipment of sports (9506)	No (3)
Chapter 96 - Miscellaneous manufactured articles (Number of HS Code –02) *(Miscellaneous) (Number of commodities-04)*	Button of coconut shell (9606); Pencils, crayon, pencil leads, pastels (9609)	Kg (2)

Note: Panels and Wooden products (Chapter-44), Pulpwood (Chapter-47), Paper & Paperboard (Chapter-48), Printing Material (Chapter-49), Furniture (Chapter-94), Sport Goods (Chapter-95), and Miscellaneous (Chapter-96). This will remain same for all tables until not specified. No: Number; Ton: Tons; Cum: Cubic meter

This study uses a quantitative assessment of import demand and export supply of wood products primarily timber and fuel wood in India and achieved by the estimation of quantity and value of export and import of wood based product in the International Trade of India. The quantity of wood products would assess in term of cubic meter round wood equivalent (CUM RWE) and the value of wood product both in terms of Indian rupees as well as US dollars. The Commodities that included in major seven chapters pertaining to wood products are used to estimate the quantity and value of import (demand) and export (supply). Total number of commodities comprises 390 that distributed in various chapters such as panels and wooden product (99), pulpwood (19), paper & paperboard (189), printing material (19), furniture (19), sports goods (12), and miscellaneous wooden articles (04). The associated units in which the commodities of the chapters have been mentioned in the trade, has also been noted and recorded. The units, in which the identified commodities of seven chapters are traded, are in numbers, weights (kg and tons) and volume (CUM). The commodities have been divided into two parts as per the availability of the information in the DGCIS portals as '*Other'* and '*Non-other'* commodities. The 'Non-other' commodities includes all commodities, which are specified clearly in the chapter, however, the 'Other' commodities includes all commodities in the chapter, which are categories under '*others and other*' in the respective chapters (Table 2).

A total of 390 commodities are distributed in various chapters, namely, panels and wooden products, pulpwood, paper & paperboard, printing material, furniture, sport goods and miscellaneous.

The 'Non-other' commodities includes all commodities, which are specified clearly in the chapter, however, the 'Other' commodities includes all commodities in the chapter, which are categories under '*others and other*' in the respective chapters.

In the study, quantity and value of the commodities in the aforementioned chapters are used for the estimation of demand and supply of timber and fuel wood in trade sector. Time series data on quantities and values of wood products has been compiled for two decades i.e. from FY 2000-01 to FY 2021-22. Data on quantity of different commodities like panels and wooden products, pulpwood, paper & paperboard, printing material, furniture, sports goods, and other miscellaneous articles are given in different units such as metric ton, cubic meter and number. On the other hand, values of these products have been compiled in Indian Rupees and US dollars. The data for the identified commodities from the respective chapters for the period FY 2000-01 to FY 2021-22 were retrieved on monthly basis. The information about the quantity as per available unit in DGCIS portal and the value in terms of Indian Rupee (₹) and Dollar (US$) was recorded and noted on monthly basis for the period FY 2000-01 – FY 2021-22 (Fig 1).

Data Retrieval

The export and import data of wood product commodities is maintained by DGCIS. To extract the data for the two decades from the secondary source, the following steps were followed as given in Fig. 1.

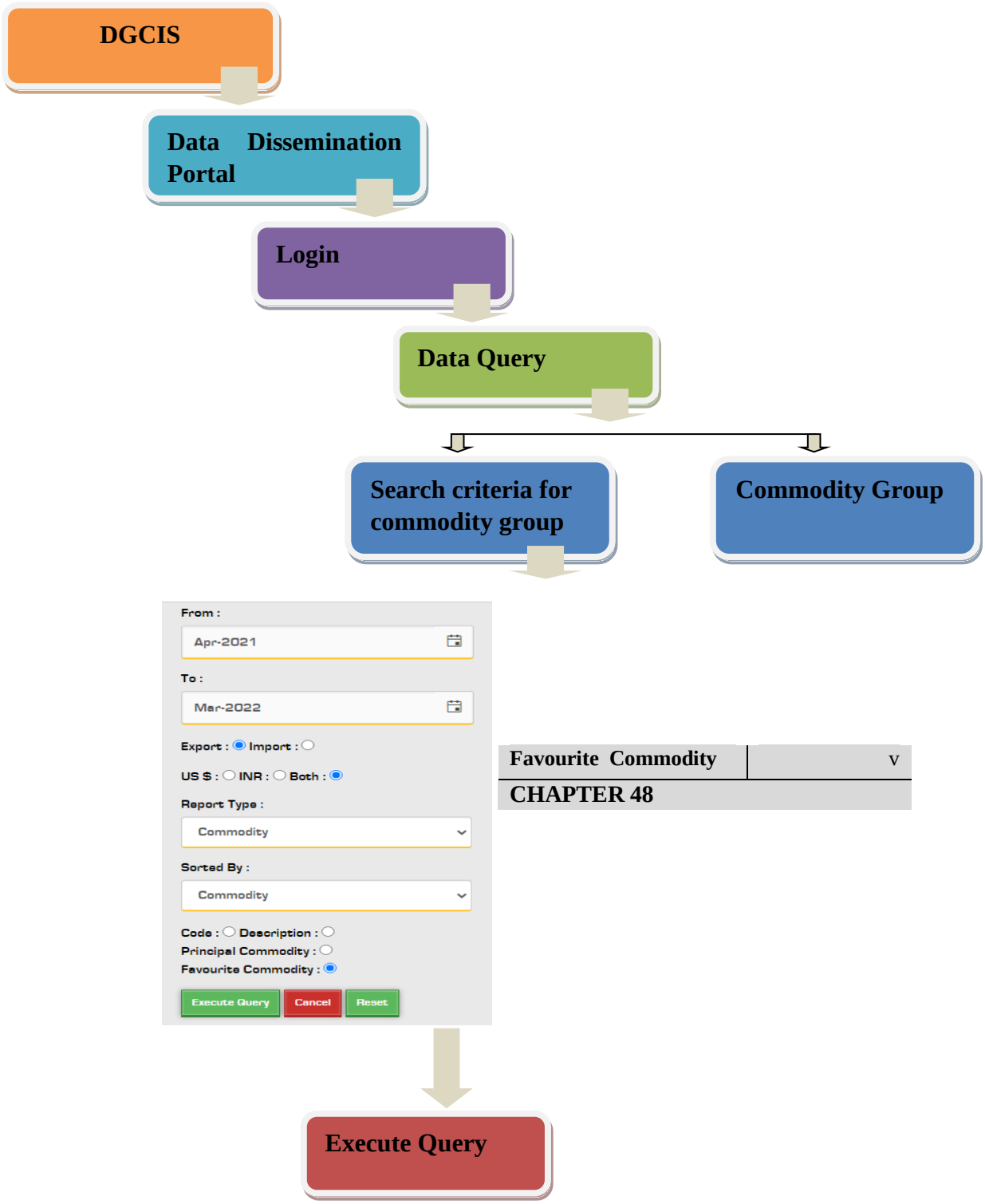


Fig 1: Systematic steps for downloading the trade data from DGCIS portal

The retrieved quantity data was in different units depending upon the *net of packing* basis depending upon the commodities.

Methodology for Conversion Factor

The wood products were traded in variety of units as number of units or in kg or in tons or in cum. Therefore, conversion factors for each exported and imported commodities were retrieved or estimated for each individual commodity under trade to maintain the uniformity in the data. The conversion factor was retrieved for conversion of all units into Round Wood Equivalent (RWE). Conversion factor has been derived from three major sources, i.e., based on "Forest Product Conversion Factor" report (FAO/ITTO/UNECE, 2020) (Source I), own estimate based on prior discussion with industry experts i.e. expert elicitation (Source II); and based on raw estimate of various items of that commodity (Source III). The term "forest product conversion factors" is used to convert a broad spectrum of ratios used in the wood based forest, using a known figure to determine or estimate an unknown figure via a ratio (FAO/ITTO/UNECE, 2020).The data on quantity of certain commodities under the different category of wood based articles such as cases boxes, crates drum and similar packaging cable drum; pallets, pallet and other load boards of wood; printed books; pamphlets, booklets, brochures; dictionaries and encyclopedias and serial installment; greeting card; advertising calendar; upholstered seats with wooden frame; cabinet ware; wooden furniture of kind used in kitchen, bedroom; dolls of wood; accessories of sport equipment such as table tennis, sailboard, water sport equipment, badminton, hockey sticks and blades, badminton etc. was reported and extracted in the given units i.e. in number, which has been converted into to cubic meter RWE using the conversion factors. Commodities such as saw logs, poles and pilling coniferous, coniferous NES, and other species wood logs etc were extracted in terms of either kg or tons therefore based on conversion factor, the weight of these commodities were converted into volume unit i.e. cum RWE is based on peer discussion and own expert knowledge. Various commodities such as fuel wood (in ton), wood chips in particles (cum), wood in rough (cum), sawn wood (cum), hop wood etc. coniferous (kg), wooden sticks, semi-finished for manufacturing of walking sticks (kg), wood wool, wood flour (kg), wood planes/tongued/grooved/ rebated etc but not molded (kg), densified wood (kg), wooden frames (kg), tools and tool bodies (kg), window French (kg), flush door (kg), building joinery (kg),

Conversion factor has been derived from three major sources, i.e., based on "Forest Product Conversion Factor" report (FAO/ITTO/UNECE, 2020) (Source I), own estimate based on prior discussion with industrialists and experts i.e. expert elicitation (Source II); and based on raw estimate of various items of the commodity (Source III).

tableware (kg), kitchen ware (kg), statuette and ornament of wood (kg), spools cops bobbins (kg), cloth hanger (kg), wood paving blocks (kg), match splints (kg), pencil slates (kg), décor articles (kg), and all other articles of wood etc. were converted from given units to CUM RWE based on FAO/ITTO/UNECE, 2020 report.

Data Analysis

The trade statistics of wood products are being discussed for section IX dealing Wood and articles of wood charcoal, cork and articles of cork, manufactures of straw, of esparto or other plating material, basket ware and wickerwork under Chapter 44 to 46; and section X dealing Pulp of wood or of other fibrous cellulosic material recovered (waste and scrap) paper or paperboard, paper and paperboard and articles thereof under Chapter 47-49. Chapter wise annual quantity and value (₹ and US$) were compiled. The quantity was compiled as per original units for each commodity on annual basis. The annual quantity was converted into RWE as per conversion factor. Based on the conversion, chapter wise round wood equivalent (RWE) and value of the products in Indian Rupee in Crore (in ₹ Cr.) and US$ along with other and non-other categories of international trade are estimated and reported. The details of international trade for supply (import) and demand (export) is being elaborated separately in subsequent paragraphs. Chapter wise distribution of individual year across the time period was estimated and reported along with total. Chapter-wise proportional contribution of quantity in cubic meter round wood equivalent (CUM RWE) and value in ₹ in cr. and in millions US Dollar (m US$) of wood products in import and export was also estimated and presented.

Category wise distribution of the wood products was also estimated on total basis for quantity and value for signifying the importance of well identified (categorized) units vs unidentified units. Moreover, growth statistics in terms of quantity and value was also estimated for various periods i.e. on the basis of 2005; 2010; 2015 and 2020 to understand the growth paradigm. The analysis also includes the annual growth for both i.e. quantity and value. The annual growth was estimated in proportion by dividing the quantity or value of a unit for the current year by the respective quantity or value of the unit in last year and subsequently multiplying the ratio by 100. Trade deficit (export and import) was also estimated for quantity and value of import and export. A country has a trade deficit when the value of imports exceeds the value of exports during a specified period. In other words, when the balance between exports and imports becomes skewed, a country can find itself in a trade surplus or trade deficit (WEF, Glossary).

Compound Annual Growth Rate (CAGR) is the mean annual growth rate of an investment over a specified period of time longer than one year and is represented as below:

$$CAGR = ((BV/EV)^{1/n} - 1) \times 100$$

where: *EV* = Ending value; *BV* = Beginning value; *n* = Number of years

However, for inclusion of trend across the period, the compound annual growth rate for the export and import data for the period of 2001-2021 was also calculated using the following method (Swant,1997):

$$Q = ab^t$$

$$\ln Q = \ln a + t \ln b$$

$$ln\ Q = \alpha + \beta\ t$$

$$CAGR = ((exp.\beta - 1) * 100)$$

Q is Annual Export or Annual Import Quantity and t is time period.

Modelling India's import and export of wood products

ARIMA Model for was applied for modelling the India's import and export of wood products. Detailed description is being discussed in subsequent paragraphs.

Autoregressive model (AR): In autoregressive model, the explanatory variable is lag of dependent variable.

$$y_t = c + \beta y_{t-1} + \varepsilon$$

Moving Average model (MA): Moving average in the ARIMA model considers the influence of the current error term (e_t) and weighted average of lagged error terms on the value of the time series variable at time t (y_t).

$$y_t = c + \varepsilon_t - b_1\varepsilon_{t-1} - b_2\varepsilon_{t-2} - \cdots - b_q\varepsilon_{t-q}$$

$$c - constant\ \ b_j - parameter\ of\ the\ moving\ average$$

$$\varepsilon_{t-k} - \text{ Error term at time t} - \text{k period}$$

Autoregressive Moving Average model (ARMA): A combination of the Autoregressive model and Moving average model are known an Autoregressive Moving Average model (ARMA). This model can be applied with stationary data.

Autoregressive Integrated Moving Average model (ARIMA): If data is not stationary, then the ARIMA model is applied into a differenced series (Box& Jenkins, 1970).

$$y_t = c + \beta y_{t-1+}\varepsilon_t - b_1\varepsilon_{t-1}$$

Steps in ARIMA

1. Checking for Stationarity: Stationarity is defined as constant mean and variance over a period. In time series data, the prime condition of stationarity is tested either through the Dickey-Fuller test, the Augmented Dickey-Fuller test, or the Phillip-Pheron test. In the present case, the Dickey-Fuller test was used to test the stationarity (Dickey& Fuller,1979)
2. Visualising ACF and PACF: ARIMA consist of three parameters/components, p, d and q, where p is the order of the AR component; d is the level of differencing to make the series stationary, and q is the order of the Moving Average.
    - To identify the order of the AR component (p), the Partial Autocorrelation Function (PACF) for the stationary series can be visualized, in which the number of significant spikes indicates the order of the AR component. Partial Autocorrelation indicates the correlation between Y_t and Y_{t-k} after removing the effect of all other lags. The partial autocorrelation at all the lags makes up the Partial Autocorrelation Function (PACF).
    - The d value is the level of differencing in which the data changes from non-stationary to stationary
    - To identify the order of the MA component (q), the autocorrelation function for the stationary series can be visualized, in which the number of significant spikes indicates the order of the MA component. Autocorrelation is defined as the correlation between the time series variable and its lagged variable. The autocorrelation at all the lags makes up the Autocorrelation Function (ACF).
3. Running and selecting the models: Models identified using the steps can be estimated, and model selection is made based on the criterion as Akaike's Information Criterion (AIC) (Akaike,1974) or Bayesian Information Criterion BIC (Brockwell &Davis,2002). The model with the lower AIC or BIC is considered.

$$AIC = -2 \log likelihood + 2m$$

$$BIC = -2 \log likelihood + \log(n) * m$$

   Where n is the number of samples and m is the number of parameters in the model
4. Residual Diagnostics: For the selected model, the residuals will be predicted and tested for white-noise. For this purpose, the portmanteau test would be applied, where the null hypothesis says the residuals are white noise. The formula for the Ljung-Box test is given below (Ljung & Box,1978)

$$Q = n(n+2)\sum_{k=1}^{h}[n-k]^{-1}r_k^2$$

Once the residuals follow white noise, then forecasting can be made; otherwise, ARCH or GARCH has to be employed.

5. Forecasting using the selected model:
   With the help of the selected models, forecasting can be made.

Co-integration analysis

The two regressed non-stationary time series data may lead to spurious regression, resulting in a biased coefficient (Granger & Newbold, 1974). The same can be evaluated by the co-integration analysis. When the two data series are not originally stationary but attain the stationary condition at the same level of differencing I(k) and if their linear combination stationary at the level I(k-1), then the series are said to be cointegrated (Engle & Granger, 1987). The OLS parameter of cointegrated series is said to be the cointegration parameter and exhibits the long-run association between both the variables.

$$y_t = a + bx_t + u_t$$

Where b is said to be a cointegrated parameter if

(i) y_t and x_t are not originally stationary, and upon differencing, both attain stationarity at the same level I(k)

(ii) u_t is stationary at I(k-1)

The above procedure will delineate the long-run relationship to understand the short-run dynamics for the Error Correction Model (ECM).

$$\Delta y_t = \alpha + \rho(y_{t-1} - bx_{t-1}) + \beta(\Delta x_t) + u_t$$

Where ρ is the error correction term and is always negative. Technically, ρ indicates the speed of adjustment of the independent variable to the dependent variable (Engle & Granger, 1987).

Relationship with Contextual Variables

To identify the factors affecting India's export of wood products, two contextual factors—price and growing stock of forests—were chosen for modelling India's import of wood products,

while three factors: price, per capita income, and population, are considered and detailed below.

Price: The price has been estimated by dividing the value of the quantity of exports by the quantity of India's export of wood products in terms of Rupees. This price was included in the model, considering the law of supply, i.e., when the price in the international market increases, India should export more, while ceteris paribus.

Growing Stock: An increase in production may positively affect the export, therefore growing stock of the forests is considered an explanatory variable.

Per Capita Income: Import is derived from the local demand, whereas local demand is affected by the income of the people, i.e. income demand. Therefore, the per capita income of the country was considered as an explanatory variable. The per capita income was obtained in the 2011-12 base period, in some cases base period was 2004-05, which was converted into 2011-12 using splicing.

Population: The demand for commodities increases with an increase in population. Moreover, if demand increases, the need for imports also increases, provided local supply is limited. Considering this, the population was included in the model.

Analysis of International Trade in India

The details of conversion factor for various items of wood products, which was identified for wood products of International trade in India for different chapters of HS Code has been searched across various literature to convert all units in CUM RWE. The remaining items of the wood products were identified and discussed among peers, which includes industry experts, managers of wood based industries, wood science experts and wood products businessmen. Still, conversion factors for many wood based items could not be assigned for conversion factor therefore conversion factor for those remaining items were extracted based on experimentation and quasi theoretical constructs. The conversion factors of all items of wood products being International trade were extracted and are reported in Annexure 1- 7.

Temporal Data Analysis of Import of Wood Products

The chapter wise quantity analysis reflects that in FY 2000-01, the supply of commodities falling under pulpwood, paper & paperboard, printing material was high along with panels and wooden products. However, with passage of time, quantity under printing materials was decreased and quantity under wooden articles was increased. The trend was more or less consistent across the later period with pulpwood and paper & paperboard were the major item imported (Table 3).

The proportion analysis reflects that Chapter 47 i.e. pulpwood has maximum contribution in the total share of quantity of import of wood based product followed by Chapter 48 (Paper and Paperboard), Chapter 44 (Wood and article of wood; wood charcoal) and Chapter 49 (Printed books, Newspaper, pictures and other products of the printing industry) almost across the period of evaluation. On the other hand, there is minimum contribution of Chapter 94, Chapter 95, and Chapter 96 (approximately 0 to 1 percent) in the total quantity. The analysis showed that share of chapter 44 i.e. panels and wooden products varied from 1 to 30 percent during the period, while, share of chapter 47 i.e. pulpwood varies from 23 to 96 percent during the period (Fig 2).

The maximum share of total import quantity of wood products was pulpwood followed by paper & paperboard, panels and wooden products, and printing material.

Table 3: Chapter-wise imports of wood products quantity (in CUM RWE)

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	56315.01*	454626.81*	106444.29	30444.47	35.52	743.05	244.14	648853.29
2001-02	72326.21	5172701.07	117503.59	25741.20	47.93	636.43	601.34	5389557.76
2002-03	218847.52	5933651.77	158711.87	23819.36	73.69	980.09	255.37	6336339.67
2003-04	1507349.70	5769420.90	3616044.54	39852.89	1238.58	49.70	1526.69	10935483.01
2004-05	2728455.37	6803446.97	3446303.36	50028.58	1778.55	108.05	1354.30	13031475.17
2005-06	2747632.51	7901544.30	3606758.81	63194.54	2896.61	125.28	2320.80	14324472.84
2006-07	2452172.48	7788327.41	4078157.85	70658.65	2801.93	131.24	1304.83	14393554.39
2007-08	2435791.82	7320291.47	4256814.70	74545.91	3875.13	210.30	3633.59	14095162.91
2008-09	5245701.87	8589544.47	5255270.47	103188.00	3363.96	287.31	9327.46	19206683.54
2009-10	6124604.51	10133618.80	5006587.72	64134.90	3885.72	489.86	9339.27	21342660.77
2010-11	5678064.86	9431311.22	6832266.85	86213.38	5086.36	752.69	14139.94	22047835.29
2011-12	7598198.04	11435818.51	8031867.50	72582.64	8916.04	1518.80	4556.13	27153457.66
2012-13	7759017.80	11734402.99	7486267.34	56742.61	5889.89	803.96	6002.33	27049126.91
2013-14	8765728.74	12980931.07	8235676.43	60602.37	6838.04	1126.29	3072.14	30053975.09
2014-15	8864292.00	15329694.63	8443473.09	60979.80	8084.64	1114.86	8337.96	32715976.97
2015-16	8273477.84	15949125.22	9482680.72	61724.42	11096.46	1455.09	4333.87	33783893.62
2016-17	7366218.08	16496585.64	14435694.53	45849.22	6359.79	5204.45	4457.81	38360369.53
2017-18	7702802.63	19615220.35	10993628.56	64662.62	15672.65	2591.95	8748.64	38403327.41
2018-19	6124604.51	28163827.00	10211287.08	58008.27	4890.89	3296.43	7710.20	44573624.38
2019-20	6478098.22	30083684.97	11495187.43	36612.08	5901.37	3514.98	7060.04	48110059.09
2020-21	5374523.48	27248963.85	6997304.07	34653.77	4609.53	5025.15	2207.44	39667287.29
2021-22	9110313.26	30310585.08	7246648.52	45185.04	4683.35	6632.23	4151.23	46728198.70

*As per the data from the site.

The total quantity of import of wood products for FY 2021-22 was 46 m CUM RWE. All categories of wood products have increasing trend in terms of quantity for the import.

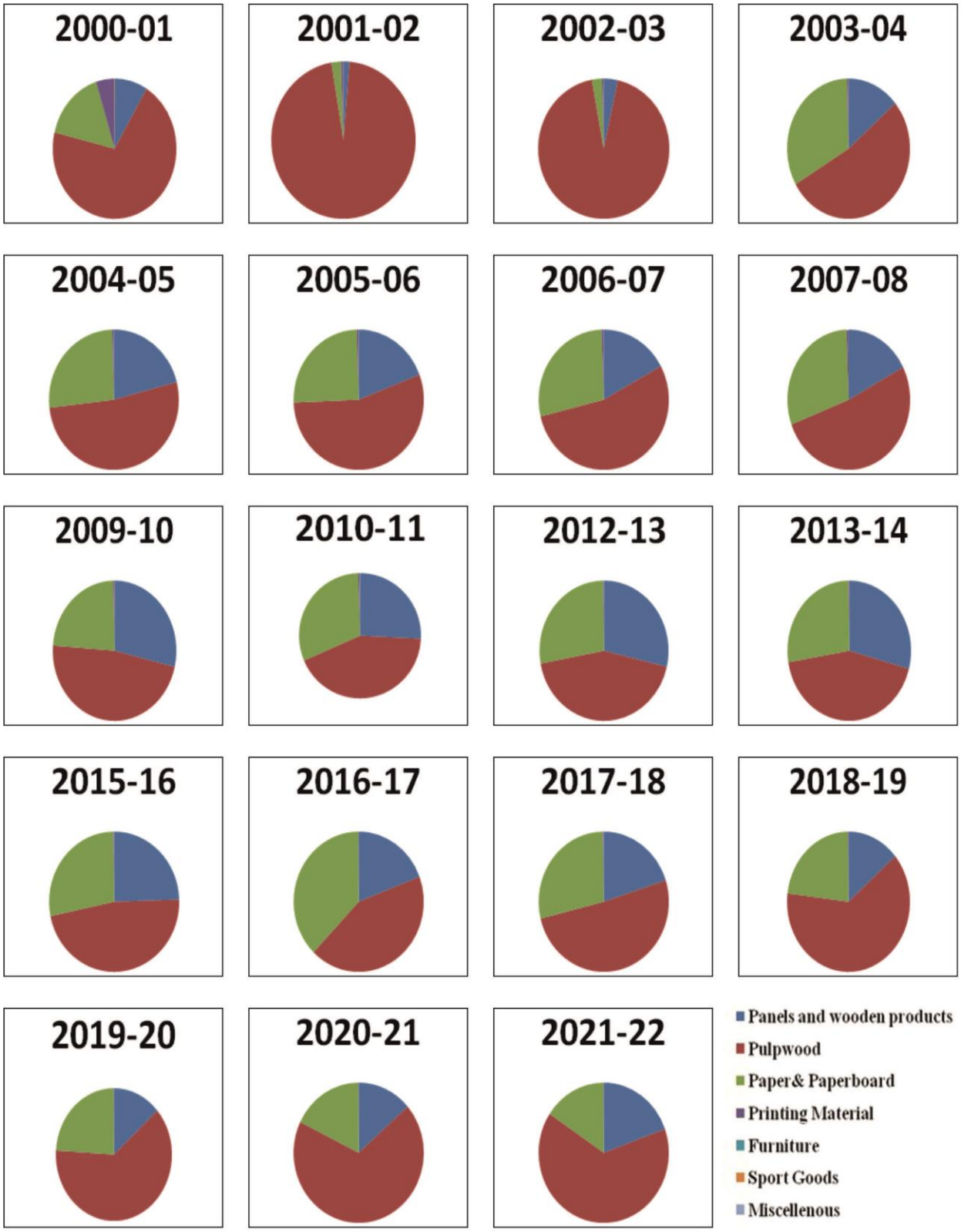


Fig 2: Chapter-wise proportional contribution of quantity (in CUM RWE) of wood products in import

The chapter wise analysis of value in Indian rupee showed that import of wood products has been increased from 2000 cr. to 55000 cr. from FY 2000-01 to FY 2021-22. The increase in trade was largely attributed to increase of pulpwood supply worth from 300 cr. in FY 2000-01 to 25000 cr. in FY 2021-22. In recent periods, the larger value of import is due to pulpwood, paper &paperboard and panels and wooden products (Table 4).

Table 4: Chapter-wise import value (in ₹ Cr.) of wood products

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	1394.12	309.71	122.93	290.27	18.50	4.23	1.65	2141.42
2001-02	1563.65	1405.25	145.06	224.88	26.77	4.10	3.20	3372.90
2002-03	1031.14	1659.87	186.71	291.51	44.46	5.87	2.96	3222.52
2003-04	2929.93	1736.41	2623.89	615.87	119.75	11.00	11.58	8048.41
2004-05	3876.00	2199.46	3070.62	611.76	210.25	14.19	14.64	9996.92
2005-06	3920.82	2537.15	3922.50	843.88	362.17	24.94	16.60	11628.06
2006-07	4459.75	2892.67	5119.33	795.10	683.25	45.47	16.92	14012.49
2007-08	4766.75	2880.36	4871.85	838.22	745.53	26.19	19.16	14148.06
2008-09	6174.88	3705.80	7622.22	1060.09	945.75	41.75	32.68	19583.16
2009-10	7593.05	4177.49	6573.45	1036.55	946.32	63.37	37.01	20427.23
2010-11	7617.57	5205.12	8698.40	1715.08	1378.47	91.86	45.17	24751.67
2011-12	12042.08	3473.53	11278.62	1382.44	1826.72	207.63	39.48	30250.49
2012-13	14547.11	6988.36	11994.32	1741.52	2008.05	248.34	53.39	37581.09
2013-14	15850.83	8375.10	14517.65	2621.53	2020.44	190.63	40.75	43616.93
2014-15	15882.13	10319.27	15801.79	1668.06	1996.61	182.81	73.48	45924.14
2015-16	15374.49	10692.10	16204.57	1594.77	2092.48	243.83	36.39	46238.64
2016-17	13358.88	11082.19	18160.99	1046.02	2206.32	243.55	34.60	46132.55
2017-18	9538.72	13585.04	19511.75	1098.30	2430.84	383.17	53.21	46601.04
2018-19	9296.49	18314.87	21646.00	1210.39	2741.23	412.36	58.06	53679.41
2019-20	8944.88	16529.40	19231.47	1069.33	2397.89	376.63	46.01	48595.60
2020-21	7118.94	14558.19	13096.16	636.95	984.09	300.17	27.95	36722.45
2021-22	9269.83	25719.96	16883.27	796.27	1617.99	394.78	48.20	54730.30

The total value of import of wood products in Indian Rupees for FY 2021-22 was 54730 crores with increasing trend in value with years.

In term of value (in ₹), there is slightly different patterns followed by the chapters in the total share of import of wood based products. Chapter 44, chapter 48 and chapter 47 have maximum contribution while chapter 94, chapter 95, and chapter 95 have minimum contribution in the total value of import of wood based products. The share of chapter 44 was varied mostly i.e. from 14 to 46% since FY 2000-01 to FY 2021-22 (Fig 3).

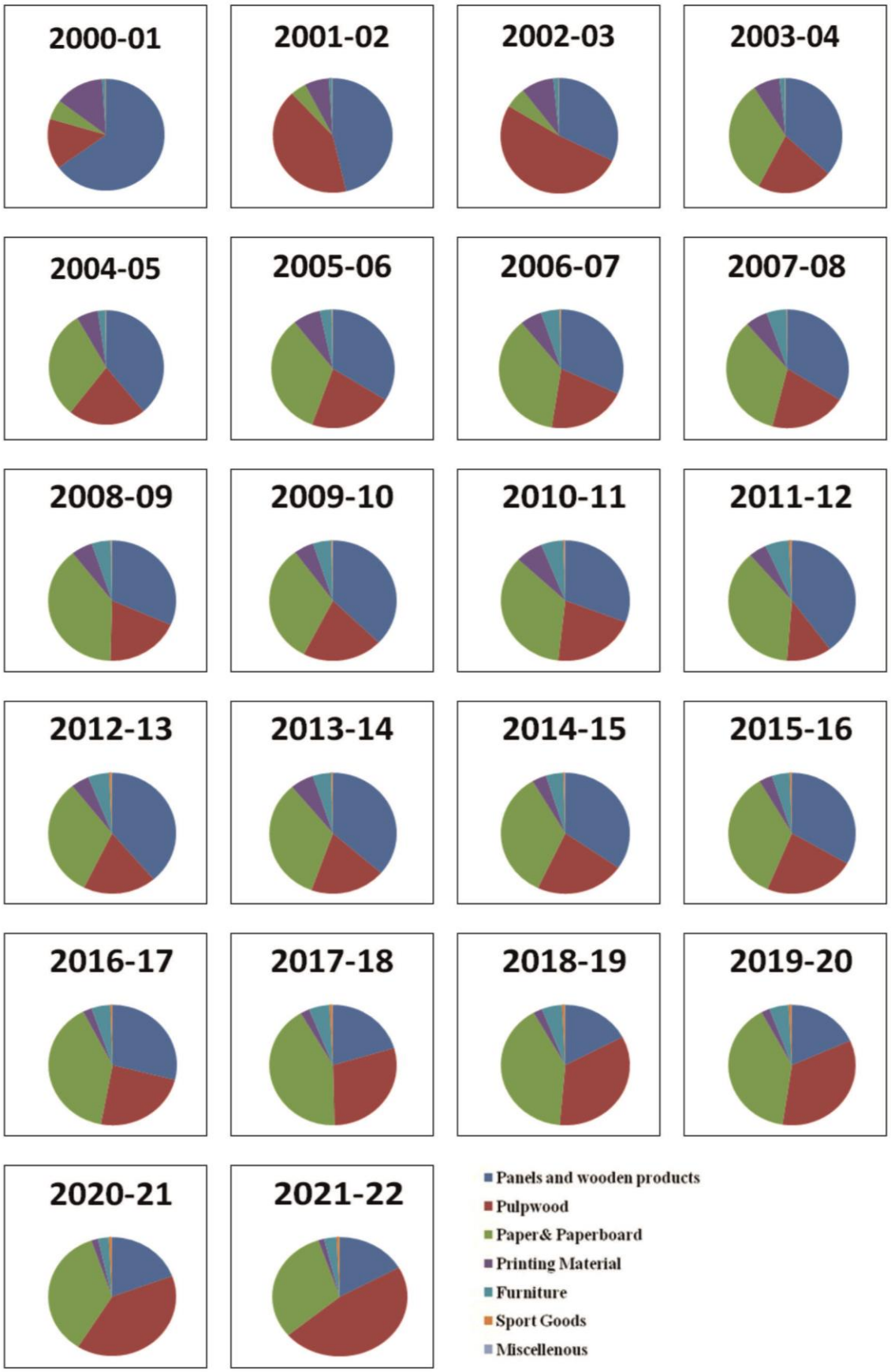


Fig 3: Chapter-wise proportional contribution of value (in ₹ Cr.) of wood products in import

The total import in US $ was increased many folds i.e. from 684 m US$ to 7344 m US$ during the period from FY 2000-01 to FY 2021-22. The import was maximum to the tune of 7740 m US$ during the period FY 2018-2019 and decreased subsequently till FY 2020-2021 and increased in FY 2021-2022 (Table 5).

Table 5: Chapter-wise import value (in m US$) of wood products

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	304.84	282.77	26.93	63.66	4.04	2.01	0.36	684.61
2001-02	328.23	294.41	30.38	47.17	5.61	2.09	0.67	708.55
2002-03	213.20	342.82	38.63	60.14	9.21	1.81	0.61	666.42
2003-04	637.20	377.57	571.29	134.33	26.10	2.28	2.52	1751.30
2004-05	862.10	489.32	683.21	136.46	46.92	3.79	3.26	2225.05
2005-06	883.88	573.34	886.07	190.52	81.68	4.77	3.75	2624.00
2006-07	987.18	639.28	1129.08	175.51	151.33	4.52	3.75	3090.65
2007-08	1184.23	714.93	1209.53	208.74	185.38	5.16	4.75	3512.73
2008-09	1363.85	812.76	1670.74	233.91	207.53	6.31	7.11	4302.21
2009-10	1605.92	883.39	1388.63	218.94	200.23	9.54	7.82	4314.48
2010-11	1669.56	1144.08	1910.04	377.46	302.45	20.23	9.91	5433.72
2011-12	2510.89	726.72	2356.48	287.52	380.33	42.93	8.21	6313.09
2012-13	2671.75	1284.81	2204.10	319.64	368.95	45.49	10.02	6904.77
2013-14	2627.34	1384.65	2394.23	428.17	332.97	31.43	6.73	7205.52
2014-15	2602.17	1687.13	2586.03	271.09	326.43	29.88	11.98	7514.70
2015-16	2349.05	1632.65	2475.71	243.69	319.31	37.20	5.56	7063.19
2016-17	1991.35	1652.67	2707.27	155.95	328.86	36.30	5.16	6877.57
2017-18	1479.77	2167.50	3027.43	170.41	377.25	59.44	8.25	7290.06
2018-19	1381.40	2628.43	3098.40	173.29	391.99	59.12	8.33	7740.97
2019-20	1264.53	2335.52	2719.15	151.03	338.81	38.30	6.51	6853.85
2020-21	961.99	1966.64	1764.55	86.15	133.00	38.11	3.77	4954.21
2021-22	1244.63	3451.17	2265.66	106.85	217.05	52.97	6.45	7344.73

The total value of import of wood products in US$ for FY 2021-22 was 7344 million. Maximum contribution of total value of import of wood products was pulpwood followed by paper & paperboard, and panels and wooden products.

The share of quantity and value of wood based products were categories into other and Non-Other. Non-Other category is defined as commodities under codes whose articles of wood are specified, While Other categories includes the commodities under codes whose articles are not specified. There is variation in the pattern of other and non-other category in term of quantity and value of wood based product. The categorized wood products under other and non-other categories showed that the share of commodities under '*other*' are around 5 to 10% across the FY 2000-01 to FY 2021-22, however, on value basis the share ranges from 6.2 to 14% with a decreasing trend in subsequent years (Table 6).

Table 6: Category-wise quantity and value (in ₹ Cr.) of wood products in import

Year	Quantity (in CUM RWE)		Quantity (%)		Value (%)	
	Other	Non-Other	Other	Non-Other	Other	Non-Other
2000-01	33913.59	614939.70	0.05	0.95	0.62	0.38
2001-02	40822.94	5348734.82	0.00	1.00	0.45	0.55
2002-03	96079.56	6240260.11	0.01	0.99	0.29	0.71
2003-04	1008403.96	9927079.04	0.07	0.93	0.30	0.70
2004-05	1397651.81	11633823.36	0.07	0.93	0.28	0.72
2005-06	1426713.99	12897758.86	0.07	0.93	0.25	0.75
2006-07	1391915.25	13001639.14	0.07	0.93	0.27	0.73
2007-08	1411465.50	12683697.41	0.08	0.92	0.30	0.70
2008-09	2498072.45	16708611.09	0.10	0.90	0.21	0.79
2009-10	2760829.43	18581831.35	0.09	0.91	0.24	0.76
2010-11	2862378.90	19185456.40	0.10	0.90	0.22	0.78
2011-12	3678015.97	23475441.68	0.10	0.90	0.29	0.71
2012-13	3655719.93	23393406.98	0.10	0.90	0.28	0.72
2013-14	4099547.98	25954427.11	0.10	0.90	0.24	0.76
2014-15	4161983.45	28553993.52	0.09	0.91	0.26	0.74
2015-16	4107028.51	29676865.11	0.09	0.91	0.27	0.73
2016-17	4482755.91	33877613.62	0.09	0.91	0.26	0.74
2017-18	4124734.83	34278592.57	0.08	0.92	0.19	0.81
2018-19	3479736.07	41093888.31	0.07	0.93	0.16	0.84
2019-20	3776639.78	44333419.31	0.06	0.94	0.18	0.82
2020-21	2783344.94	36883942.35	0.05	0.95	0.16	0.84
2021-22	4079894.70	42648304.00	0.06	0.94	0.14	0.86

Almost 90% share of wood commodities covered by 'Non-Other' category in the total import commodities of wood products.

The percent growth in FY 2021-22 was evaluated on five year basis to adjudge the trend and growth on five year basis. The growth in terms of the quantity in RWE in FY 2021-22 was around 326% since FY 2005-06; around 211% since FY 2010-11 and 138% since FY 2015-16 and even more than 17% in last two years. In terms of the value, the growth was 471% since FY 2005-06 and 148% since FY 2021-22 in terms of Indian rupee and similar trend with low in growth proportion as observed for US $ also (Table 7).

Table 7: Percent growth and Compound Annual Growth Rate (CAGR) in import of wood products since different time period in FY 2021-22

Year	Percent Growth			Compound Annual Growth Rate (CAGR)		
	Quantity (CUM RWE)	Value (₹ Cr.)	Value (m US$)	Quantity (CUM RWE)	Value (₹ Cr.)	Value (m US$)
2005 - 2022	326.21	470.67	279.09	7.80	10.51	7.27
2010 - 2022	211.94	221.12	135.17	6.74	8.56	4.53
2015 - 2022	138.31	118.37	103.99	5.22	2.54	-0.33
2020 - 2022	117.80	149.04	148.25	-1.44	6.12	3.52

- The percent growth in terms of the import quantity in RWE in FY 2021-22 was around 326% since FY 2005-06; around 211% since FY 2010-11 and 138% since FY 2015-16 and even more than 17% in last two years.
- The Compound Annual Growth rate (CAGR) in terms of the import quantity in RWE in FY 2021-22 was around 7% since FY 2005-06; around 6% since FY 2010-11 and 5 % since FY 2015-16.
- CAGR for the quantity imported in last two year is decreased by 1%.

The annual growth in import for quantity in terms of RWE and value in terms of ₹ and US$ was mostly on increasing trend except the period of COVID 19 impact periods. The annual growth in the import of wood products was more or less between 10 to 20% during FY 2000-01 to FY 2021-22 for quantity and values both (Table 8).

Table 8: Annual growth in import quantity and value of wood products (in %)

Year	Percentage change in Quantity	Percentage change in Value
2001-02	730.63	57.51
2002-03	17.57	-4.46
2003-04	72.58	149.76
2004-05	19.17	24.21
2005-06	9.92	16.32
2006-07	0.48	20.51
2007-08	-2.07	0.97
2008-09	36.26	38.42
2009-10	11.12	4.31
2010-11	3.30	21.17
2011-12	23.16	22.22
2012-13	-0.38	24.23
2013-14	11.11	16.06
2014-15	8.86	5.29
2015-16	3.26	0.68
2016-17	13.55	-0.23
2017-18	0.11	1.02
2018-19	16.07	15.19
2019-20	7.93	-9.47
2020-21	-17.55	-24.43
2021-22	17.80	49.04

Temporal Data Analysis of Export of Wood Products

The export of wood products in terms of quantity has increased from 0.2 m CUM RWE to 15 m CUM RWE from FY 2000-01 to FY 2021-22 with high exports for paper & paperboard, panels and wooden products, pulpwood and printing material (Table 9).

Table 9: Chapter-wise export of wood products quantity (CUM RWE)

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	12125.71	9536.65	163239.30	2336.01	55.23	1289.00	980.04	189561.95
2001-02	22087.77	19637.57	231226.01	1592.52	77.13	380.87	2054.40	277056.27
2002-03	48882.68	844.44	290437.17	2763.70	41.80	503.89	1893.21	345366.89
2003-04	124088.17	4007.11	902756.76	111531.35	4346.54	218.34	5315.58	1152263.86
2004-05	167828.23	10425.92	1020830.73	146853.63	4815.91	245.15	5475.80	1356475.37
2005-06	139508.62	8189.43	1311877.78	144447.48	11584.96	286.73	5814.65	1621709.65
2006-07	221877.17	4869.62	1537774.24	255340.60	18100.63	285.99	9864.85	2048113.10
2007-08	205495.22	21686.85	1364533.65	173169.22	96714.68	280.98	6152.04	1868032.64
2008-09	877901.34	5330.36	1539445.81	203185.53	3426.30	280.66	10708.73	2640278.72
2009-10	351281.75	10987.03	1626303.43	237405.59	1056.45	321.86	10151.93	2237508.03
2010-11	456918.35	4069.82	2328042.99	250480.55	3435.74	236.72	12959.44	3056143.62
2011-12	304421.50	26419.27	2405150.66	329970.88	5883.62	205.15	17677.11	3089728.19
2012-13	309169.64	1239.43	2432753.70	349337.09	22368.24	181.39	27651.69	3142701.17
2013-14	496402.82	2794.24	2942799.20	284699.25	9736.85	383.62	17002.47	3753818.44
2014-15	366182.71	39936.93	3345863.36	200946.35	7035.67	426.89	19968.13	3980360.06
2015-16	361791.61	52551.22	3109388.74	228350.23	20178.38	253.06	19611.44	3792124.69
2016-17	458668.71	40899.00	4186295.41	273393.12	45936.97	363.84	21668.14	5027225.18
2017-18	224836.04	7567.78	4300905.39	277996.59	59578.64	358.37	20606.74	4891849.55
2018-19	199532.83	26231.07	6466477.72	518585.74	64877.76	2026.12	27171.05	7304902.28
2019-20	184425.03	98053.75	7216657.48	800522.25	29130.49	849.94	32360.38	8361999.32
2020-21	420058.08	119908.24	9392170.31	512844.04	19626.89	883.28	24625.71	10490116.5
2021-22	875677.95	17683.87	13352557.0	527737.89	105515.9	1489.70	34982.48	14915644.8

- The total quantity of export of wood products for FY 2021-22 was 14 m CUM RWE.
- The major share of quantity of export of wood products for FY 2021-22 was for paper & paperboard, panels and wooden products, pulpwood and printing material.

Chapter 48 i.e. Paper & paperboard has maximum contribution in the total share of quantity of export of wood based products followed by Chapter 44 (Panels and Wooden Products), Chapter 49 (Printing Material) and Chapter 47 (Pulpwood). The pulpwood export is having the decreasing trend and almost became negligible in later period. Almost of all export of wood products are covered for paper & paperboard, printing material, and panels and wooden products. Low contribution of Chapter 94, Chapter 95, and Chapter 96 (approximately 0 to 1 percent) was noted across the period for the total quantity (Fig 4).

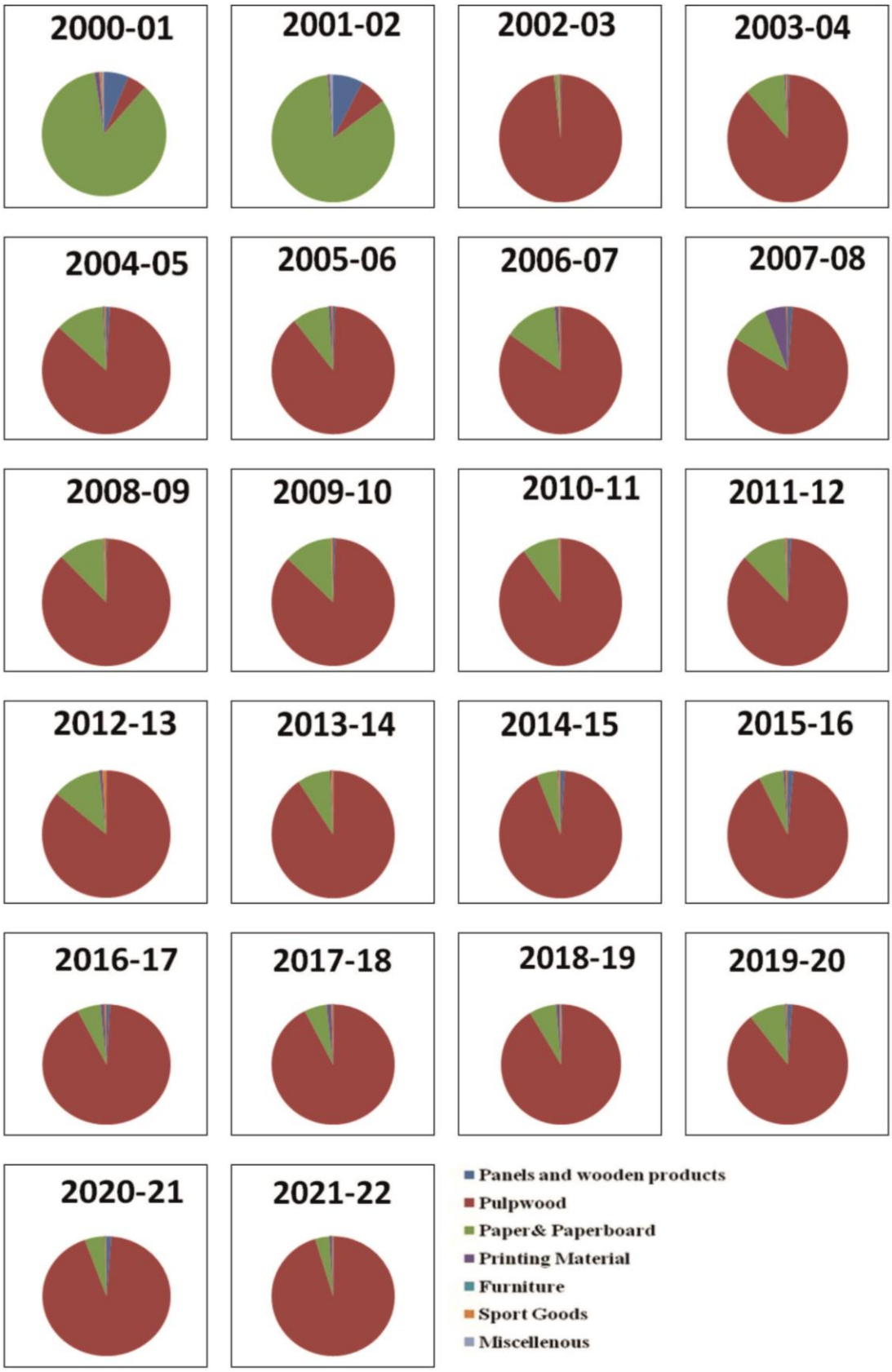


Fig 4: Chapter-wise proportional of quantity (In CUM RWE) of wood products in export

Table 10: Chapter-wise export value (in ₹ Cr.) of wood products

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	42.94	6.86	120.40	7.65	96.62	9.25	3.13	286.85
2001-02	38.73	7.31	149.84	6.12	162.74	9.99	7.19	381.91
2002-03	59.86	1.19	221.32	10.81	199.05	8.76	7.08	508.06
2003-04	168.69	3.66	1109.44	371.98	375.98	10.51	15.86	2056.12
2004-05	249.13	6.92	1466.53	438.14	867.11	17.03	16.96	3061.82
2005-06	315.19	5.12	1762.87	602.58	863.34	21.12	17.85	3588.09
2006-07	413.21	3.64	1945.65	1080.77	1225.33	20.47	33.17	4722.23
2007-08	414.66	14.18	1720.39	680.37	1237.53	20.78	38.28	4126.19
2008-09	726.40	5.90	2318.54	876.97	1293.90	29.11	36.67	5287.49
2009-10	626.95	8.62	2521.22	824.18	1190.15	44.94	36.59	5252.64
2010-11	737.40	4.05	3559.41	939.36	1775.45	42.97	43.22	7101.87
2011-12	1022.16	18.18	4060.66	1266.41	1864.39	53.16	61.01	8345.97
2012-13	1418.94	6.99	4965.63	1516.64	2289.26	73.31	90.05	10360.82
2013-14	1921.19	3.78	6330.01	1621.37	2843.75	108.64	108.56	12937.30
2014-15	1978.14	49.52	7036.35	1403.80	2877.43	110.39	132.97	13588.61
2015-16	2855.59	73.88	7493.86	1591.55	3345.46	130.81	162.31	15653.47
2016-17	2599.00	47.85	7855.82	1667.38	3448.23	145.59	180.90	15944.76
2017-18	1333.16	7.52	9219.96	1485.41	3625.18	125.49	161.01	15957.72
2018-19	1921.84	24.46	13915.14	2242.29	4452.02	306.13	182.43	23044.32
2019-20	1476.77	62.48	13821.60	2083.67	4645.26	271.38	199.71	22560.88
2020-21	1488.05	79.87	14353.42	1608.81	5695.20	281.32	196.66	23703.35
2021-22	2360.13	15.27	23687.36	2410.72	7792.93	353.62	260.75	36880.78

- The total value of export of wood products in Indian Rupees for FY 2021-22 was 36880 crores.
- The value of export was high for paper & paperboard, furniture, and panels and wooden products in FY 2000-01.

The proportion of export for paper & paperboard has increased from 42% to 64% during FY 2000-01 to FY 2021-22 and furniture and panels and wooden products has decreased from 34% to 21%; 15% to 7%, respectively (Fig 5).

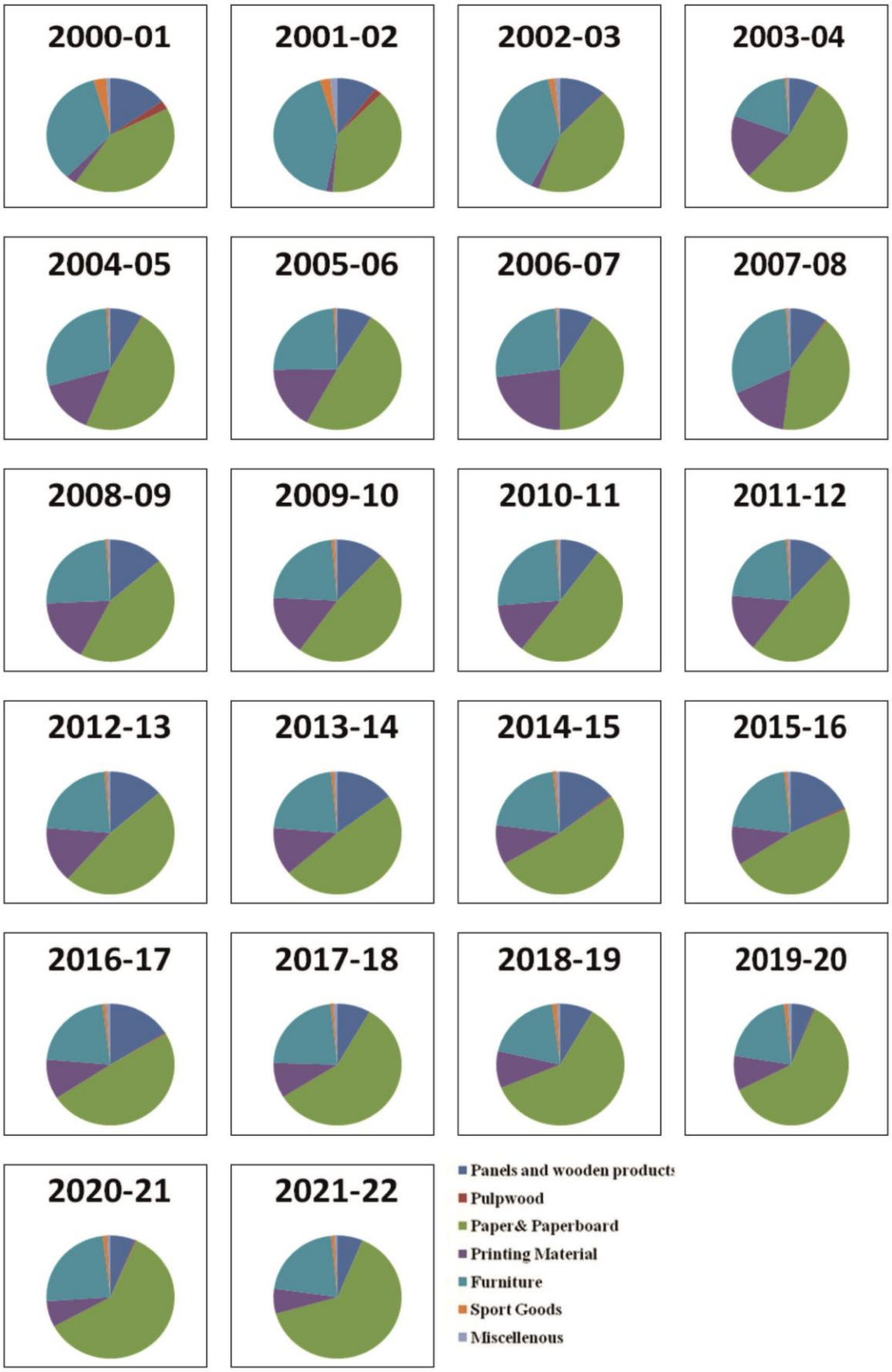


Fig 5: Chapter-wise proportional contribution of value (in ₹ Cr.) of wood products in export

In FY 2000-01 the value of export in US$ was 62.7 m and increased to 4948 m in FY 2021-22. Consistent increase in the value of export was observed during the period from FY 2000-01 to FY 2021-22. Paper & paperboard has maximum contribution in the export value of the wood products followed by furniture, and panels and wooden products (Table 11).

Table 11: Chapter-wise export value (in m US$) of wood products

Year	Panels and Wooden Products	Pulpwood	Paper & Paperboard	Printing Material	Furniture	Sport Goods	Miscellaneous	Total
2000-01	9.43	1.50	26.29	1.68	21.07	2.01	0.68	62.66
2001-02	8.11	1.54	31.41	1.28	34.07	2.09	1.51	80.01
2002-03	12.37	0.25	45.71	2.24	41.15	1.81	1.46	104.98
2003-04	36.78	0.80	241.27	81.08	81.58	2.28	3.45	447.24
2004-05	55.83	1.54	326.72	97.59	193.09	3.79	3.76	682.29
2005-06	71.12	1.16	398.36	135.61	195.27	4.77	4.00	810.29
2006-07	91.34	0.80	429.37	240.68	271.07	4.52	7.34	1045.11
2007-08	103.08	3.54	427.01	168.95	307.18	5.16	9.52	1024.44
2008-09	160.12	1.27	511.66	191.09	284.08	6.31	8.13	1162.67
2009-10	132.47	1.81	532.57	173.92	251.43	9.54	7.76	1109.50
2010-11	161.92	0.90	780.99	206.32	389.96	9.44	9.48	1558.99
2011-12	213.46	3.67	850.82	263.15	387.82	11.06	12.56	1742.55
2012-13	266.49	1.26	911.90	2678.63	420.40	13.49	16.56	4308.74
2013-14	316.37	0.62	1046.57	267.28	469.43	17.88	17.87	2136.03
2014-15	323.67	7.99	1151.25	29.93	470.43	18.00	21.76	2023.03
2015-16	437.79	11.38	1145.45	243.10	510.82	19.95	24.89	2393.37
2016-17	388.03	7.12	1171.68	248.46	514.33	21.72	27.62	2378.96
2017-18	206.76	1.17	1436.11	230.50	562.58	19.47	24.97	2481.56
2018-19	275.85	3.48	1995.36	321.39	638.30	43.60	26.33	3304.31
2019-20	208.43	8.84	1951.88	294.56	655.27	38.30	28.24	3185.52
2020-21	201.48	10.76	1940.95	217.58	772.05	38.11	26.43	3207.36
2021-22	316.74	20.06	3179.14	323.34	1045.01	47.40	34.98	4948.68

Export value in US$ for FY 2021-22 was 4948 million with maximum contribution of paper & paperboard (3179 m US$), followed by furniture (1045.01 m US$) and printing material (323 m US$).

Table 12: Category-wise quantity and value (in ₹ Cr.) of wood products in export

Year	Quantity (in CUM RWE)		Quantity (%)		Value (%)	
	Other	Non Other	Other	Non Other	Other	Non Other
2000-01	160123.48	29438.47	0.15	0.85	0.52	0.91
2001-02	234303.85	42752.42	0.15	0.85	0.74	0.36
2002-03	286199.44	59167.45	0.17	0.83	0.65	0.53
2003-04	972568.04	179695.81	0.15	0.85	0.46	1.16
2004-05	1145945.14	210530.22	0.15	0.85	0.59	0.68
2005-06	1368906.16	252803.49	0.15	0.85	0.48	1.10
2006-07	1733522.58	314590.53	0.15	0.85	0.47	1.14
2007-08	1549526.54	318506.10	0.17	0.83	0.58	0.72
2008-09	2162828.98	477449.75	0.16	0.84	0.53	0.89
2009-10	1883419.11	354088.93	0.15	0.85	0.51	0.98
2010-11	2561367.97	494775.65	0.15	0.85	0.54	0.84
2011-12	2620093.42	469634.77	0.15	0.85	0.44	1.25
2012-13	2659485.62	483215.55	0.15	0.85	0.44	1.27
2013-14	3147276.25	606542.19	0.15	0.85	0.43	1.33
2014-15	3345475.38	634884.68	0.16	0.84	0.43	1.32
2015-16	3189682.03	602442.67	0.16	0.84	0.36	1.77
2016-17	4215116.55	812108.63	0.16	0.84	0.46	1.19
2017-18	4115625.84	776223.71	0.16	0.84	0.45	1.23
2018-19	6183911.70	1120990.58	0.15	0.85	0.38	1.64
2019-20	7138700.85	1223298.47	0.15	0.85	0.41	1.47
2020-21	8866232.34	1623884.20	0.15	0.85	0.44	1.25
2021-22	12500842.66	2414802.14	0.18	0.82	0.37	1.70

Non other category comprises 80- 85% share proportionally in the total quantity of export of wood products in the International Trade in India.

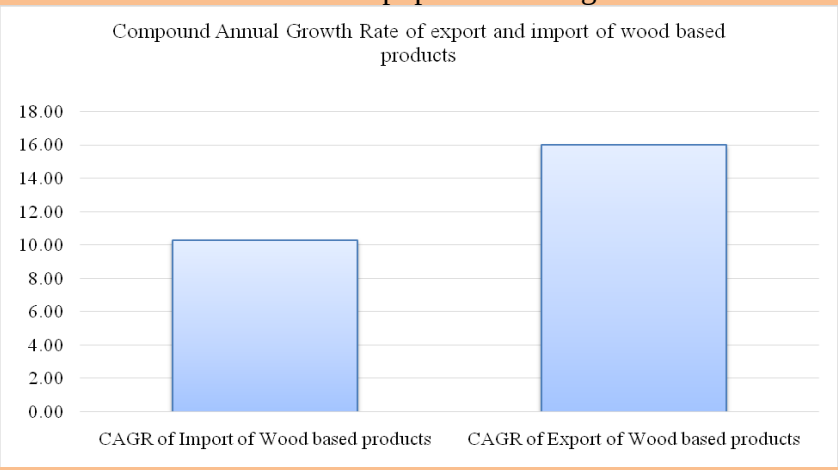
The percent growth in FY 2021-22 was estimated to ascertained the trend of export in term of quantity and value (in Cr. ₹ and US$) for the period FY 2000-01 to FY 2021-22. The growth in terms of the quantity in RWE in FY 2021-22 was around 919% since FY 2005-06; around 488% since FY 2010-11 and 393% since FY 2015-16 and 142% since FY 2020-21. In terms of the value, the growth in FY 2021-22 was 1063% since FY 2005-06 and 161% since FY 2020-21 in terms of Indian rupee and similar trend with low in growth proportion was observed for value measured in US$ (Table 12).

Table 13: Percent growth and Compound Annual Growth Rate (CAGR) in export of wood products since different time period in FY 2021-22

Year	Percent Growth			CAGR		
	Quantity (CUM RWE)	Value (in ₹ Cr.)	Value (in m US $)	Quantity (CUM RWE)	Value (in ₹ Cr.)	Value (in m US $)
2005-2022	919.75	1063.77	610.73	15.14	15.76	12.36
2010-2022	488.05	544.12	317.43	17.12	17.63	13.27
2015-2022	393.33	236.19	206.77	20.77	15.33	13.63
2020-2022	142.19	161.42	154.29	33.55	27.86	24.64

- The percent growth in terms of the quantity of export in RWE in FY 2021-22 was around 919 % since FY 2005-06; around 488% since FY 2010-11 and 393% since FY 2015-16 and even more than 142% in last two years.
- The Compound Annual Growth rate (CAGR) in terms of the quantity in RWE in FY 2021-22 was around 15% since FY 2005-06; around 17% since FY 2010-11, 20% since FY 2015-16 and 33% since last two years.

In the last two decades, export of Indian wood based products had a Compound Annual Growth Rate (CAGR) of 16 percent whereas import had CAGR of 10 percent, once a trend of the whole period is considered. The below figure depicts the CAGR of import and export of wood products. The steady increase in export maybe attributed to the increased production via the promotion of Tree Outside Forests and contribution of furniture industries whereas the import maybe correlated with an increase in population and growth of National Income.



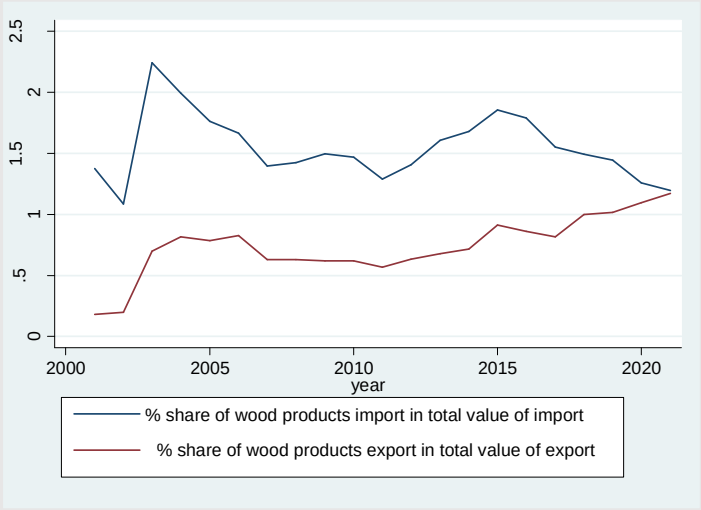
CAGR of India's Import vs Export of Wood based products

There annual growth in export for quantity in terms of RWE and value in terms of ₹ and US$ was generally having increasing trend barring some periods during the period (Table 14).

Table 14: Annual growth in export of wood products for quantity (in x 10^5CUM RWE) and value (in ₹ Cr. and m US$)

Year	Quantity (in x 10^5 CUM RWE)	Value (₹ Cr.)	Value (m US $)
2001-02	146.16	133.14	127.69
2002-03	124.66	133.03	131.21
2003-04	333.63	404.70	426.02
2004-05	117.72	148.91	152.56
2005-06	119.55	117.19	118.76
2006-07	126.29	131.61	128.98
2007-08	91.21	87.38	98.02
2008-09	141.34	128.14	113.49
2009-10	84.75	99.34	95.43
2010-11	136.59	135.21	140.51
2011-12	101.10	117.52	111.77
2012-13	101.71	124.14	247.27
2013-14	119.45	124.87	49.57
2014-15	106.03	105.03	94.71
2015-16	95.27	115.20	118.31
2016-17	132.57	101.86	99.40
2017-18	97.31	100.08	104.31
2018-19	149.33	144.41	133.15
2019-20	114.47	97.90	96.40
2020-21	125.45	105.06	100.69
2021-22	142.19	155.59	154.29

The value of total India's import and export of wood products reflects that the percentage of wood-based products in the total value of import was fluctuating around 1.5 percent of the total import of the country for the past two decades, however, the percentage share of the total value of export, a steady rise from around 0.2 percent in 2001 to 1.2 percent in 2021 was noted i.e. India's trade in wood sector is progressing steadily.



Share of Indian wood products trade in total value of trade

The annual growth in the quantity of export of wood products is maximum in 2003-04 with respect to 2004-05 and minimum in 2009-10 with respect to 2010-11.

Product-wise Analysis of Import and Export

Seven Chapters distributed in three sections containing various wood products commodities under international trade. The details of quantity and value (in Rs Cr.and US$) for export and import as per the available data in DGCIS portal was evaluated for each chapter for evaluating the deficit in quantity. Each chapter contains a different category of wood products and thereby product wise description was highlighted in subsequent paragraphs.

Panels and wooden products (Chapter 44) includes fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles sawdust and wood waste an scrap; wood charcoal; wood in rough; coniferous and non-coniferous; railway sleepers; wood sawn; sheet for veneering; particle board; fiberboards; plywood, veneered panel and laminated wood; packing cases; builders' joinery; tableware; ornament of wood; other article of wood. It is the third broad categories of wood products that have maximum contribution in the export and import of wood product trade in India. The trend of import was increased consistently in initial two years (FY 2000-02) with a sudden increase in the import in the FY 2002-03 thereafter steady increase in quantity of import of commodities under wooden articles with maximum in FY 2021-22. However, export trend was inconsistent with two peaks during the reported period i.e. one is FY 2008-09 and a FY 2021-22 (Fig 6).

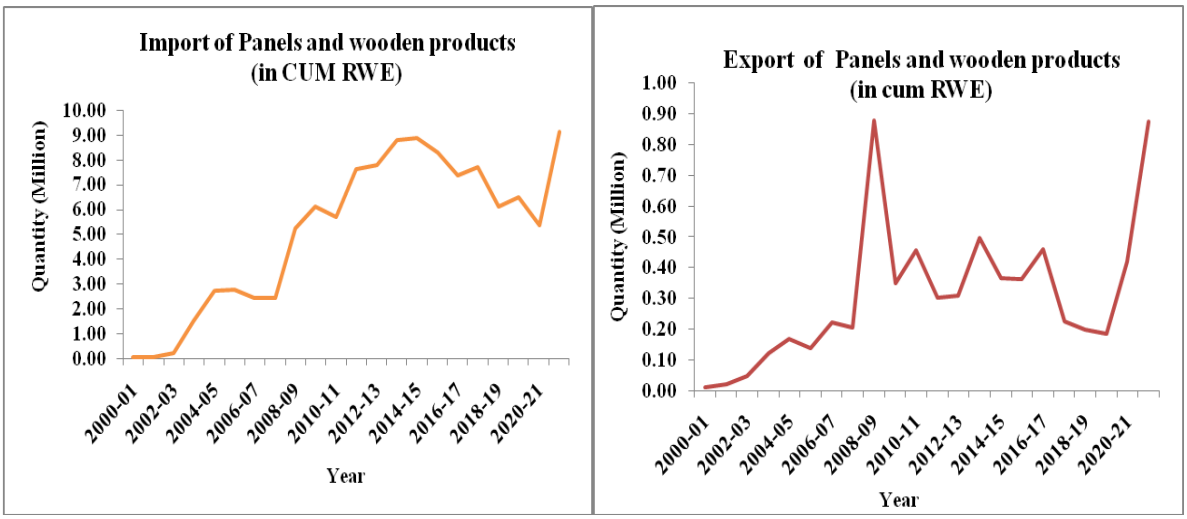


Fig 6: Import and export quantity (in CUM RWE) of Panels and wooden products

The volume of wood products under import was higher than export during the period. The differences in traded quantity were increased till FY 2014-16 however thereafter decreased till FY 2020-21 with further increase in FY 2021-22 (Fig 7).

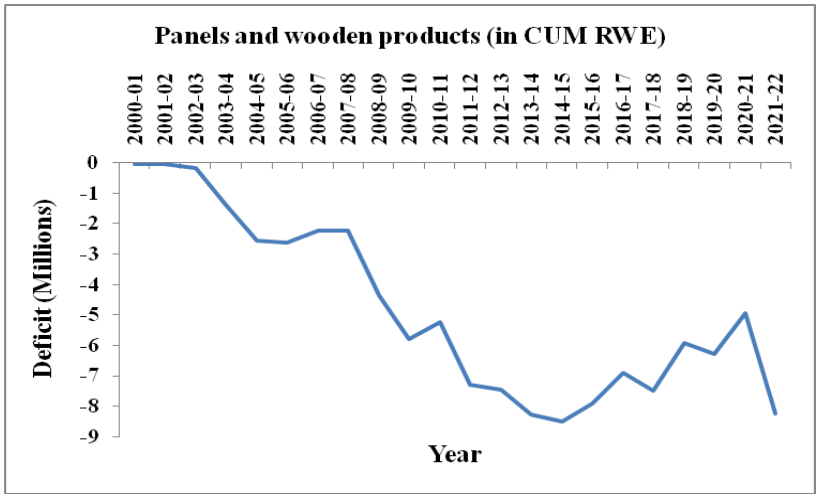


Fig 7: Trade deficit in quantity (in CUM RWE) of panels and wooden products

Pulpwood (Chapter 47) consists of pulpwood of other fibrous cellulosic material, recovered paper or paperboard, and articles thereof. The import of pulpwood was having increasing trend across the period except a dip during FY 2010-11, however, the export of pulpwood was having inconsistent trend with a sudden increase in FY 2020-21 (Fig 8).

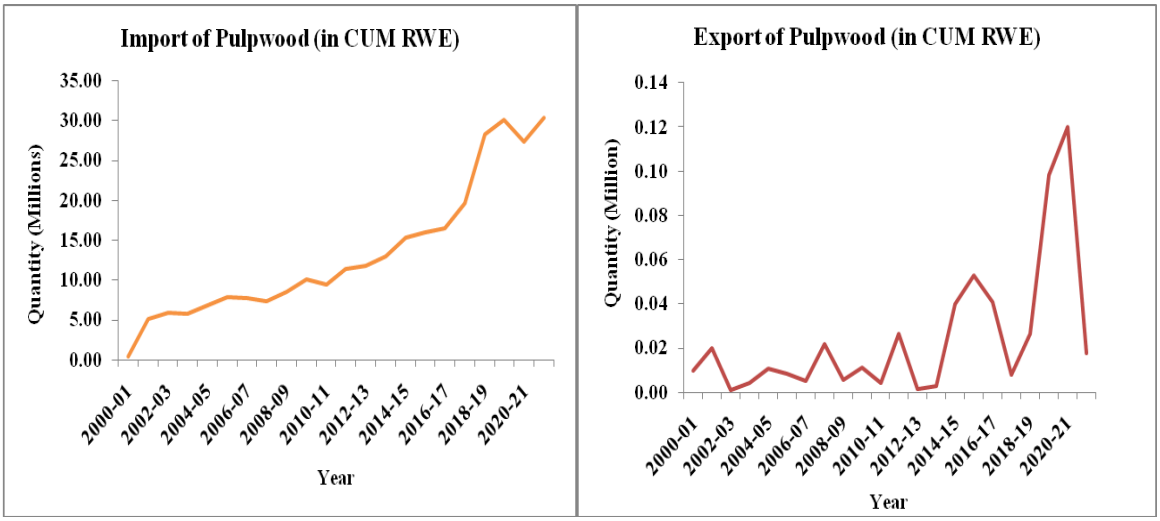


Fig 8: Import and export of quantity (in CUM RWE) of pulpwood

The deficit in quantity was having an increasing trend i.e. import was higher than the export across the period with huge jump during FY 2018-19 to FY 2021-22 (Fig 9).

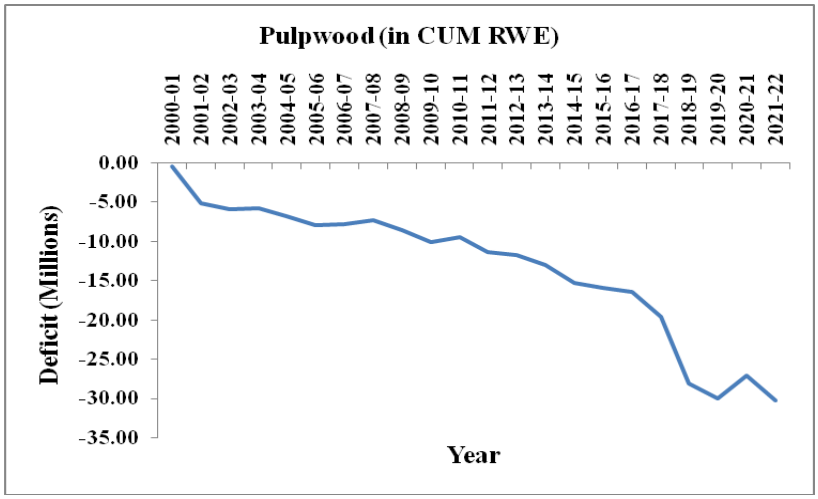


Fig 9: Trade deficit in quantity (in CUM RWE) of pulpwood

Paper & paper board (Chapter 48) consists of broad category of paper and paperboard and includes newsprint, Uncoated paper, Napkin stock, craft paper, vegetable parchment, composite paper, carbon paper, paperboard coated with kaolin, cellulose wading and webs of cellulose fibers, cigarette paper, wallpaper, carbon paper, envelopes letter, postcard letter, postcard, toilet paper, cartons, registers, notebook, and other paper. A smooth increasing trend in import quantity of paper and paper board was observed with high increase since FY 2016-2017; moreover import was also having more or less increasing trend for the commodities with decreasing trend during FY 2016-2017 (Fig 10).

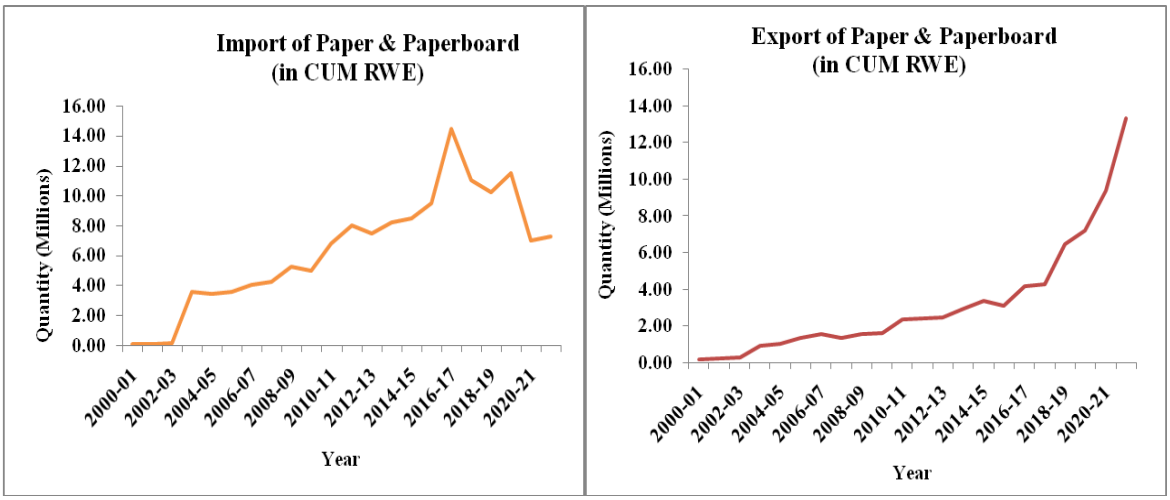


Fig 10: Import and export of quantity (in CUM RWE) of paper & paperboard

The trade deficit for the quantity of paper and paperboard was increasing towards import till FY 2016-2017 and then after the trade deficit was started decreasing and from FY 2020-21, the export was more than the import (Fig 11).

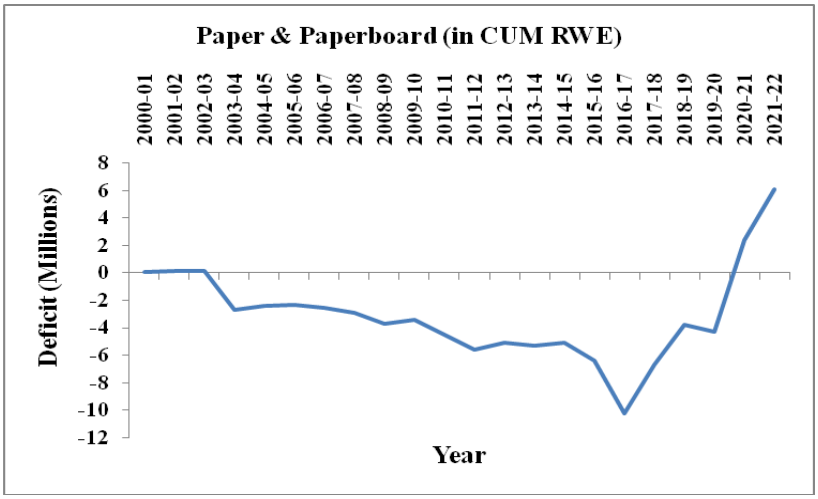


Fig 11: Trade deficit in quantity (in CUM RWE) of paper & paperboard

Printed materials (Chapter 49) includes printed books, newspaper, pictures and other products of the printing industry; manuscripts, typescripts and plans. The trend of import of wood product is quite inconsistent with the maximum peak in the FY 2008-09. However, the export remained consistent with increasing trend with huge growth in FY 2017-18 (Fig 12).

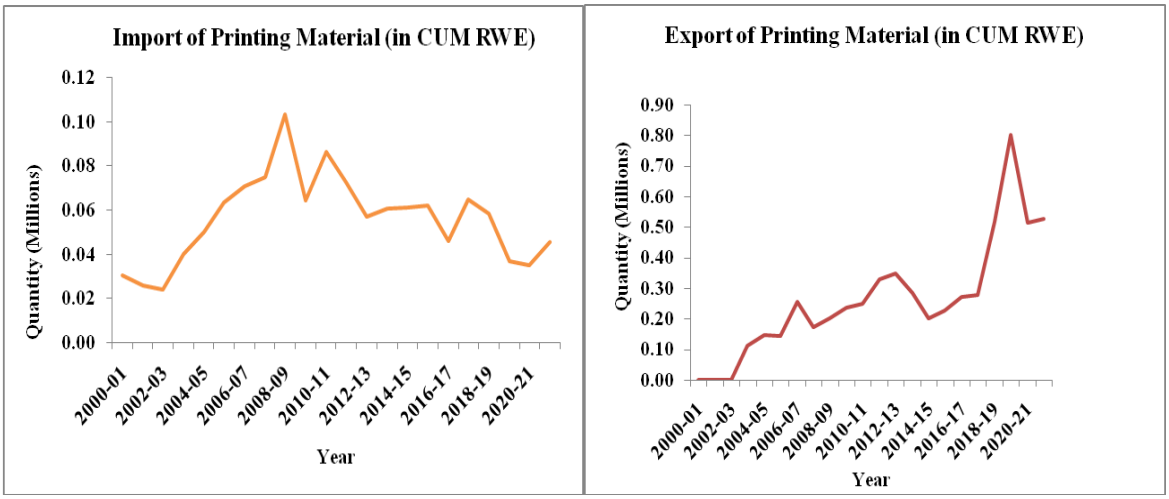


Fig 12: Import and export of quantity (in CUM RWE) of printing material

The trade deficit for quantity for printing material was positive after FY 2002-2003 with sharp increase in trade deficit in FY 2017-2018, however now the growth is more or less consistent (Fig 13).

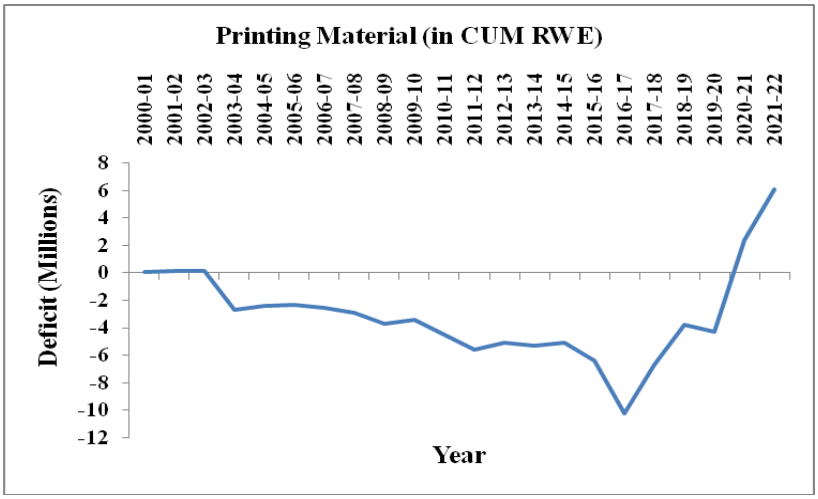


Fig 13: Trade deficit in quantity (in CUM RWE) of printing material

Furniture (Chapter 94) comprises furniture, bedding, mattresses, mattress supports, cushions and similar stuffed furnishing, lamps and lighting fittings, not elsewhere specified or included, illuminated signs, illuminated name plates and the like, and prefabricated building. The export of these products increased till FY 2008-09 and decrease in FY 2009-2010. The reason may be attributed to the global economic slowdown around 2007 that unfolded between 2007 and 2009, often called the Global Financial Crisis (GFC)**.** It was the most severe economic downturn the economic downturn which persisted in 2009 as the effects rippled through the global economy. However, after the global economy started to recuperate, the exports again showed a peak in FY 2016-2017 and FY 2020-2021, however, the import of these items was more or less was having increasing trend with decrease since FY 2018-2019 (Fig 14).

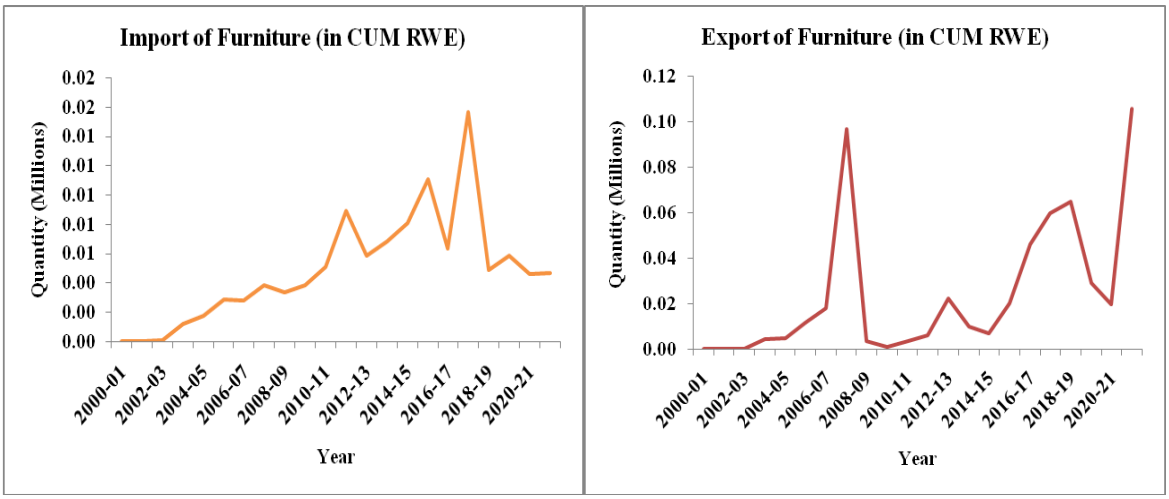


Fig 14: Import and export of quantity (in CUM RWE) of furniture

The trade deficit for furniture is positive for most of the period with increasing trend since FY 2016-2017 (Fig 15).

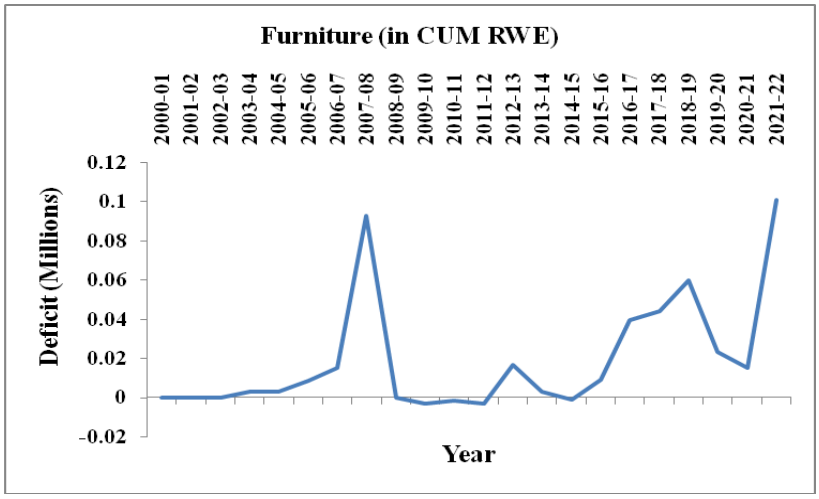


Fig 15: Trade deficit in quantity (in CUM RWE) of furniture

Sport goods (Chapter 95) consist of toys, games, and sports requisites, part and accessories thereof. With the smooth fluctuation in the quantity of import, there was sudden rise and fall in the last six years with increasing trend for import quantity. On the contrary, with the sudden fall in the early periods, there is relatively smooth flow in the quantity and thereafter, huge improvement in export was observed during the later period (Fig 16).

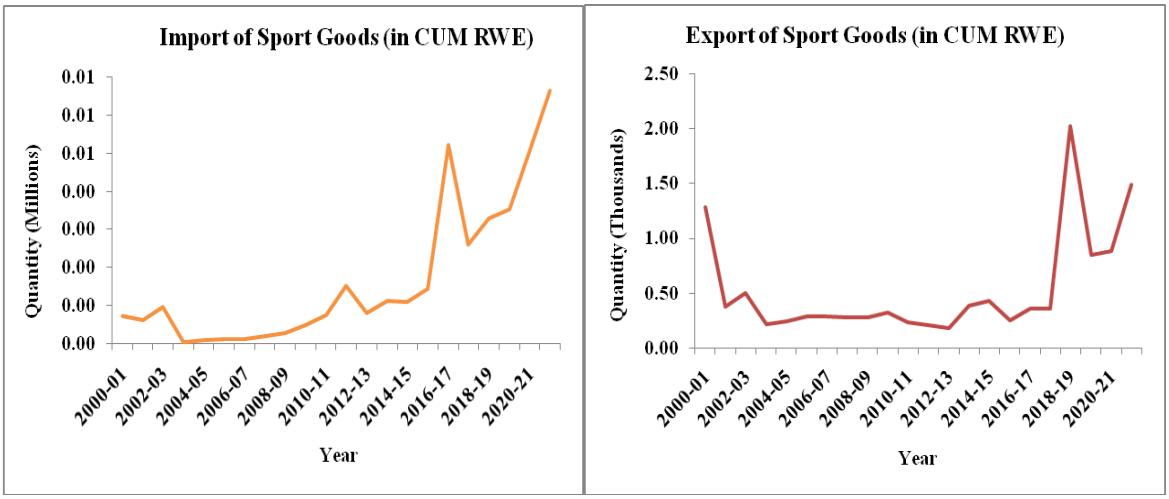


Fig 16: Import and export of quantity (in CUM RWE) of sport goods

The sport good trade deficit for quantity was negative with huge peak during FY 2016-2017 (Fig 17).

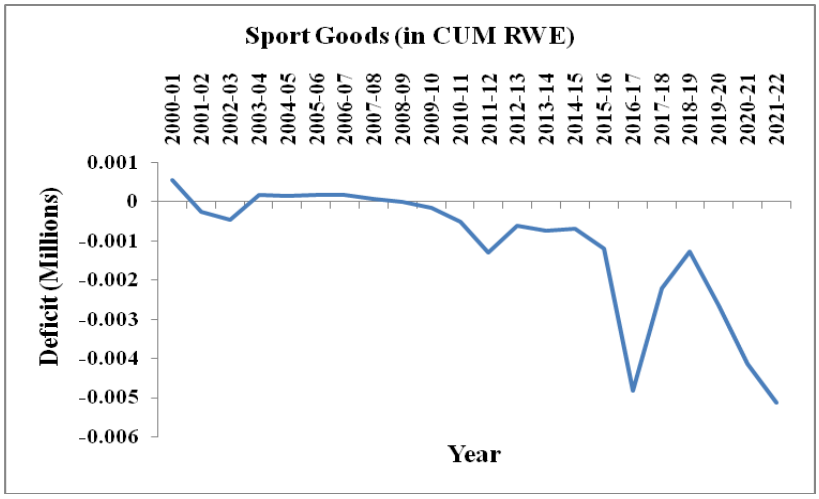


Fig 17: Trade deficit in quantity (in CUM RWE) of sport goods

Miscellaneous (Chapter 96) includes all the miscellaneous manufactured articles of wood. The trend of export was increasing during the period with fluctuating trend for import for the miscellaneous items (Fig 18).

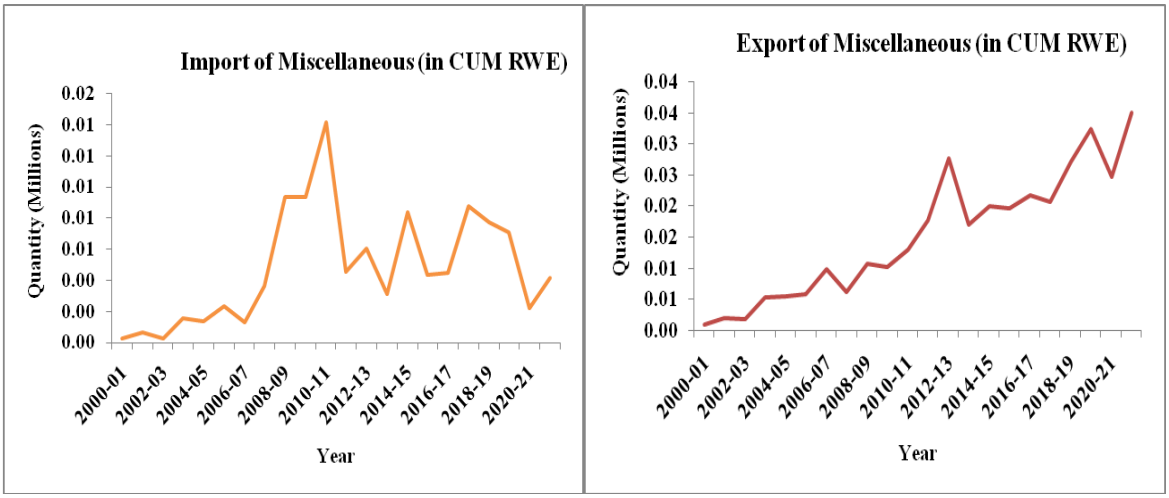


Fig 18: Import and export of quantity (in CUM RWE) of miscellaneous wooden articles

The trade deficit for quantity under miscellaneous commodities was positive with sharp increase since FY 2011-12 (Fig 19).

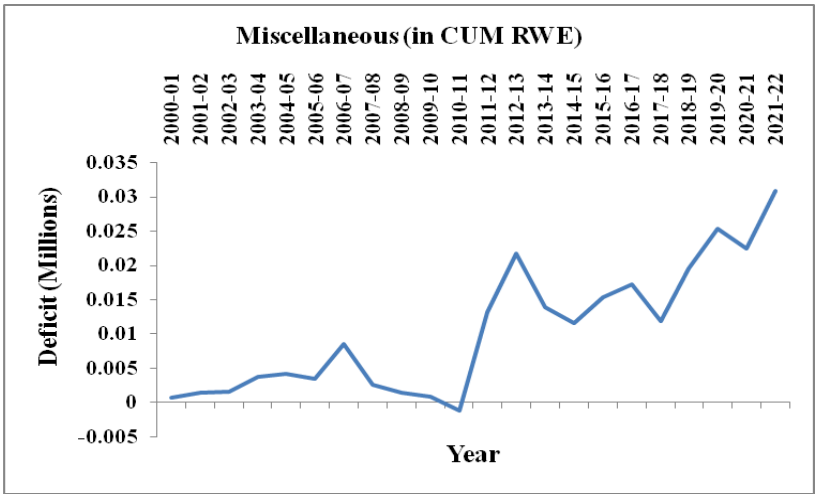


Fig 19: Trade deficit in quantity (in CUM RWE) of miscellaneous wooden articles

From the above findings on the trade deficit, it is evident that the furniture is the commodity shining like a bright star and showing the positive trade deficit in the recent times. Due to low-cost trained labor, a plentiful supply of raw materials in the past, growing international demand, and government assistance, India's furniture export sector has enormous growth potential. The nation is competing with China, Vietnam, and other significant exporters as a major furniture supplier in international markets. By focusing on premium markets, enhancing logistics, and investing in modern production, India has enormous potential to increase its furniture exports. India can compete with leading exporting countries like China and Vietnam and grow its market share globally with government assistance and industry innovation. There is a need of focussing on the sustainable wood supply from ToF to this sector to keep it thriving.

Trade Deficit in Wood products

The trade deficit was noted for quantity and value for the wood products in International Trade for India. The negative balance in trade was primarily due to demand of the wood products in the country which could not be sufficed within the domestic wood products. The deficit in the quantity of wood products in RWE was mostly in increasing trend across the period from FY 2000-01 – FY 2021-22, however the increase in annual deficit was more or less varied till 2011-12 and then after the deficit in increase or more or less around 10% (Table 15).

Table 15: Trade deficit in import and export for quantity (in CUM RWE) of wood products

Year	Import	Export	Trade Deficit (Export – Import)	Annual Growth in Deficit (%)
2000-01	648853.29	189561.94	-459291.35	-
2001-02	5389557.76	277056.27	-5112501.49	1113.13
2002-03	6336339.67	345366.88	-5990972.78	117.18
2003-04	10935483.01	1152263.85	-9783219.15	163.30
2004-05	13031475.17	1356475.36	-11674999.80	119.34
2005-06	14324472.84	1621709.65	-12702763.19	108.80
2006-07	14393554.39	2048113.103	-12345441.29	97.19
2007-08	14095162.91	1868032.644	-12227130.27	99.04
2008-09	19206683.54	2640278.72	-16566404.82	135.49
2009-10	21342660.77	2237508.03	-19105152.74	115.32
2010-11	22047835.29	3056143.62	-18991691.67	99.41
2011-12	27153457.66	3089728.19	-24063729.47	126.71
2012-13	27049126.91	3142701.16	-23906425.75	99.35
2013-14	30053975.09	3753818.43	-26300156.65	110.01
2014-15	32715976.97	3980360.05	-28735616.91	109.26
2015-16	33783893.62	3792124.69	-29991768.93	104.37
2016-17	38360369.53	5027225.17	-33333144.35	111.14
2017-18	38403327.41	4891849.55	-33511477.85	100.54
2018-19	44573624.38	7304902.28	-37268722.10	111.21
2019-20	48110059.09	8361999.31	-39748059.77	106.65
2020-21	39667287.29	10490116.54	-29177170.75	73.41
2021-22	46728198.70	14915644.80	-31812553.90	109.03

The trade deficit in value for wood products was having increasing trend across the period. The percent annual increase in value for Indian Rupee was around 10% increase or decrease with preceding year trade deficit with a sharp increase during FY 2021-2022 (Table 15). Similar trend for trade deficit was observed for the value in terms of US$ with the proportional annual change 5 to 10% decrease or increase in respect to preceding year (Table 16).

Table 16: Trade deficit in imports and exports for value

Year	Value (in ₹ Cr.)				Value (in m US $)			
	Import	Export	Trade Deficit (Export - Import)	Annual Growth in Deficit (%)	Import	Export	Trade Deficit (Export – Import)	Annual Growth in Deficit (%)
2000-01	2123.33	192.38	-1930.94	-	684.61	62.66	-621.95	-
2001-02	3346.69	222.62	-3124.07	161.79	708.55	80.01	-628.54	101.06
2002-03	3178.97	313.11	-2865.86	91.73	666.42	104.98	-561.43	89.32
2003-04	7931.24	1688.21	-6243.02	217.84	1751.30	447.24	-1304.06	232.27
2004-05	9791.31	2213.84	-7577.47	121.37	2225.05	682.29	-1542.75	118.30
2005-06	11274.10	2744.32	-8529.78	112.57	2624.00	810.29	-1813.71	117.56
2006-07	13344.31	3523.94	-9820.37	115.13	3090.65	1045.11	-2045.54	112.78
2007-08	13420.56	2918.58	-10501.98	106.94	3512.73	1024.44	-2488.28	121.64
2008-09	18659.15	4023.33	-14635.81	139.36	4302.21	1162.67	-3139.54	126.17
2009-10	19500.47	4087.08	-15413.39	105.31	4314.48	1109.50	-3204.98	102.08
2010-11	23403.35	5365.24	-18038.10	117.03	5433.72	1558.99	-3874.73	120.90
2011-12	28462.91	6521.53	-21941.38	121.64	6313.09	1742.55	-4570.53	117.96
2012-13	35610.62	8114.40	-27496.21	125.32	6904.77	4308.74	-2596.03	56.80
2013-14	41630.96	10142.08	-31488.88	114.52	7205.52	2136.03	-5069.49	195.28
2014-15	43960.25	10758.33	-33201.92	105.44	7514.70	2023.03	-5491.67	108.33
2015-16	44178.79	12360.16	-31818.63	95.83	7063.19	2393.37	-4669.82	85.03
2016-17	43959.06	12547.84	-31411.22	98.72	6877.57	2378.96	-4498.61	96.33
2017-18	44207.53	12388.21	-31819.32	101.30	7290.06	2481.56	-4808.50	106.89
2018-19	50978.26	18657.39	-32320.87	101.58	7740.97	3304.31	-4436.66	92.27
2019-20	46231.76	17981.58	-28250.18	87.41	6853.85	3185.52	-3668.33	82.68
2020-21	35751.64	18085.01	-17666.63	62.54	4954.21	3207.36	-1746.85	47.62
2021-22	53134.19	29193.28	-23940.92	135.51	7344.73	4948.68	-2396.05	137.16

The trend of Export of Indian wood products (2001-2021)

After various economic reforms happened in the last decade of the 20th century, the export of Indian commodities had picked its pace, wood based products also no exception to this. While visualizing the export of Indian wood based products, it's evident that there has been a significant rise in the export of wood based products in the last two decades, with a Compound Annual Growth Rate of 16 percent. To know the future demand for wood based products in the Indian context, we tried to forecast the export of Indian wood based products using Time series models.

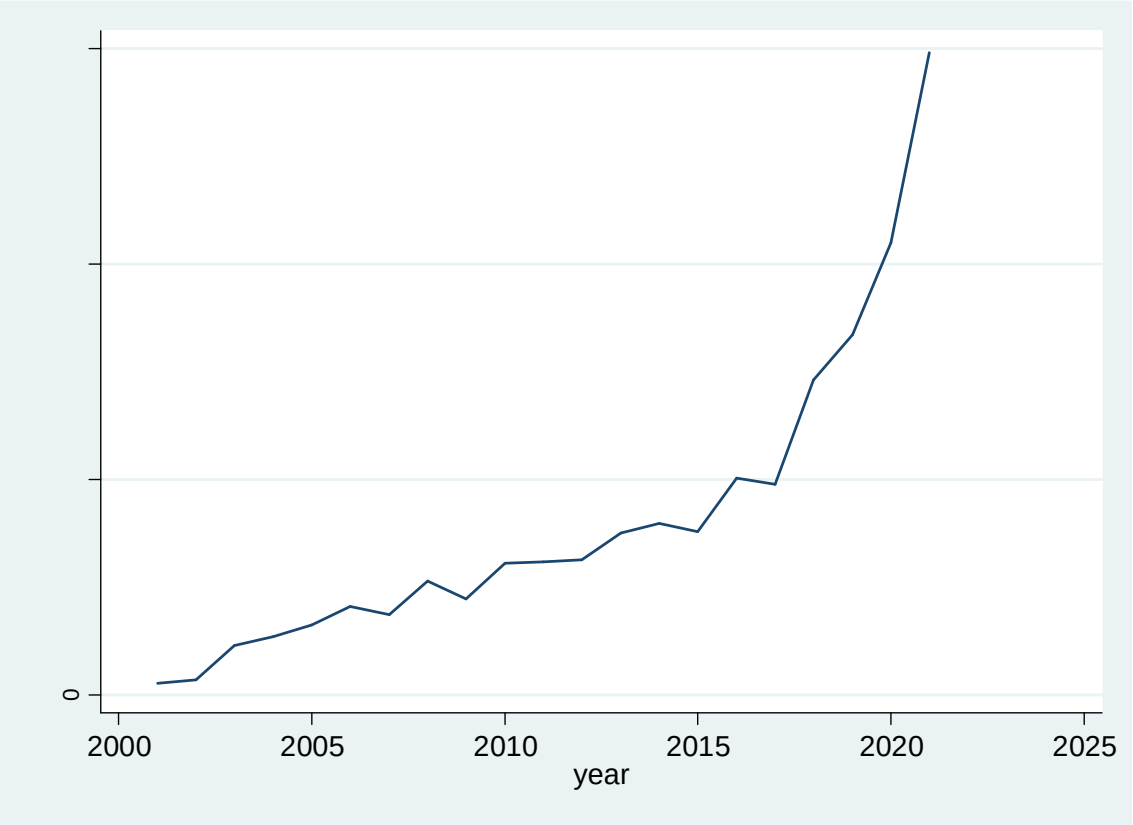


Fig 20: Export of Indian wood products (2001-2021)

The stationarity of time series data, i.e., constant mean and variance, is essential for robust prediction. In this context, with the help of the Dickey-Fuller test, the stationarity of the original data was checked. The null hypothesis of the Dickey-Fuller test assumes that the data is non-stationary. The result revealed that there is no evidence to reject the null hypothesis, indicating that the data is not stationary (Table 17). Therefore, further order of differencing had been done, and then the stationarity was tested. After the second order of differencing, the data holds the property of being stationary. This also indicates the d value for the ARIMA model, i.e. 2.

Table 17: Testing of stationarity

Level	**Test Statistic**	**p-value**
Original series	4.529	1.00
1st order Differencing	-1.391	0.58
2nd order Differencing	-7.957	0.00

Testing of the Autocorrelation Function (ACF): The visualized ACF of the stationary series i.e. 2nd order differenced series, indicated that only 1st lag had a significant spike, which indicated that the q value in the ARIMA model was 1 (Fig 21).

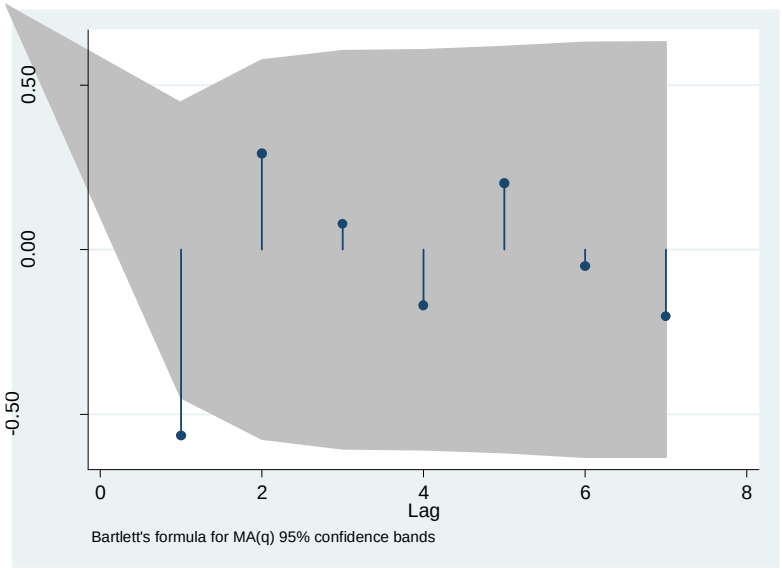


Fig 21: Autocorrelation Function of India's export of wood products

Checking the Partial Autocorrelation Function (PACF): The Partial Autocorrelation function of the stationary series, i.e. 2nd order differenced series, indicated that the stationary series had significant spikes at different lags (Fig 22).

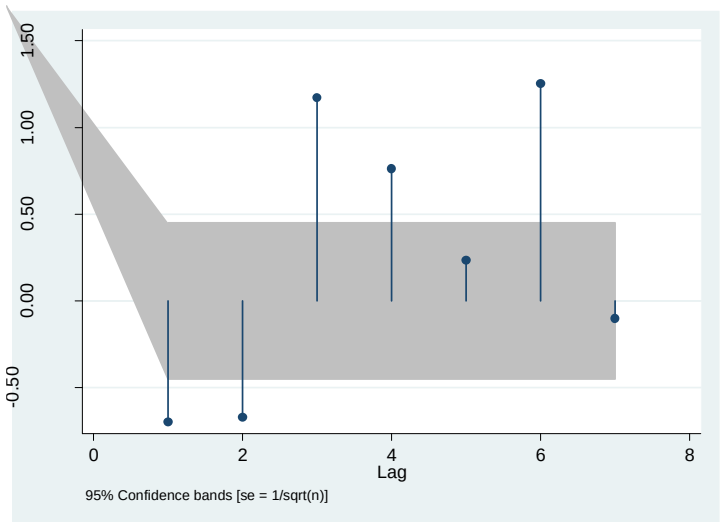


Fig 22: Partial Autocorrelation Function of Indian Export

The ARIMA model, as identified by p, d, q, the two models was run, and the statistics of the model were estimated along with AIC and BIC. The ARIMA (2,2,1) model was selected based on AIC and BIC values (Table 18 and 19).

Table 18: ARIMA model statistics for India's export of wood products

Model	AIC	BIC
1,2,1	581.51	585.29
2,2,1	578.69	583.41

Sample period: 2003-2021, containing 19 observations.

Table 19: Statistics of ARIMA (2,2,1)

Second differenced quantity	Coefficient	z	P>z	[95% Conf.	Interval]
Constant	139236.30 (111773.40)	1.25	0.21	-79835.67	358308.20
AR L1.	-1.49 (0.44)	-3.39	0.00	-2.34	-0.63
AR L2.	-0.81 (0.34)	-2.39	0.02	-1.48	-0.15
MA L1.	0.47 (0.59)	0.81	0.42	-0.68	1.62
sigma	724657.40 (173803.60)	4.17	0.00	384008.60	1065306.00

Values in the parentheses indicate the Standard Error. Portmanteau (Q) statistic = 4.67; Prob > chi2(7) = 0.70; Log Likelihood: - 284.34; Prob> chi^2 = 0.00

For the residual diagnostic, the residuals were predicted and tested for white noise using the Portmanteau (Q) test. The null hypothesis of the test proposes that the residuals follow white noise. The residual diagnostics of the chosen model, ARIMA (2,2,1), also indicated that the residuals hold the property of white noise.

Forecasting: With the help of the ARIMA (2,2,1) model, the export quantity of Indian wood products was forecasted up to the Year 2025 (Table 20; Fig 23).

Table 20: Forecast of India's export of wood products

Year	2023	2024	2025	2026	2027
Export quantity (CUM RWE)	17500000	19500000	22300000	25200000	27700000

(Note: Considering the inadequacy of data and the limitations of the econometric model, result has to be interpreted cautiously)

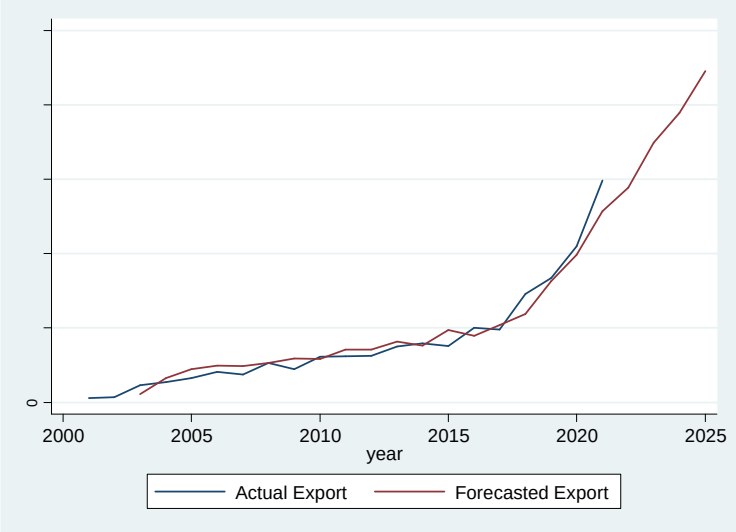


Fig 23: India's export of wood products (in CUM RWE)

Factors affecting Indian Wood based products export: To check whether price or growing stock has any effect on Indian exports, we employed the Granger co-integration approach since the data is not stationary in the base level. The results of the Granger Co-integration approach didn't provide any evidence to claim a relationship between Export quantity and price or growing stock of the country (Table 21).

Table 21: Results of Engle and Granger cointegration for export and contextual factors

Dependent Variable	Independent Variable	Z-statistics	10 % critical value
Export quantity (CUM RWE)	Price (Rs.)	2.371	-3.263
	Growing Stock	2.437	-3.263

The trend of the Import of Indian wood products (2001-2021)

India's import of wood products reflects a steadily increasing trend with a 10% CAGR. Moreover, a dip in 2021 was also observed, which may be attributed to the COVID-19 pandemic (Fig 24).

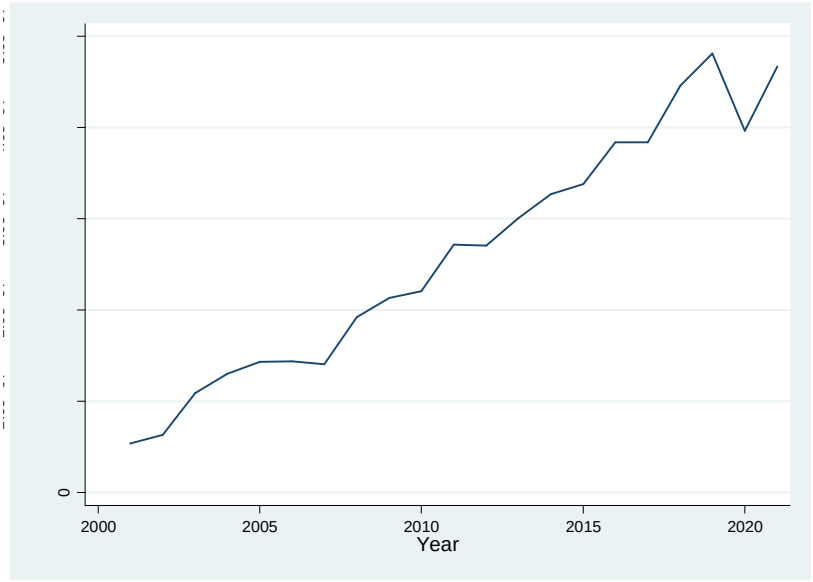


Fig 24: India's Import of wood products

The Dickey-Fuller test revealed the non-stationarity of the original data (Table 22). Therefore, further order of differencing had been done, and then the stationarity was tested. After the first order of differencing, the data holds the property of being stationary. This also indicates the d value for the ARIMA model, i.e. 1. The visualization of ACF indicated that only 1st lag had a significant spike; therefore q value in the ARIMA model will be 1 (Fig 25).

Table 22. Results of Dickey-Fuller test for India's Imports of wood products

Level	Test Statistic	p-value
Original series	-1.73	0.41
1st order Differencing	-6.66	0.00

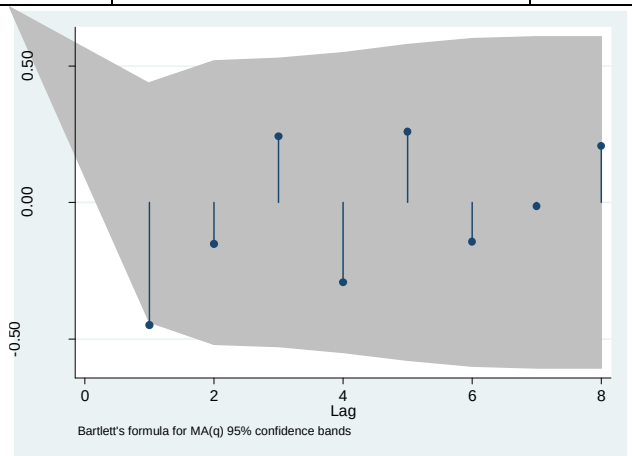


Fig 25: Autocorrelation Function of India's Import of wood products

The visualisation of the Partial Autocorrelation function of the stationary series resulted that the stationary series had significant spikes at different lags (Fig 26).

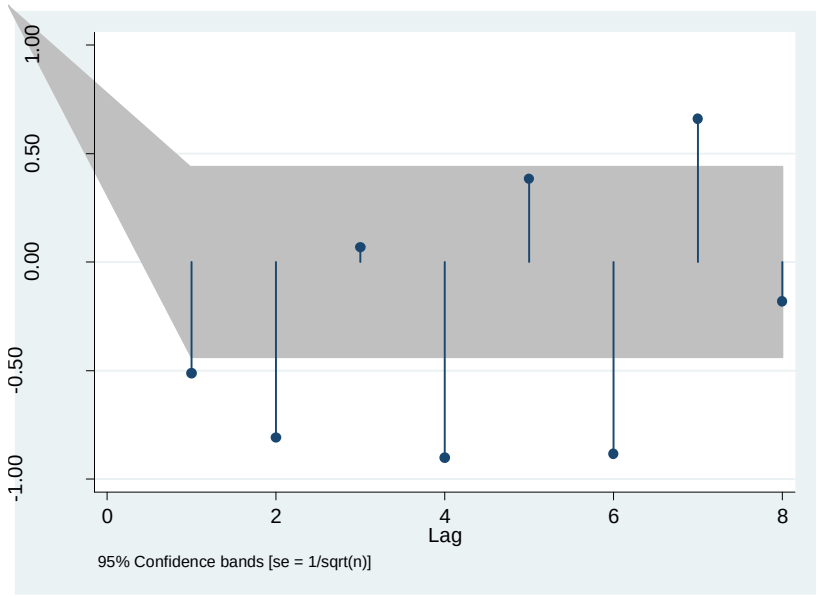


Fig 26: Partial Autocorrelation Function of India's Import of wood products

The final three models were considered for the analysis are (1,1,0), (2,1,0) and (2,1,1) and for those models AIC and BIC were estimated. ARIMA(2,1,1) was found the best and used for forecasting purpose (Table 23).

Table 23. Comparison of potential models

Model	AIC	BIC
1,1,0	657.43	660.42
2,1,0	654.35	658.33
2,1,1	652.14	657.12

For the residual diagnostic, the residuals were predicted and tested for white noise using the Portmanteau (Q) test. The null hypothesis of the test proposed that the residuals hold white noise property. The residual diagnostics of the chosen model ARIMA (2,1,1) also indicated that the residuals hold the property of white noise (Fig 27; Table 24).

Table 24. Result of ARIMA (2,1,1) model for India's import of wood products

differenced quantity	coefficient	z	P>z	[95% Conf. Interval]	
Constant	2048750 (491291.2)	4.17	0.00	1085837	3011663
AR L1.	-1.10 (0.36)	-3.06	0.00	-1.80	-0.39
AR L2.	-0.82 (0.29)	-2.82	0.00	-1.39	-0.25
MA L1.	0.90 (0.42)	2.17	0.03	0.09	1.73
/sigma	2069478 (535009.40)	3.87	0.00	1020879	3118078

(*Values in the parenthesis indicates the standard error.*
Portmanteau (Q) statistic = 3.58; Prob > chi2(7) = 0.89; Log Likelihood: -321.07; Prob> chi^2 = 0.00; Sample period: 2002-2021 (n=20))

Forecasting: With the help of ARIMA (2,1,1) model, the export quantity of Indian wood products was forecasted upto the Year 2025 (Table 25; Fig 27).

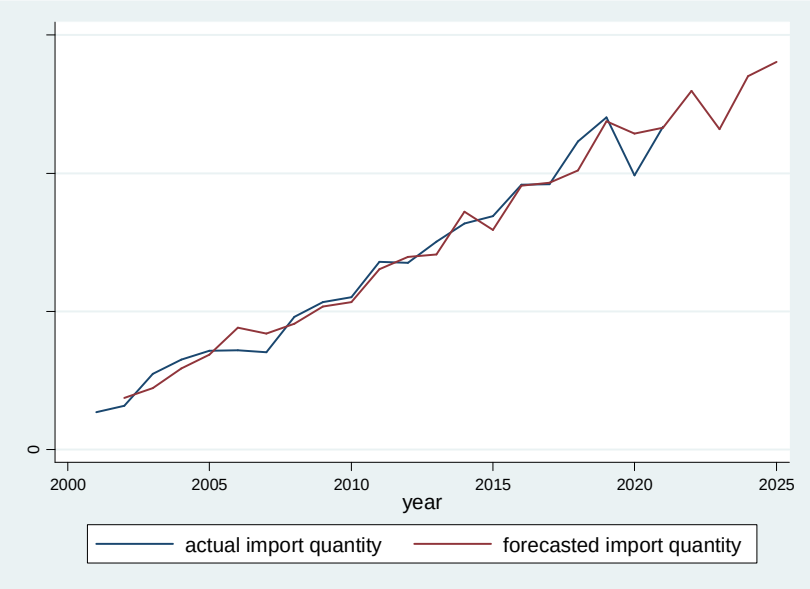


Fig 27: India's import of wood products (in CUM RWE)

Table 25. Forecast of India's import of wood products

Year	2023	2024	2025	2026	2027
Forecasted Import quantity (CUM RWE)	46400000	54100000	56100000	53500000	60700000

Note:(As ARIMA is short term forecast model and considering the downfall of import in 2020 due to covid, the results has to be interpreted cautiously)

Factors affecting Indian Wood based products export: The results of the Granger Co-integration approach to claim a relationship between import quantity with price, population and

per capita income were presented in Table 26. The results indicated that there exists a long-run relationship between import and population as well as import and per capita Income; however, no evidence was observed with price.

Table 26: Results of Engle and Granger cointegration for import and contextual factors

Dependent Variable	Independent Variable	Z-statistics	10 % critical value
Import quantity (CUM RWE)	Price (Rs.)	-0.740	-3.263
	Population (In Millions)	-4.360	-3.263
	Per Capita Income (Rs)	-3.800	-3.263

Granger Cointegration

Import Quantity	Coefficient	t-statistic	P>t	Durbin-Watson d-statistic
Population	128322.50 (5283.60)	24.29	0.00	1.95
Per Capita Income	660.46 (19.18)	34.43	0.00	1.67

Values in the parentheses indicates the standard error.

It is quite evident that as per the law of Income demand, when the income of the people increases then the demand for wood increases which will put pressure to import more. Similarly, the increase in population will also put pressure on local production, which will lead to import more. The Durbin-Watson statistic for this regression indicates the absence of autocorrelation. The short run dynamics using the Error Correction Model results for the Correction Model is reported in Table 27.

Table 27: Error Correction Model a. Import vs Population b. Import vs Per capita income

D. Import quantity	Coef.	t-value	p>t
With Population			
Population D1.	675.23 (114820.60)	0.01	0.99
Residuals L1.	-0.98 (0.23)	-4.24	0.00
Constant	2029055 (1972226)	1.03	0.32
With per capita income			
Per Capita Income D1.	676.08 (136.32)	4.96	0.00
Residuals L1.	-0.88 (0.26)	-3.39	0.00
constant	48664.41 (547136.60)	0.09	0.93

Values in the parenthesis indicates the standard error

The table (25) indicates the short run dynamics between Population and Import quantity where the error coefficient is statistically significant with a coefficient of -0.98. The error correction coefficient indicates the speed of adjustment of the dependent variable to the independent

variable in a time period. Here, the coefficient -0.98 indicates the swift response of import to the increase in population. The error correction coefficient in Table (26) indicates the speed of adjustment of Import to Per capita Income in a time period. Here, the coefficient -0.88 indicates the quick response of imports to the increase in per capita income in a time period. The relationship between income and import can be attributed to the Income demand i.e. when the income increases the demand of wood increases which puts pressure to import more.

Summary of the findings

A total of 58 commodities of wood products distributed in seven chapters of HS Code are being imported and exported in India and the commodities wise statistics of quantity and value (₹ and US$) are being managed by Directorate General of Commercial Intelligence and Statistics (DGCIS) in India. The seven broader categories of wood products commodities under international trade are wooden articles; pulpwood; paper and paperboard; printed materials; furniture; sport goods and miscellaneous wooden items. The quantity of wood contained in various wood products were not readily available therefore a uniform system was used to convert the wood contained (quantity or volume) in Round Wood equivalent (RWE) based on available literature, expert elicitation and quasi theoretical construct, as per the commodity.

The official import and export statistics of GoI reveals that in 2021, the total International trade of wood products was around 60 m CUM RWE with 77% share on import; and the total value of the trade was around ₹ 91611 Cr. (12,292 m US$) with import of 60% share in ₹ and in US$. The quantity of wood products for import and export was increased from 0.6 m to 46 m CUM RWE and 0.1 m to 14 m CUM RWE during FY 2000-01 to FY 2021-22, respectively with a trade deficit of 31.8 m CUM RWE. However, the value of import and export of wood products increased from ₹ 2123 Cr. (684 m US$) to ₹ 54730 Cr. (7344 m US$) and ₹ 192 Cr. (63 m US$) to ₹ 36881 Cr. (4948 m US$) during FY 2000-01 to FY 2021-22, respectively with a trade deficit of ₹ 23940 Cr. (2396 m US$).

- The annual growth of wood products for quantity (cum RWE) since FY 2010-11; FY 2015-16 and FY 2020-21 was 19.27; 23.05% and 117.80% for India's import and 44.37%; 65.56% and 142.19% for India's export, respectively.
- The annual growth of wood products for value (in ₹ Cr.) since FY 2010-11; FY 2015-16 and FY 2020-21 was 20.10%; 19.73% and 148.04% for import and 49.477%; 39.37% and 161.429% for export, respectively.

The annual growth of wood products for quantity (cum RWE) since FY 2010-11; FY 2015-16 and FY 2020-21 was 19.27; 23.05% and 117.80% for import and 44.37%; 65.56% and 142.19% for export, respectively. However, the annual growth of wood products for value (in ₹ Cr.) since FY 2010-11; FY 2015-16 and FY 2020-21 was 20.10%; 19.73% and 148.04% for import and 49.477%; 39.37% and 161.429% for export, respectively.

Pulpwood, paper and paperboard and wooden articles has high share in import, however, paper & paperboard, furniture, printing material and panels and wooden products are major

contributors for export. The recent growth of wood products traded for FY 2021-22 since FY 2015-16 and FY 2020-21 was 138% and 117% for quantity (in m RWE) and 118% and 149% in value (₹ Cr.) for import and was 393% and 142% for quantity (in m RWE) and 236% and 161% in value (₹ Cr.) for export. Trade deficit in term of quantity (in cum RWE) and value (in ₹ Cr. and US$) was having increasing trend from FY 2000-01 to FY 2021-22, however, the pace of increase in quantity and value, both was reduced during the later periods. The trade deficit for quantity and value of wood products was 31.8 m cum RWE and ₹ 23940 Cr. (1063 US$) in FY 2021-22, respectively.

The trade deficit for quantity and value of wood products was 31.8 m cum RWE and ₹ 23940 Cr. (1063 US$) in FY 2021-22, respectively.

Concluding Recommendations

The evaluation presents following recommendations:

Government of India should consider suitable programs and policies for reduction of the trade deficit. The policy perspective may revolve around encouraging tree cultivation through incentivizing the farmers with the development of improved and hassle free market besides reviving the artesian and handicrafts industries. India's furniture export sector is poised for substantial growth due to its low-cost labor and government support, and potential to boost exports against China and Vietnam. Technological development for development of designed and quality furniture may also be an option for high end production of furniture.

The wood products import may be reduced by encouraging the technological intervention for alternate sources of pulpwood production besides reducing the import of paper & paperboard through meeting the demand by some other alternatives, through the increase in wood production in TOFs and encouraging the use of digital technology. Use of recycled paper may be encouraged besides ensuring a proper mechanism for collection of wood based waste paper. Moreover, use of digital media should be encouraged to reduce the burden of pulpwood.

The wood products export may be encouraged in general by developing or producing various wooden products based on encouraging production of plantation. The demand of paper and paperboard are high in abroad therefore production of the commodities may be increased. Moreover, furniture also has a huge share for export therefore production of furniture may be increased using the wood from plantation and refabricating or reusing of the wooden products. Wooden articles may also have scope for export therefore handicraft industries may be promoted.

References

Akaike, H. (1974). A new look at the statistical model identification. IEEE transactions on automatic control, 19(6), 716-723.

Bansal A. K. 2004. India Timber Import-An Analysis, Indian Forester, 130 (9): 963-976.

Bansal, A. K, 2022, Wood Production and Consumption in India during 2019-20, NCCF Policy Paper No. 1/2022, New Delhi, India.

Box, G.E.P and G.M. Jenkins (1970).Time series analysis: Forecasting and control, San Francisco: Holden-Day

Brockwell, P. J., & Davis, R. A. (Eds.). (2002). Introduction to time series and forecasting. New York, NY: Springer New York.

Chand, P., Sirohi, S., Sirohi, S.K. and Chahal, V.P. 2015. Estimation of demand and supply of livestock feed and fodder in Rajasthan: A disaggregated analysis. Indian Journal of Animal Sciences. 85 (11). 1229-1234

DGCIS. 2023. Meta Data. Accessed on 14 January, 2023 http://www.dgciskol.gov.in/writereaddata/Downloads/20211111162223META%20DATA.pdf

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427–431.

Dikshit, A.K. and Birthal, P.S. 2010. India's livestock feed demand: Estimates and Projections. Agriculture Economics Research Review. Vol. 23. 15-28

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. Econometrica: journal of the Econometric Society, 251-276.

FAO. 2021. Forestry Production and Trade, Food and Agriculture Organisation, Rome, accessed on 23 March 2022.

FAO. 2021. Forestry Production and Trade, Food and Agriculture Organisation, Rome, accessed on 23 March 2022.

FAO. 2022. Global forest sector outlook 2050: Assessing future demand and sources of timber for a sustainable economy – Background paper for The State of the World's Forests 2022. FAO Forestry Working Paper, No. 31. Rome. https://doi.org/10.4060/cc2265en

FAO. 2022. Global forest sector outlook 2050: Assessing future demand and sources of timber for a sustainable economy – Background paper for The State of the World's Forests 2022. FAO Forestry Working Paper, No. 31. Rome. https://doi.org/10.4060/cc2265en

FAO/ITTO/ UNECE Rome.2020. Forest Product Conversion Factors.

FSI. 2011. India State of Forest Report 2011. Forest Survey of India, New Delhi. Available at: https://www.fsi.nic.in/forest-report-2011

GoI. 1998. Study of Forest Industry, Chemprojects Design Pvt. Ltd., Ministry of Environment and Forests, New Delhi, India.

Granger, C. W., & Newbold, P. (1974). Spurious regressions in econometrics. Journal of econometrics, 2(2), 111-120.

Guleria, A.S. 1988. Current production and future requirement of wood products in India. *Indian J. Agric. Econ.*, 43 (3): 270-76.

ICAR, 2013. Vision 2050.

IPIRTI. 2021. Import/Export of wood and wood based products. IPIRTI Bulletin, Bengaluru.

IPIRTI. 2021. Import/Export of wood and wood based products. IPIRTI Bulletin, Bengaluru.

Kalla, J.C. 1988. Forestry and economic development. Indian J. Agric. Econ., 34 (3): 237-57

Kant, P. and Nautiyal, R. 2021. India Timber Supply and Demand 2010–2030. ITTO,

Ljung, G. M., & Box, G. E. (1978). On a measure of lack of fit in time series models. Biometrika, 65(2), 297-303.

Manoharan, T.R. 2011. Supply determinants of timber trade in India. World Wildlife Fund

Patel, B.H., 2012.Export Market Challenges for Indian Timber Products.19th Illegal logging stakeholder update. London

Rai, K.N. Shri Niwas and R.K. Khatkar. 1983. Demand and supply analysis of forest products in India. *Indian J. Agric. Econ.*, 34 (3): 51-60.

Sawant, S. D. (1997). Performance of Indian agriculture with special reference to regional variations. Indian journal of agricultural economics, 52(3), 353-373.

USDA. 2019. India: Wood products Update 2019. GAIN Report Number:IN9033.

WITS. 2023. Trade Summary for India: 2020. Accessed on 12 January, 2023 from https://wits.worldbank.org/countrysnapshot/en/IND/textview.

Annexure 1: Conversion factor for the various commodities of the Chapter 44 (Wooden Article)

Code	Panels and Wood products	Unit	Conversion Value	Remark/Equation (Source)
44011010	Fuel wood in logs	*t*	1.86	*1 t = 1.86 m^3 RWE(FAO, ITTO, and UNECE, 2020; Page No 48)*
44011090	Other fuel wood in logs, billets, twigs, faggots etc	*t*	1.86	
44012100	Coniferous wood in chips or particles	*t*	2.43	*1m^3 RWE = 2.43mt chips or particles (FAO, ITTO, and UNECE, 2020; Page No 19)*
44012200	Non-coniferous wood in chips or particles	*t*	0.40	
44032010	Saw logs and veneer logs	*m^3*	1.00	*1 m^3 log = 1 m^3 RWE (Expert Elicitation)*
44032020	Poles pilling & posts coniferous	*m^3*	1.00	
44032090	Coniferous NES	*m^3*	1.00	
44031000	Wood treated with paint stain creosote/other preservative	*m^3*	0.54	*1 m^3 log = Mean (50,58) m^3 RWE = 0.54 m^3 RWE Where 50 for coniferous wood and 58 for non-coniferous (type of wood is not specify) (FAO, ITTO, and UNECE, 2020; Page No 26)*
44034100	Dark red/light red meranti & meranti bakau	*m^3*	1.00	*1 m^3 log = 1 m^3 RWE (Expert Elicitation)*
44034910	Teak wood in rough	*m^3*	1.68	*1 m^3 rough = 1.68 m^3 log;(FAO, ITTO, and UNECE, 2020; Page No 26)*
44039100	Oak wood in rough	*m^3*	1.68	
44039200	Beech wood in rough	*m^3*	1.68	
44039911	Rose wood (*Dalbergea latifolia*)	*m^3*	1.00	*1 m^3 log = 1 m^3 RWE*
44039912	Sal (*Chorea robusta*)	*m^3*	1.00	
44039913	Sandal wood (*Santalum alburn*)	*m^3*	1.00	
44039914	Semul (*Bombaxceiba)*	*m^3*	1.00	
44039915	Walnut wood (*Juglansrejia*)	*m^3*	1.00	
44039917	Paliwood (*Palaquimelliplicum)*	*m^3*	1.00	
44039911	Andaman padauk (*Pterocarousdalbaergioides*)	*m^3*	1.00	
44039913	Gurgan (*Dipterocarpusalatus*)	*m^3*	1.00	
44039914	Khair(*Acacia catachu)*	*m^3*	1.00	
44039921	White cedar (*Dysozylummalabaricum)*	*m^3*	1.00	
44039926	Birch (*Betullaspp)*	*m^3*	1.00	
44039929	Other	*m^3*	1.00	
44041000	Hoopwood etc coniferous	*Kg*	0.002	*1 m^3 log (coniferous) = 420 kg;1 kg = 0.002 m^3 (FAO, ITTO, and UNECE, 2020; Page No 13)*
44042010	Wooden sticks, semi finished for manufacturing of walking stick, to	*Kg*	0.004	*Wood based durables= 516.5 (FAO, ITTO, and UNECE, 2020; Page No 13); roundwood to sawnwood conversion factor = 0.46(FAO, ITTO, and UNECE, 2020; Page No 21); 1 m^3 RWE = 0.004 kg*
44042020	Drawn wood	*Kg*	0.004	
44042090	Others	*Kg*	0.004	
44050000	Wood wool ,wood flour	*Kg*	0.00241	*1 m^3 RWE= 2.41 od t ; 1 m^3RWE= 0.00241 m^3 RWE (FAO, ITTO, and UNECE, 2020; Page No 19)*
44061000	Wooden sleepers not impregnated	*m^3*	1.68	*1 m^3 RWE = 1.68 m^3 log(FAO, ITTO, and UNECE, 2020; Page No 26)*
44069000	Other wooden sleeper	*m^3*	1.68	
44071010	Doglas fir (*Psudotsugamenziesie*)	*m^3*	1.00	*1 m^3 log = 1 m^3 RWE*
44071020	Pine (*Pinusspp)*	*m^3*	1.00	
44071090	Other coniferous wooden articless	*m^3*	1.00	

Code	Panels and Wood products	Unit	Conversion Value	Remark/Equation (Source)
44072500	Meranti (dark red, light red &bakau)	m^3	1.00	
44072600	White (lauan,seraya), meranti(white, yellow)& Alan	m^3	1.00	
44072910	Sawn/chipped teak wood	m^3	1.86	*1 m^3 RWE = 1.86m^3rough sawn (FAO, ITTO, and UNECE, 2020; Page No 26)*
44072990	Other tropical woods sawn or chipped	m^3	1.86	
44079100	Sawn/chipped wood of oak	m^3	1.86	
44079200	Sawn/chipped wood of beech	m^3	1.86	
44079910	Sawn/chipped wood of birch (*Betulaspp)*	m^3	1.86	
44079920	Sawn/chipped wood of willow	m^3	1.86	
44081010	Sheets for plywood	*Kg*	0.0022	*Average weight of veneer= 635 (FAO, ITTO, and UNECE, 2020; Page No 31);1m^3 RWE = 1.91m^3 (FAO, ITTO, and UNECE, 2020; Page No 31); 1m^3 RWE = 0.0022 unit of veneer sheet (kg)*
44081020	Oak wood veneer	*Kg*	0.0022	
44081030	Veneer sheets for match boxes/match splints	*Kg*	0.0022	
44081090	Others	*Kg*	0.0022	
44083190	Other veneer sheets- meranti	*Kg*	0.0022	
44083910	Sheets for plywood	*Kg*	0.0022	
44083920	Veneer sheets of rosewood	*Kg*	0.0022	
44083990	Others	*Kg*	0.0022	
44089010	Sheets for plywood	*Kg*	0.0022	
44089020	Veneer sheets for match boxes/splints	*Kg*	0.0022	
44089090	Others	*Kg*	0.0022	
44091010	Wooden planned/tongued/ grooved/rebated etc but not moulded	*Kg*	0.004	*wbd= 516.5 (FAO, ITTO, and UNECE, 2020; Page No 13); roundwood to sawnwood conversion factor = 0.46(FAO, ITTO, and UNECE, 2020; Page No 21); 1 m^3 RWE = 0.004 kg*
44091020	Wooden beadings &moulding (inclmoulded skirting & other moulded board	*Kg*	0.004	
44091090	Other	*Kg*	0.004	
44129910	Plastic laminated plywood	m^3	1.91	*Average weight of veneer= 635 (FAO, ITTO, and UNECE, 2020; Page No 31);1m^3 RWE = 1.91m^3 (FAO, ITTO, and UNECE, 2020; Page No 31)*
44129920	Decorative plywood	m^3	1.91	
44129990	Others	m^3	1.91	
44101900	Other particle /similar board of wood	*Kg*	0.00214	*1000 kg*2.14= 1 m^3 RWE;1kg = 0.00214 m^3 RWE (Expert Elicitation)*
44130000	Densified wood in blocks plates strips or profile shapes	*Kg*	0.004	*wbd= 516.5 (FAO, ITTO, and UNECE, 2020; Page No 13); roundwood to sawnwood conversion factor = 0.46(FAO, ITTO, and UNECE, 2020; Page No 21); 1 m^3 RWE = 0.004 kg*
44140000	Wooden frames for paintings photographs mirrors or similar	*Kg*	0.004	
44151000	Cases boxes crates drums and similar packings cable-drum	*No*	0.000017	*Own estimate*
44152000	Pallets, pallets(box, collars) & other load boards of wood	*No*	0.000017	
44160010	Cases, barrels, vats & tubs	*Kg*	0.004	*wbd= 516.5 (FAO, ITTO, and UNECE, 2020; Page No 13); roundwood to sawnwood conversion factor = 0.46(FAO, ITTO, and UNECE, 2020; Page No 21); 1 m^3 RWE = 0.004 kg*
44160099	Others	*Kg*	0.004	
44170000	Tools, tool bodies, tool handles broom or brush bodies	*Kg*	0.004	
44181000	Windows, French windows and their frames	*Kg*	0.004	
44182010	Flush doors	*Kg*	0.004	
44182020	Frames and threshold of flush doors	*Kg*	0.004	

Code	Panels and Wood products	Unit	Conversion Value	Remark/Equation (Source)
44182090	Others	*Kg*	0.004	
44184000	Shuttering for concrete constructional work	*Kg*	0.004	
44189000	Other builders joinery etc	*Kg*	0.004	
44190010	Tableware of wood	*Kg*	0.004	

Annexure 2: **Conversion factor for the various commodities of the Chapter 47 (Pulpwood)**

Codes	Wood products	Unit	Conversion Value	Remark/Equation (Source)
47010000	Mechanical wood pulp	*Kg*	0.00370	*1mt = 3.70 m^3 RWE ; 1kg= 0.0037 m^3 RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
47020000	Chemical wood pulp dissolving grades	*Kg*	0.00370	
47031100	Chemical wood pulp unbleached coniferous, sulphate	*Kg*	0.00370	
47031900	Chemical wood pulp unbleached non coniferous, sulphite	*Kg*	0.00370	
47032100	Bleached or semi-bleached coniferous chemical wood pulp	*Kg*	0.00370	
47032900	Bleached or semi-bleached non-coniferous chemical wood pulp	*Kg*	0.00370	
47041100	Unbleached coniferous chemical wood pulp sulphite	*Kg*	0.00370	
47042100	Semi-bleached/bleached coniferous chemical wood pulps	*Kg*	0.00370	
47042900	Semi-bleached/bleached non-coniferous chemical wood pulp	*Kg*	0.00370	
47050000	Wood pulp obtained by combination of mechanical and chemical	*Kg*	0.00370	
47061000	Cotton linters pulp	*Kg*	0.00370	
47062000	Pulps of fibres derived from recovered (waste and scrap)	*Kg*	0.00370	
47069100	Other mechanical pulp	*Kg*	0.00370	
47069200	Other chemical pulps	*Kg*	0.00370	
47069300	Other semi-chemical pulp	*Kg*	*0.00370*	

Annexure 3: Conversion factor for the various commodities of the Chapter 48 (Paper and Paperboard)

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48010010	Glazed newsprint	*Kg*	0.0035	*1mt = 3.50m³ RWE ; 1kg= 0.0035 m³ RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
48010090	Other newsprints	*Kg*	0.0035	
48021010	Hand-made paper	*Kg*	0.0035	
48021020	Hand-made paperboard	*Kg*	0.0035	
48022010	Photographic base paper uncoated	*Kg*	0.0035	
48022090	Others	*Kg*	0.0035	
48024000	Wallpaper base	*Kg*	0.0035	
48025410	India paper	*Kg*	0.0035	
48025420	Litho and offset paper	*Kg*	0.0035	
48025430	Duplicating paper	*Kg*	0.0035	
48025510	Litho and offset paper	*Kg*	0.0035	
48025520	Drawing paper	*Kg*	0.0035	
48025530	Duplicating paper	*Kg*	0.0035	
48025540	Account book paper	*Kg*	0.0035	
48025550	Bank,bond and cheque paper	*Kg*	0.0035	
48025590	Other paper	*Kg*	0.0035	
48025610	Litho and offset paper	*Kg*	0.0035	
48025620	Drawing paper	*Kg*	0.0035	
48025640	Account book paper	*Kg*	0.0035	
48025690	Other paper	*Kg*	0.0035	
48025710	Litho and offset paper	*Kg*	0.0035	
48025720	Drawing paper	*Kg*	0.0035	
48025730	Duplicating paper	*Kg*	0.0035	
48025740	Account book paper	*Kg*	0.0035	
48025770	Paper for security printing, currency paperstamp paper	*Kg*	0.0035	
48025790	Other paper	*Kg*	0.0035	
48025810	Litho and offset paper	*Kg*	0.0035	
48025820	Drawing paper.	*Kg*	0.0035	
48025830	Duplicating paper	*Kg*	0.0035	
48025890	Other	*Kg*	0.0035	
48026110	Drawing paper	*Kg*	0.0035	
48026120	Poster paper	*Kg*	0.0035	
48026190	Other	*Kg*	0.0035	
48026210	Drawing paper	*Kg*	0.0035	
48026220	Poster paper	*Kg*	0.0035	
48026250	Automatic data processing machine paper	*Kg*	0.0035	
48026290	Other	*Kg*	0.0035	
48026910	Drawing paper	*Kg*	0.0035	*1mt = 3.50m³ RWE ; 1kg= 0.0035 m³ RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
48026920	Poster paper	*Kg*	0.0035	
48026930	Printing paper dyed/marbled in mass	*Kg*	0.0035	
48026990	Other	*Kg*	0.0035	

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48030010	Tissue paper for house hold/sanitary purpose in commercial	*Kg*	0.0035	
48030090	Other tissue paper	*Kg*	0.0035	
48041100	Kraft liner unbleached	*Kg*	0.0035	
48041900	Other kraft liner	*Kg*	0.0035	
48042100	Sack kraft paper unbleached	*Kg*	0.0035	
48042900	Other sack kraft paper	*Kg*	0.0035	
48043100	Other craft paper and paperboard weighing 150 g/m2 or less	*Kg*	0.0035	
48043900	Other craft paper and paperboard weighting<=150g/m2	*Kg*	0.0035	
48044100	Other kraft paper/paperboard weighting more than 150g/m2 but less t	*Kg*	0.0035	
48044200	Other kraft paper/paprboard weighting > 150 g/m2 but<225g/m2 bleached	*Kg*	0.0035	
48044900	Other kraft paper and paperboard weighting above 150g/m2 but below	*Kg*	0.0035	
48045100	Kraft paper/paperboard weighting/225g/m2 unbleached	*Kg*	0.0035	
48045200	Other kraft paper and paperboard weighting>=225g/m2 bleached uniformly	*Kg*	0.0035	
48045900	Other kraft paper/paperboard weighting 225g/m2/more	*Kg*	0.0035	
48051100	Semi-chemical fluting paper	*Kg*	0.0035	
48051900	Other fluting paper	*Kg*	0.0035	
48052400	Test liner(recycled liner board) of wt<=150 g/m2	*Kg*	0.0035	
48052500	Test liner(recycled liner board)of wt>250 g /m2	*Kg*	0.0035	
48053000	Sulphite wrapping paper	*Kg*	0.0035	
48054000	Filter paper and paperboard	*Kg*	0.0035	
48055000	Felt paper and paperboard	*Kg*	0.0035	
48059100	Other uncoated paper and paperboard of wt<=150 g/m2	*Kg*	0.0035	
48059200	Other uncoated paper and paperboard of wt< 150 g/m2 sut<225 g/	*Kg*	0.0035	
48059300	Other uncoated paper and paperboard of wt>=225 g/m2	*Kg*	0.0035	
48061000	Vegetable parchment paper	*Kg*	0.0035	
48062000	Greaseproof papers	*Kg*	0.0035	
48063000	Tracing papers	*Kg*	0.0035	
48064010	Glassine paper	*Kg*	0.0035	
48064090	Others (e.g. vellum)	*Kg*	0.0035	

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48070010	Straw paper and other straw board, covered with paper other	*Kg*	0.0035	
48070090	Other	*Kg*	0.0035	*1mt = 3.50m³ RWE ; 1kg= 0.0035 m³ RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
48081000	Corrugated paper/paperboard w/n perforated	*Kg*	0.0035	
48084010	Sack kraft paper, creped or crinkled, whether or not embossed	*Kg*	0.0035	
48084090	Other kraft paper, creped or crinkled, whether or not emboss	*Kg*	0.0035	
48089000	Other paper and paperboard corrugated	*Kg*	0.0035	
48092000	Self copy paper	*Kg*	0.0035	
48099000	Other copying or transfer papers	*Kg*	0.0035	
48101310	Imitation art paper	*Kg*	0.0035	
48101320	Art paper	*Kg*	0.0035	
48101330	Chrome paper or paperboard	*Kg*	0.0035	
48101390	Other	*Kg*	0.0035	
48101410	Imitation paper	*Kg*	0.0035	
48101420	Art paper	*Kg*	0.0035	
48101430	Chrome paper or paperboard	*Kg*	0.0035	
48101490	Other	*Kg*	0.0035	
48101910	Imitation art paper	*Kg*	0.0035	
48101920	Art paper	*Kg*	0.0035	
48101930	Chrome paper or paperboard	*Kg*	0.0035	
48101990	Other	*Kg*	0.0035	
48102200	Light-weight coated paper other graphic purpose out of total fiber	*Kg*	0.0035	
48102900	Other paper and paperboard for writing etc of which >=10% by wt of t	*Kg*	0.0035	
48103100	Kraft paper and paperboard other than for writingetc bleached w	*Kg*	0.0035	
48103200	Kraft paper and paperboard,other than for writingprinting etc b	*Kg*	0.0035	
48103910	Insulating paper	*Kg*	0.0035	
48103920	Electric insulating press board kg	*Kg*	0.0035	
48103930	Insulation boards (homogeneous)	*Kg*	0.0035	
48103990	Others	*Kg*	0.0035	
48109200	Multiply paper and paperboard	*Kg*	0.0035	
48109900	Other coated paper and paperboard (not multiply)	*Kg*	0.0035	
48111000	Tarred, bituminised/asphalted paper and paperboard	*Kg*	0.0035	

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48114100	Self adhesive paper and paperboard	*Kg*	0.0035	
48114900	Other gummed or adhesive paper and paperboard	*Kg*	0.0035	
48115110	Aseptic packaging paper	*Kg*	0.0035	
48115190	Other bleached paper, paperboard etc. Weighing > 150gm/sqmt	*Kg*	0.0035	
48115910	Aseptic packaging paper	*Kg*	0.0035	
48115990	Other paper, paperboard etc. Weighing > 150gm/sq.mt	*Kg*	0.0035	
48116000	Paper and paperboard, coated, impregnated or covered with wax	*Kg*	0.0035	*1mt = 3.50m^3 RWE ; 1kg= 0.0035 m^3 RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
48119011	Hand-made paper and paperboard, rules, lined or squared but not otherwise printed	*Kg*	0.0035	
48119012	Chromo and art paper coated	*Kg*	0.0035	
48119013	Building board of paper or pulp impregnated	*Kg*	0.0035	
48119015	Raw base paper for sensitizing coated	*Kg*	0.0035	
48119016	Surface marbled paper.	*Kg*	0.0035	
48119017	Leather board and imitation leather board	*Kg*	0.0035	
48119091	Other grape guard paper	*Kg*	0.0035	
48119093	Thermal paper for fax machines	*Kg*	0.0035	
48119094	Thermal paper in jumbo rolls	*Kg*	0.0035	
48119099	Others	*Kg*	0.0035	
48120000	Filter blocks slabs and plats of paper pulp	*Kg*	0.0035	
48131000	Paper in the form of booklets or tubes	*Kg*	0.0035	
48132000	Cig paper in rolls of width not excluding 5 cm	*Kg*	0.0035	
48139010	Cig paper in bulk or sheets	*Kg*	0.0035	
48139090	Others	*Kg*	0.0035	
48142000	Wallpaper and similar wall coverings consisting of paper coated/covered on face side	*Kg*	0.0035	
48149000	Other wallpaper and wallcoverings	*Kg*	0.0035	
48162010	Duplicating papercut to size	*Kg*	0.0035	
48162090	Others	*Kg*	0.0035	
48169010	Other copying or transfer papers(excl. printed transfer) cut to s	*Kg*	0.0035	
48169020	Calculating mach paper in rolls and strips not exceeding 15 cm i	*Kg*	0.0035	
48169090	Others	*Kg*	0.0035	

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48171000	Envelopes	*Kg*	0.0035	
48172000	Letter cards, postcards and correspondence cards	*Kg*	0.0035	
48173010	Writing blocks	*Kg*	0.0035	
48173090	Other paper stationery for correspondence containing only an assortment of paper stationary	*Kg*	0.0035	
48181000	Toilet paper	*Kg*	0.0035	
48182000	Handkerchiefs,cleaning/facial tissue and towels	*Kg*	0.0035	
48183000	Tablecloths and serviettes.	*Kg*	0.0035	
48185000	Articles of apparel andclothing accessories	*Kg*	0.0035	
48189000	Other articles of paper,paper pulp,cells wading etc	*Kg*	0.0035	
48191010	Boxes of corrugated paper and paper board	*Kg*	0.0035	
48191090	Cartonsandcases of corrugated paperandpaperboard	*Kg*	0.0035	
48192010	Cartons/boxes/cases for packing matchsticks	*Kg*	0.0035	*1mt = 3.50m^3 RWE ; 1kg= 0.0035 m^3 RWE* (*FAO, ITTO, and UNECE, 2020; Page No 40)*
48192020	Boxes of non-corrugated paper and paperboard	*Kg*	0.0035	
48192090	Fling cartonsandcases of non-corrugated paperandboard	*Kg*	0.0035	
48193000	Sacks ,bags width of base 40 cm and above	*Kg*	0.0035	
48194000	Other sacks and bags including cones	*Kg*	0.0035	
48195010	Other packing containers made of corrugated paper/paperboard	*Kg*	0.0035	
48195090	Other packing containers made of other materials	*Kg*	0.0035	
48196000	Box files letter trays storage boxes and similar articles used in of	*Kg*	0.0035	
48201010	Registers account books	*Kg*	0.0035	
48201020	Letter pads	*Kg*	0.0035	
48201090	Others	*Kg*	0.0035	
48202000	Exercise books	*Kg*	0.0035	
48203000	Binders folders and file covers	*Kg*	0.0035	
48204000	Manifold business form, interleaved carbon sets	*Kg*	0.0035	
48205000	Albums for samples or for collections	*Kg*	0.0035	
48209010	Blotting papers cut to size	*Kg*	0.0035	
48209090	Others	*Kg*	0.0035	
48211010	Paper tag	*Kg*	0.0035	
48211020	Labels	*Kg*	0.0035	
48211090	Other printed paper or paperboard	*Kg*	0.0035	

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
48219010	Labels	*Kg*	0.0035	
48219090	Others	*Kg*	0.0035	
48221000	Bobbins spools used forwarding textile yarn	*Kg*	0.0035	
48229010	Paper tube of all kinds	*Kg*	0.0035	
48229090	Others	*Kg*	0.0035	
48232000	Filter paper and paperboard	*Kg*	0.0035	
48234000	Printed rolls,sheetsanddials for selfrecording apparatus	*Kg*	0.0035	
48236900	Other	*Kg*	0.0035	
48237010	Paper pulp moulded trays	*Kg*	0.0035	
48237020	Wood pulp board	*Kg*	0.0035	
48237030	Articles of paper machine other than artware and moulded/pressed	*Kg*	0.0035	
48237090	Others	*Kg*	0.0035	
48239011	Braille paper	*Kg*	0.0035	
48239012	Cellulose in sole board/sheet	*Kg*	0.0035	
48239013	Packing and wrapping paper	*Kg*	0.0035	
48239014	Paper for cigarette filter tips	*Kg*	0.0035	
48239015	Paper cone for loud speaker	*Kg*	0.0035	
48239016	Patterns of paper for leather footwear/ garments/goods	*Kg*	0.0035	*1mt = 3.50m^3 RWE ; 1kg= 0.0035 m^3 RWE (FAO, ITTO, and UNECE, 2020; Page No 40)*
48239017	Patterns of paper for articles of apparel/ clothing accessories	*Kg*	0.0035	
48239018	Product consisting of sheets of paper/paperboard, impregnated	*Kg*	0.0035	
48239019	Decorative laminates	*Kg*	0.0035	
48239022	Monotype and news tape paper in strips, width<15cm	*Kg*	0.0035	
48239030	Plain or embossed seals made of paper laminated paper or	*Kg*	0.0035	
48239090	Others	*Kg*	0.0035	

Annexure 4: Conversion factor for the various commodities of the Chapter 49 (Printing Material)

HS Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
49011010	Printed books	*No*	0. 000525	*Av. weight of printed book = 150 gm= 0.15 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit = (0.15*0.0035) m^3 RWE = 0. 000525 m^3 RWE (Own estimate)*
49011020	Pamphlets booklets brochures leaflets	*No*	0.0002	*Av. weight of printed book = 50 gm= 0.05 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit = (0.05*0.0035) m^3 RWE = 0. 0002 m^3 RWE (Own estimate)*
49019100	Dictionaries and encyclopedias and serial installment thereof	*No*	0. 000525	*Av. weight of printed book = 150 gm= 0.15 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit = (0.15*0.0035) m^3 RWE = 0. 000525 m^3 RWE (Own estimate)*
49019900	Other printed books etc (of Hs code no. 4901)	*No*	0.000525	*Av. weight of printed book = 150 gm= 0.15 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit = (0.15*0.0035) m^3 RWE = 0. 000525 m^3 RWE (Own estimate)*
49021010	Newspaper	*Kg*	0.0035	*1mt = 3.50 m^3 RWE; 1kg= 0.0035 m^3 RWE(FAO, ITTO, and UNECE, 2020; Page No 40)*
49021020	Journals and periodicals	*Kg*	0.0035	
49029010	Newspaper	*Kg*	0.0035	
49029020	Journals and periodicals	*Kg*	0.0035	
49030010	Children picture books	*Kg*	0.0035	
49030020	Children drawing or coloring books	*Kg*	0.0035	
49070010	Unused postage rev of similar stamps of currency/ newissue having face value	*Kg*	0.0035	
49070020	Bank notes	*Kg*	0.0035	
49090010	Greetings cards	*No*	0.00002	*Average weight of printed book = 5gm= 0.005 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit= (0.005*0.0035) = 0.0000175 m^3 RWE (Own estimate)*
49090090	Others	*No*	0.00002	*Average weight of printed book = 5gm= 0.005 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit= (0.005*0.0035) = 0.0000175 m^3 RWE (Own estimate)*
49100010	Advertising calendar	*No*	0.0002	*Average weight of printed book = 50gm= 0.05 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *1 unit = (0.05*0.0035) = 0.000175 m^3 RWE (Own estimate)*
49100090	Other printed calendar	*No*	0.0002	*Average weight of printed book = 50gm= 0.05 kg* *1 mt = 3.50 m^3 RWE; or 1 kg = 0.0035 m^3 RWE* *Nos= (0.05*0.0035) = 0.000175 m^3 RWE (Own estimate)*

HS Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
49111010	Posters, printed	*Kg*	0.0035	*1mt =3.50 m^3 RWE;1kg = 0.0035 m^3 RWE (FAO, ITTO, and UNECE, 2020; Page No 40)*
49111030	Printed inlay cards etc.	*Kg*	0.0035	
49119100	Pictures designs and photographs	*Kg*	0.0035	
49119910	Hardcopy(printed)of computer software	*Kg*	0.0035	

Annexure 5: Conversion factor for the various commodities of the Chapter 94 (Furniture)

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
94016100	Upholstered seats with wooden frames	*No*	0.0006	*1. Average weight of wooden frame = 175gm= 0.175 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.175*2.27)/613= 0.0006 m^3 RWE*
94016900	Other seats with wooden frames	*No*	0.0006	*1. Average weight of wooden frame = 175gm= 0.175 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.175*2.27)/613= 0.0006 m^3 RWE*
94033010	Cabinetware	*Kg*	0.0037	*wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit =(1*2.27)/613= 0.0037 m^3 RWE*
94033090	Others	*Kg*	0.0037	*wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit =(1*2.27)/613= 0.0037 m^3 RWE*
94034000	Wooden furniture of a kind used in the kitchen	*No*	0.0008	*1. Average weight of wooden furniture= 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94035010	Bed stead	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
94035090	Other wooden furniture used in bedroom	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94036000	Other wooden furniture	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94060011	Green houses- in ready to assemble sets	*No*	0.000037	*1. Average weight of wooden furniture = 100gm= 0.01 kg(Own estimate)* *2. Wood basic density (dry weight of wood /green cum wood only)= 613(page 13)* *3. Hardwood semi-finished retrieval % = 0.44(page 21)* *4. 1 unit = (0.01*2.27)/613= 0.00003 m^3 RWE*
94060019	Green houses-other	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94060091	Prefabricated housing material	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94060092	Prefabricated construction for cold storage	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
94060093	Silos for storing ensilage	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*
94060099	Other prefabricated buildings	*No*	0.0008	*1. Average weight of wooden furniture = 250gm= 0.25 kg(Own estimate)* *2. wbd= 613(FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.25*2.27)/613= 0.0008 m^3 RWE*

Annexure 6: Conversion factor for the various commodities of the Chapter 95 (Sport Goods)

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
95030010	Dolls of wood	*No*	0.00037	*1. 100 unit = 1 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.01*2.27)/613= 0.00037 m^3 RWE*
95042000	Articles & accessories for billiard	*No*	0.00037	*1. 100 unit = 1 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.01*2.27)/613= 0.00037 m^3 RWE*
95044000	Playing cards	*No*	0.00037	*1. 100 unit = 1 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.01*2.27)/613= 0.00037 m^3 RWE*
95049090	Others	*No*	0.00037	*1. 100 unit = 1 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.01*2.27)/613= 0.00037m^3 RWE*
95062100	Sailboards	*No*	0.000074	*1. 50 unit = 1 sqft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);*

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
				*3. 1 unit = (0.5*2.27)/613= 0.000074 m^3 RWE*
95062900	Other water-sport equipments (surf-boards water-skis etc)	*No*	0.000074	*1. 50 unit = 1 sqft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.5*2.27)/613= 0.000074 m^3 RWE*
95064000	Articles & equipment for table-tennis	*No*	0.0005	*1. 5 board = 72 sq. ft ; or 1000 unit = 14.4 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit= (0.014*2.27)/613= 0.0005 m^3 RWE*
95065910	Badminton rackets,w/n strung	*No*	0.00037	*1. 100 unit = 1 sq. ft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit = (0.01*2.27)/613= 0.00037 m^3 RWE*
95069940	Hockey sticks and blades	*No*	0.0006	*1. 25 sticks = 4 sqft (Own estimate)* *2. wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21);* *3. 1 unit= (0.16 *2.27)/613= 0.00056 m^3 RWE*

Annexure 7: Conversion factor for the various commodities of the Chapter 96 (Miscellaneous)

Hs Code	Wood products	Unit	Conversion Value	Remark/Equation (Source)
96062910	Button of coconut shell/wood	*Kg*	0.0037	*wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit = 0.0037 m^3 RWE*
96091000	Pencil and crayons with leads enclosed in rigid sheet	*Kg*	0.0037	*wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit = 0.0037 m^3 RWE*
96099010	Slate pencils	*Kg*	0.0037	*wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit = 0.0037 m^3 RWE*
96099020	Other pencils	*Kg*	0.0037	*wbd = 613 (FAO, ITTO, and UNECE, 2020; Page No 13); Hardwood semi-finished retrieval % = 0.44 (FAO, ITTO, and UNECE, 2020; Page No 21); 1 unit = 0.0037 m^3 RWE*

Contact us

Head, Division of Forestry Statistics
Indian Council of Forestry Research & Education
Dehradun
Phone No : 0135-222-4811
head_stat@icfre.org