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GROWTH, COMPETITIVENESS AND SPECIALIZATION IN TRADE OF MAJOR WOOD PRODUCTS IN INDIA

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ABSTRACT

The demand of wood and wood products is higher in India while supply is less, which results higher import of these commodities to meet the raising demand. Export of wood and wood products in the country found less than the import. Therefore, the present investigation was undertaken to study the growth and instability in production, export and import of major wood products and also to study the comparative advantage and specialization in trade of these commodities for the period 1990-2022. The study based on secondary data collected from website of ITTO. To arrive at conclusion the CAGR, Cuddy Della Instability Index, RCA and RSCA index and Lafay index was used. The results of study showed that the production, consumption, export and import of industrial round wood, swan wood, veneer wood, plywood and total wood products increased significantly during 1990 to 2022. The import of industrial round wood, swan wood, veneer wood and plywood increased over a period of time than the export during the study period. The instability indices for export and import value of wood products found higher. The RCA and RSCA index for veneer wood and plywood export and export value of India showed that these commodities enjoying greater comparative advantage in world market than the other wood products during study period. India had trade specialization in plywood during the period 1992-1998 while India became despecialized in trade of swan wood, veneer wood and ply wood year 2010 onwards.

Keywords: Growth, Instability, Export, Trade specialization, Comparative advantage

Introduction

Forestry is the major sector which influences the socio-economic development of the country. The National Forest Policy of India-1988 aims to achieve 33% of the geographical area of country under the forest and tree cover. According to India state of Forest Report-2021, the total forest cover of the county was 713789 sq km which was 21.71 % of the total geographical area of the country. Still, we are lacking 11.29% to reach the goal of 33% of forest cover in the country. Forests are considered as the primary source of timber in the country. However, the production of timber from these forests are limited as they are bounded by new policies, acts and programmes related to forest conservation and degradation. These regulations influence the supply of timber in the market which causes gap between demand and supply of timber (IWST, 2021).

Wood based industry is the fastest growing industry in India and one of the most important part of economy. Wood based industry include paper factory, lac industry, handicraft, match industries etc. Which are facing the problem of availability of raw material. At present the supply of raw material for wood-based industry is lagging the demand. The supply of wood to these industries is very less due to low productivity (0.7 m^3/ha/year) in the country (Samy *et al.*, 2022). The plywood industry in India facing the sever problem of shortage of timber due to the present forest management policies (Prakash *et al.*, 2021). The demand of wood by these wood-based industries will increase in future (Samy *et al.*, 2022).

The demand for wood in paper and paper board, construction industry, packaging, furniture industries is consistently increasing and expected to increase in future due to rapid economic growth and rise in population. Thus, there is huge demand of timber in the country for different purposes, but it cannot be cope up with the existing supply. The timber production from government forest is less than 4% as compared to timber production from TOF, which cope up the 45% of timber demand of country (IWST, 2021). Another way to meet this demand is import of timber. In case of wood products India is importer rather than the exporter of these commodities. The export of total wood products from India is 0.40% of total production, though India is importing 7107 thousand m³ wood products (ITTO, 2023). Export of wood is much lower than the import. India is importing wood logs, pulp, paper, plywood etc and the furniture is one type of wood in which Indian export of furniture exceeds the import. The export quantity and value of different wood products from India is less than the import which showed negative balance of trade for wood products. The large-scale import also affects the domestic pricing of timber and wood product at considerable extent.

Under such circumstances the interest has be increasing to know the status, growth and competitiveness in trade of wood product over the period of time which may fruitful in taking future decisions in relation to production and trade of wood products the present investigation carried out with following specific objectives.

1. To study growth and instability in production, export and import of wood products in India
2. To study the comparative advantage of wood products export of India
3. To study the trade specialization of specific wood product in India

Materials and Methods

For present study the major wood products viz. Industrial round wood, swan wood, veneer and plywood were selected. The study was based on the secondary data on quantity and value of export and import of these wood products of India collected from the website of the International Tropical Timber Organization (ITTO) for the period from 1990 to 2022.

Compound Annual Growth Rates (CAGR)

To study the growth exponential trend equation was fitted and Compound Annual Growth Rate was calculated for quantity and value of export and import of wood products of India.

$$Y = ab^t$$

Where Y = production/ export / import, a = intercept, b = regression coefficient, t = time variable in year

The above equation transformed in to log linear form as

$$Log\ Y = Log\ a + t\ Log\ b$$
$$Log\ Y = A + Bt$$

Where Log a = A and Log b = B

CAGR were worked by the formulae

$$CGR = (antilog\ b - 1) * 100$$

The significance of CAGR was tested with help of correlation coefficient (r) by using 't' test.

Cuddy and Della Velle Instability Index (CDVI)

CDVI de-trend the given series of data and provide a clear direction of instability. Therefore, to study the instability in quantity and value of export and import of wood products CDVI was worked out as given below

$$CDVI\ (\%) = C.V. * \sqrt{(1 - R^2)}$$

Where C.V. = Coefficient of variation

R^2 = Coefficient of multiple determination

Revealed Comparative Advantage Index (RCA)

Balassa (1965) formulated an index to measure comparative advantage in trade of specific commodity known as Revealed Comparative Advantage Index (RCA). By using this index, we can identify the specific commodity for which country is enjoying comparative advantage. The RCA was used to study the comparative advantage of wood products export of India.

$$RCA_{ij} = \frac{X_{ij}/X_{it}}{X_{wj}/X_{wt}}$$

were,

RCA_{ij} = Revealed comparative advantage of ith country for j^{th} product

X_{ij} = j^{th} commodity export of ith country

X_{it} = Total commodity export of ith country

X_{wj} = World export of jth commodity

X_{wt} = World export of total commodity

The calculated value of RCA lies between 0 and 1

If RCA$_{ij}$> 1, country 'i' have revealed comparative advantage in product 'j'

If RCA*ij*< 1, country '*i*' have comparative disadvantage capability in product '*j*'

Revealed Symmetric Comparative Advantage (RSCA)

However, RCA having the limitation of asymmetry, therefore to make RCA symmetric another method was suggested by Dalum *et.al* (1998) called as Revealed Symmetric Comparative Advantage (RSCA) was used.

$$RSCA = \frac{RCAij - 1}{RCAij + 1}$$

The value of RSCA lies between +1 and -1.

If RSCA*ij*> 0, RSCA*ij* represent the revealed symmetric comparative advantage of country i for product j and vice versa when RSCA*ij*< 0. The method of RCA and RSCA also used by Shinoj and Mathur (2008); Burange and Chaddha (2008) and Singh *et al.,* (2020) in their study related to comparative advantage of trade in agricultural commodities.

Lafay Index (LFI):

The LFI is an index measures the trade specialization concerning the specific product. The specialization of the country's trade is denoted by the higher positive value of the calculated index, whereas the negative value of index shows despecialization (Oberai, 2019; Nirmal & Gummagolmath, 2021). To study the trade specialization of specific wood product in India the Lafay Index (LFI) will be worked out.

$$LFI = \left[\frac{Xij - Mij}{Xij + Mij} - \frac{\sum_{j=1}^{N}(Xij - Mij)}{\sum_{j=1}^{N}(Xij + Mij)} \right] * \frac{(Xij - Mij)}{\sum_{j=1}^{N}(Xij + Mij)} * 100$$

Where '*X*' denotes export of ith country for j^{th} commodity and '*M*' denotes import of ith country for j^{th} commodity. If calculated value of index is positive, then the country '*i*' having relative advantage and specialize in trade of commodity '*j*'. And if calculated value of index is negative, then the country '*i*' having relative disadvantage and not specialize in trade of commodity '*j*'.

Results and Discussion
Overview of Production, Consumption and Trade of Wood Products in India
Table 1 : Overview of production, consumption and trade of wood products in India

Year	Production	Consumption	Export		Import	
	Quantity (1000m³)	Quantity (1000m³)	Quantity (1000m³)	Value (Million US$)	Quantity (1000m³)	Value (Million US$)
1990	47325 (100)	48645 (102.79)	87.26 (0.18)	25.24	1407.04 (2.97)	259.61
2000	52938 (100)	55338 (104.53)	41.38 (0.08)	18.46	2441.45 (4.61)	475.17
2010	74510 (100)	80379 (107.88)	90.53 (0.12)	63.59	5959.92 (8.00)	1457.08
2020	82460 (100)	86992 (105.50)	131.06 (0.16)	63.97	4662.61 (5.65)	1222.19
2022	82480 (100)	89468 (108.47)	215.06 (0.26)	134.72	7202.95 (8.73)	1952.27

Note: Figure in parenthesis indicate percentage to the production
Source: ITTO official website

Table 1 showed the production, consumption, export and import of wood products in India was 47325 thousand m³, 48645 thousand m³, 87.26 thousand m³ and 14.07.04 thousand m³ during the year 1990 which raised up to 82480 thousand m³, 89468 thousand m³, 215.06 thousand m³ and 7202.95 thousand m³ during the year 2022, respectively. It was observed that out of total production of wood products a negligible quantity was exported during the period from 1990 to 2022. The consumption of wood products found higher than the production during the study period. During the year 2022 the consumption was higher by 8.47 per cent than the production in India. To coup up this demand India imported about 8.73 percent of wood products during the year 2022. During 1990 the export and import value of wood products was 25.24 million US$ and 259.61 million US$ which increased up to 134.72 million US$ and 1952.27 million US$ during 2022.

Growth and Instability in Production, Export and Import of Wood Products in India

Table 2 : Growth and instability in production, export and import of wood products in India (1990-2022)

Particulars	Production (%)		Export (%)				Import (%)			
	Quantity		Quantity		Value		Quantity		Value	
	CAGR	CDVI	CAGR	CDVI	CAGR	CDVI	CAGR	CDVI	CAGR	CDVI
Ind. Roundwood	1.47***	63.91	1.20	92.99	10.35***	225.94	7.00***	99.44	7.07***	97.52
Sawnwood	2.07***	41.74	2.01	82.25	4.59***	89.61	20.06***	260.59	18.29***	257.84
Veneer	11.04***	131.92	6.21***	244.60	6.69***	113.54	26.08***	254.93	23.83***	254.93
Plywood	14.62***	262.19	4.99***	79.16	7.24***	117.18	11.42***	186.91	12.32***	218.48
Total wood products	1.47***	3.29	3.64***	1.17	15.27***	1.66	8.23***	1.04	8.85***	1.08

Table 2 depicts the CAGR and Cuddy Della Vella Instability index of production, export and import of wood products in India. It was observed that production, export and import of industrial round wood, swan wood, veneer wood, plywood and total wood products increased significantly during 1990 to 2022. The highest CAGR in production was recorded in case of plywood (14.62%) followed by veneer wood (11.04%). The export of veneer wood, plywood and total wood products increased significantly by 6.21 %, 4.99% and 3.64% per annum where as the highest per annum growth in import observed in veneer wood (26.08%) followed by swanwood (20.06%), plywood (11.42%) and industrial roundwood (7.00%) during study period. It indicated that the import of industrial round wood, swan wood, veneer wood and plywood increased over a period of time than the export during the study period. The highest growth in veneer wood may be attributed to higher demand of it than the other wood products. The huge demand of wood products in the country which may not be fulfilled by the production which resulted in to import of these commodities. Shrinivasan (2018) reported that the growth in the import of round wood was higher than the production and export during the period 2000 to 2016. Population explosion, urbanization and higher income in India raise the demand of round wood, which leads to higher demand and further higher import as production of round wood was less. Shobika *et al.,* (2021) found that the export and import of wood products in India showed positive growth, but the growth in import was higher than the export during 2005 to 2019. Bansal (2021) reported that the to reduce the import of wood logs to the extent possible, efforts needed to enhance cultivation of tree species to meet the demand of wood industry through various agro-forestry systems.

The highest growth in export value was found for industrial roundwood (10.35 % per annum) followed by plywood (7.24% per annum), veneer wood (4.59% per annum) and swanwood (4.59% per annum). It is interesting to note that though the growth in export quantity of industrial roundwood is less and non significant, the growth in export value of industrial round wood is highest and significant as compare to other wood products under study. This indicated that the Indian industrial round wood fetched higher price in the international market. The growth in import value recorded highest for veneer wood (23.83% per annum) followed by swanwood (18.29% per annum), plywood (12.32% per annum) and industrial round wood (7.07% per annum). According to IPIRTI news bulletin (2019) India's annual import of logs, lumber and wood products have increased from US$ 1.3 billion to US$ 2.0 billion during past decade. Bit and Banerjee (2014) found that the growth rate of value of import of total wood products from India was 9.00% and that of export was 6.00%.

The instability index of production, export quantity and value, import quantity and value found higher for all the wood products implied that there was high variation in production, export and import of wood products in the India during 1990-2022. The higher instability indices in export and import value of wood products may be attributed to fluctuation in per unit prices of wood products in international market over the period of time. Chaudhari *et al.,* (2023) found the higher variability in export and import quantity and value of veneer, plywood and swan wood during the study period.
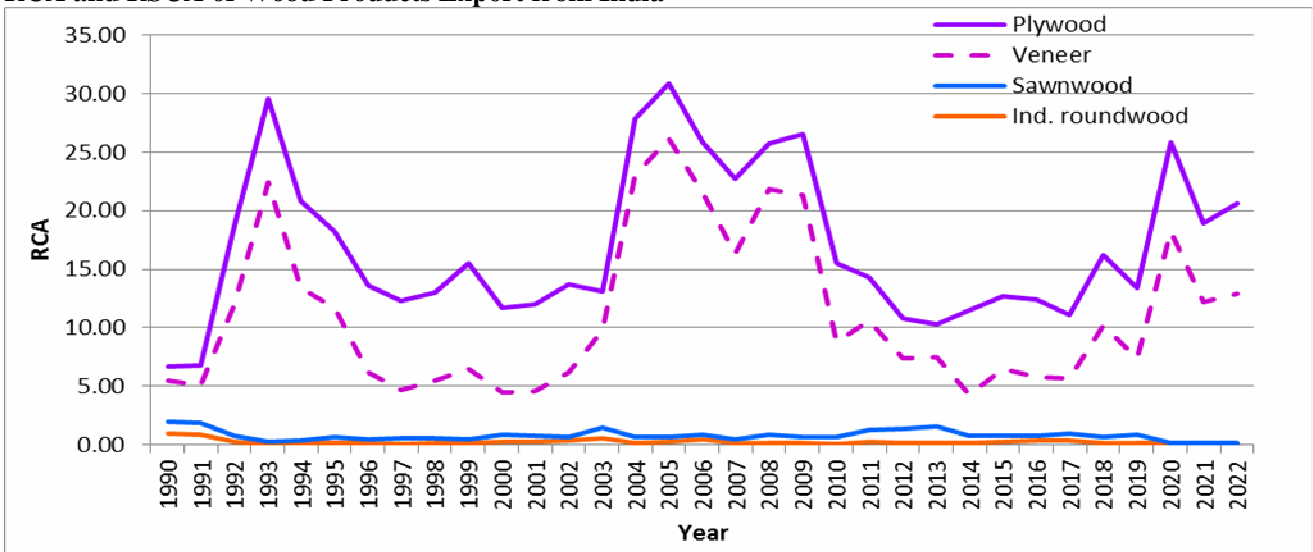
RCA and RSCA of Wood Products Export from India

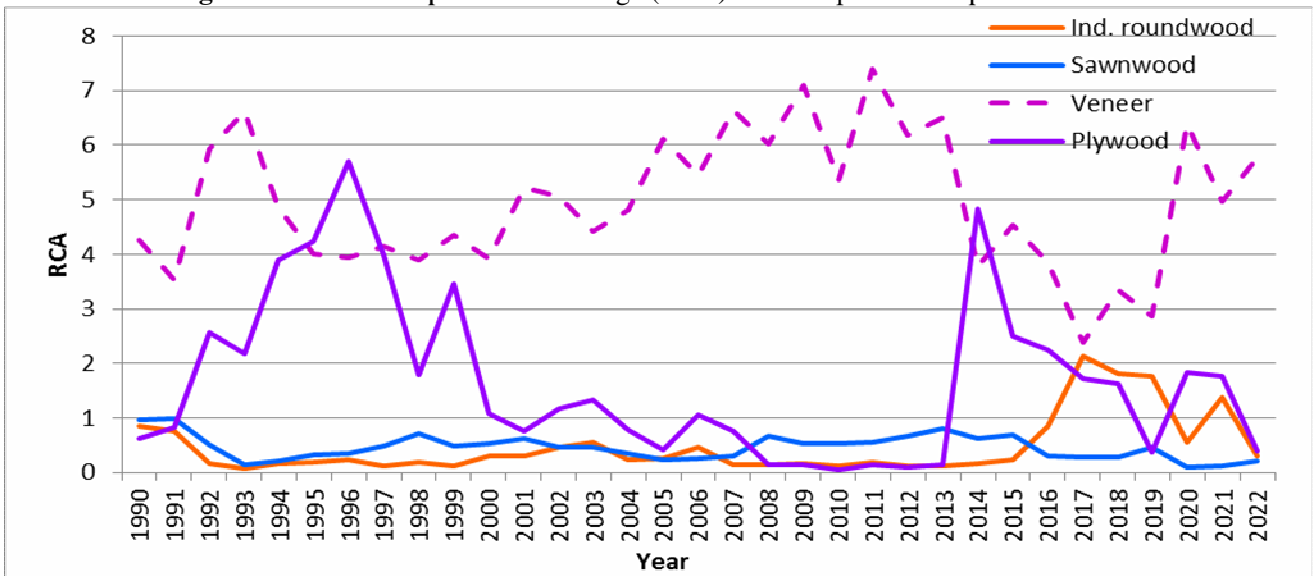**Fig. 1 :** Revealed comparative advantage (RCA) of wood products export from India

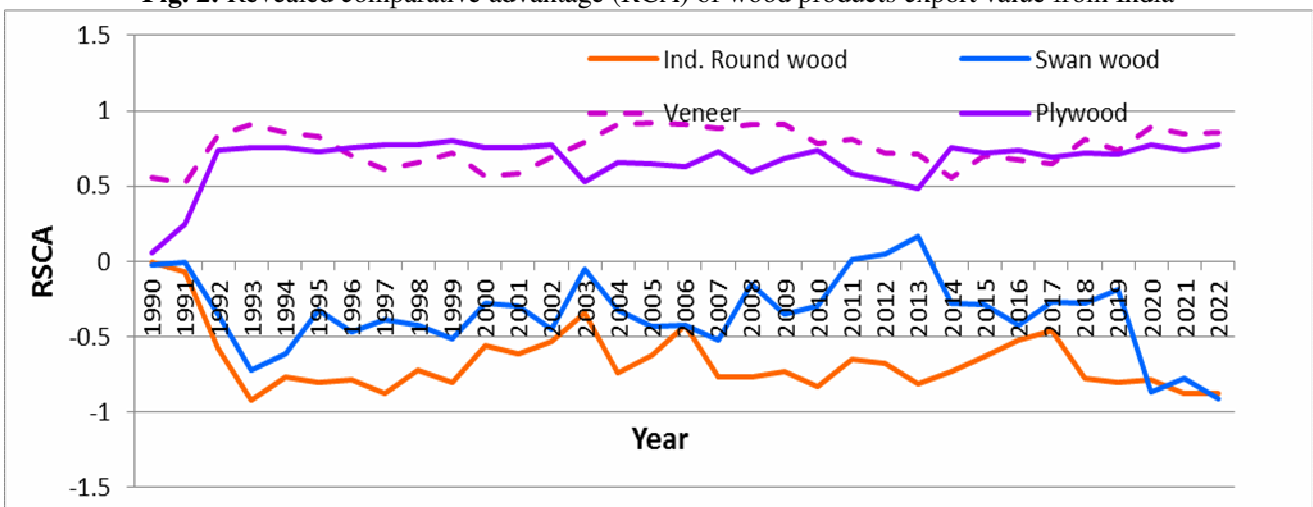**Fig. 2:** Revealed comparative advantage (RCA) of wood products export value from India

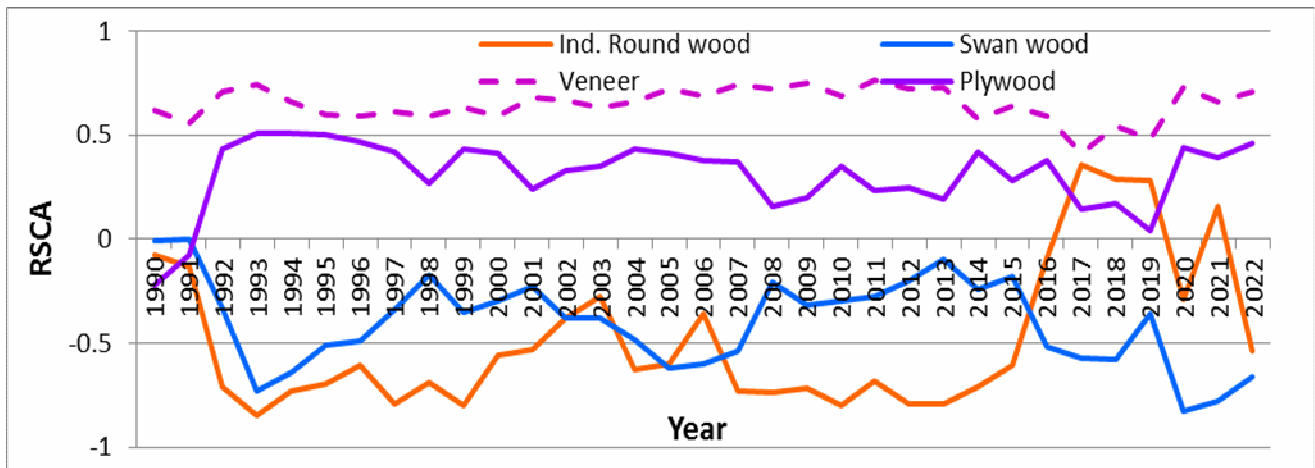**Fig. 3 :** RSCA of wood products export from India

Fig. 4 : RSCA of export value of wood products from India

The RCA of different wood products export and export value of India during the period from 1990 to 2022 presented Fig. 1 & 2. If RCA>1, it means the commodity is more competitive in the world market as compared with the rest of the commodities. It was observed that the RCA index for veneer wood and plywood export and export value of India found greater than one implied that these commodities enjoying greater comparative advantage or more competitive in world market than the other wood products during study period. It is interesting to note that the curve of RCA index of export quantity and export value of veneer wood lies above the curve of RCA index of export quantity and export value of indicated that veneer wood was more competitive than the ply wood in the world market.

The RSCA of different wood products export and export value of India during the study period presented in Fig. 3 & 4. If RSCA > 0, it means the county enjoying the revealed symmetric comparative advantage for that particular commodity and vice versa if RSCA<0. From the figures it was observed that India has revealed symmetric comparative advantage for the veneer wood and plywood than the industrial round wood and swan wood during the study period. Chaudhari *et al.* (2023) found that the export of veneer wood and plywood was more competitive than the other wood products in India.

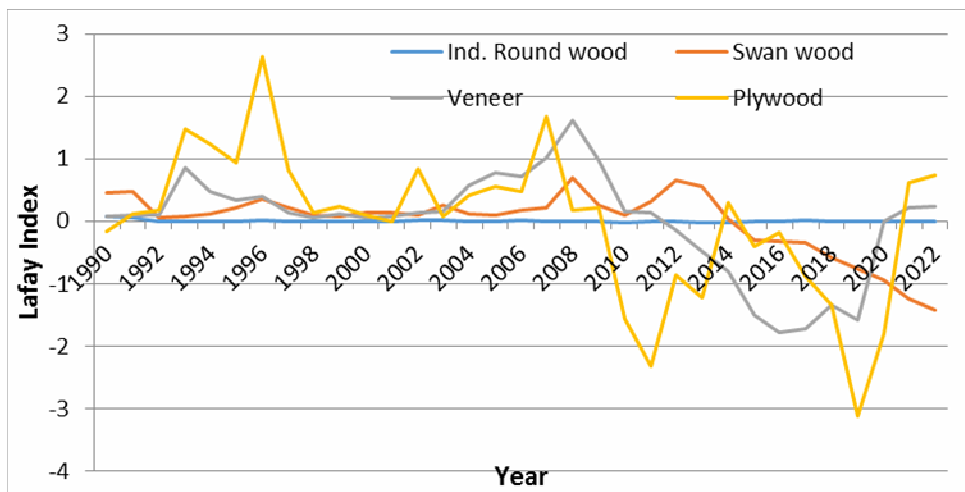**Specialization of India in Wood Products Trade**

Fig. 5: Lafay index showing specialization of India in wood products trade

Table 3: Specialization of India in wood products trade

Year	Ind. Round wood	Swan wood	Veneer	Plywood
1990	0.07	0.46	0.08	-0.17
1991	0.06	0.47	0.09	0.11
1992	0.00	0.05	0.10	0.18
1993	0.00	0.08	0.86	1.48
1994	0.00	0.11	0.47	1.24
1995	0.00	0.21	0.33	0.93
1996	0.01	0.35	0.40	2.63
1997	0.00	0.21	0.13	0.81
1998	0.00	0.10	0.05	0.13
1999	-0.01	0.07	0.11	0.23
2000	0.00	0.13	0.06	0.09
2001	0.00	0.13	0.07	0.00
2002	0.01	0.10	0.14	0.83
2003	0.01	0.26	0.16	0.08
2004	-0.01	0.12	0.58	0.41
2005	0.00	0.10	0.77	0.55
2006	0.01	0.17	0.71	0.48
2007	0.00	0.22	1.01	1.67
2008	0.00	0.70	1.61	0.17
2009	-0.01	0.25	0.97	0.22
2010	-0.02	0.09	0.15	-1.57
2011	-0.01	0.32	0.14	-2.32
2012	-0.01	0.66	-0.15	-0.87
2013	-0.02	0.55	-0.48	-1.23
2014	-0.02	0.03	-0.81	0.30
2015	-0.01	-0.30	-1.51	-0.41
2016	0.00	-0.33	-1.78	-0.18
2017	0.01	-0.34	-1.73	-0.89
2018	-0.01	-0.59	-1.35	-1.34
2019	-0.01	-0.77	-1.59	-3.12
2020	0.00	-0.94	-0.01	-1.80
2021	-0.01	-1.25	0.21	0.62
2022	-0.01	-1.43	0.23	0.73

Lafay index that measures the trade specialization in wood products trade calculated and presented in Table 3. and Fig. 5. The higher positive value of the calculated index indicate specialization in the trade of that particular commodity and negative values of index shows despecilization. From the table and graph, it was observed that the values of lafay index were positive for plywood during the period from 1992 to 1998, indicated that during this period India had trade specialization in plywood than the other wood products. Again, during the period from 2005 to 2008 India had trade specialization in plywood and veneer wood. After the year 2010 the values of lafay Index become lower and then negative for swan wood,

veneer wood and ply wood implied that India became despecialized in trade of these commodities.

Conclusions

Production, consumption, export and import of industrial round wood, swan wood, veneer wood, plywood and total wood products increased significantly during 1990 to 2022. The import of industrial round wood, swan wood, veneer wood and plywood increased over a period of time than the export during the study period. This may be due the huge demand of wood products in the country which may not be fulfilled by the production which resulted in to import of these commodities. To coup up the increasing demand of wood products and to reduce the dependence on import for wood products in India, the production of wood/timber should be increased by promoting the agro forestry, tree outside forest, productive use of degraded land etc. As compare to other wood products under study the growth in export quantity of industrial round wood is less and non significant and the growth in export value of industrial round wood is highest and significant. This indicated that the Indian industrial round wood fetched higher price in the international market. The higher instability indices in export and import value of wood products may be attributed to fluctuation in per unit prices of wood products in international market over the period of time. The values of RCA and RSCA for export quantity and export value of veneer wood and plywood indicated that these commodities were more competitive in world market than the industrial round wood and swan wood during study period. To remain competitive in the trade, export of Indian veneer wood and plywood should be increased by encouraging exporters and production through different programs and schemes. India had trade specialization in plywood than the other wood products during the period 1992-1998 while India became despecialized in trade of swan wood, veneer wood and ply wood year 2010 onwards.

References

Balassa, B. (1965). Trade liberalization and revealed comparative advantage. *The Manchester School of Economics and Social Studies,* **33**(2), 99-123.

Bansal, A.K. (2021) Sustainable trade of wood and wood-based products in India. NCCF Policy Paper No. 1/2021, New Delhi, India.

Bit, J. and Banerjee, S. (2014) Consumption of Wood Products and Dependence on Imports, A Study on Post-reform India. *Foreign Trade Review* **49**(3), 263-290.

Burange, L.G. and Chaddha, S.J. (2008) India's Revealed Comparative Advantage In Merchandise Trade. Working Paper UDE28/6/2008, 5-7.

Chaudhari, D.J., Leua, A.K. and Chaudhary, A.P. (2023) Performance and comparative advantages of wood product trade from India. *Indian J. of Ecology,* **50**(5), 1343-1347.

Dalum, B., Laursen, K. and Villumsen, G. (1998) Structural Changes in OECD Export Specialization Pattern, De-Specialisation and Stickiness. *International Review of Applied Economics*, **12**(3),423-443.

FSI (2021) India State of Forest Report 2021

ITTO (2023) Statistical Database. Retrieved fromwww.itto.int

IWST (2021) Wood is good, grow more, use more. *India wood Sector Report*. **2** (3), 5-14.

Nirmal, R. K. and Gummagolmath, K. C. (2021) Domestic and export competitiveness of major agricultural commodities in India with special reference to Telangana. Retrieved from https,//www.manage.gov.in/conres/Domestic%20 & %20Export%20Competitiveness.pdf

Oberoi, S. (2019) Dynamics of Trade Specialization and Trade Performance of ASEAN–India Free Trade Agreement. *Journal of International Commerce, Economics and Policy*. **10**(1), 1950003.

Prakash, V., Singh, M.P., Uday, D.N., Sujatha, D., Kiran, M.C. and Narsimhamurthy (2021) Indian timber for veneering-A review. *Indian Forester*, **147**(5), 431-442

Samy, A., Meena, R.K. and Tulika Kumari (2022) Growth of Wood Based Industry through Industrial Agroforestry in India. *The Agriculture Magazine*. **1**(10), 131-134.

Shinoj, P. and Mathur, V.C. (2008) Comparative Advantage of India in Agricultural Exports vis-á-vis Asia, A Post-reforms Analysis. *Agril. Economics Research Review*. **21**, 60-66.

Shrinivasan, M., Varadha Raj, S. and Eswari, A. (2018) Demand and Supply Analysis of Roundwood in India. *Madras Agric. J.* **105** (1-3), 84-86.

Shobika , R., Selvanayaki, S., Deepa, N. and Vasanthi, R. (2021). An Empirical Analysis of Timber Trade in India . *Asian Journal of Agricultural Extension, Economics & Sociology,* **39**(11), 1-10.

Singh, O.P., Anoop, M. and Singh, P.K. (2020) Revealed Comparative Advantage, Competitiveness and Growth Performance, Evidences from India's Foreign Trade of Agricultural Commodities. *Indian Jr. of Agril. Economics.* **75**(4), 560-577.