

Exploring the Export Scenario of Indian Walnuts

Surbhi Bansal¹, Lovepreet Singh² and Namami Gohain³

¹Kamla Lohtia Sanatan Dharam College, Ludhiana

²Guru Kashi University, Talwandi Sabo, Bathinda

³Department of Economics and Sociology, Punjab Agricultural University, Ludhiana

Abstract

This study assesses the progress, production dynamics, and shifting export directions of Indian walnuts from 2010–11 to 2023–24 using secondary data from APEDA and the National Horticultural Board. Analytical tools including the Cuddy-Della Valle Index, log-lin regression models, and first-order Gauss-Markov Chain Approach were utilized to analyze growth trends, measure trade instability, and forecast market shares up to 2026–27. The findings revealed that while Jammu and Kashmir maintains a domestic production monopoly of 92%, India accounts for less than 1% of global output. Domestically, walnut exports collapsed from 3,292 metric tonnes in 2015–16 to 717.67 metric tonnes in 2022–23, driven by traditional tree diseases and stiff competition from Californian, Chilean, and Chinese imports. Markov analysis identifies the UAE and UK as the most consistent and dependable markets, with the UAE retaining a high export share of 64.18%, whereas Germany, France, and the USA have become highly unstable destinations. Projections up to 2026–27 suggests that France and UAE will face a decline in market share, while the UK is anticipated to grow to 19.01%. To gain a competitive edge and stabilize exports, the government must prioritize setting up new plantations featuring high-yielding, disease-resistant varieties with shorter gestation periods. Furthermore, policy interventions must focus on improving international quality standards through value-added shelled kernels, providing agricultural extension support to train farmers in modern harvesting, and offering credit and investment subsidies to support private trade players.

Key words: Horticulture, Walnut, Export, Gauss markov analysis, Trade direction

JEL Classification: C22, C53, Q12, Q13

Introduction

Horticulture has become an integral component of agriculture, offering abundant opportunities for sustaining numerous agro-based industries. These industries not only create significant employment opportunities but also provide livelihoods to farmers (Qammer and Baba, 2016). A vast majority of farmers have shifted their preference towards horticulture crops for their economic development (Joshi, 2005). This shift not only aids in boosting farm income and agricultural growth but also augments employment opportunities within the agricultural sector (Vyas 1996; BIRTHAL *et al* 2007). Walnut, an important dry fruit, plays a pivotal role in India's agricultural economy and contributes significantly to the nation's foreign exchange earnings. Globally, India is the seventh-largest producer of walnuts, following China, the USA, Turkey, Iran, Ukraine, and Mexico (FAO 2008).

In India, walnuts are primarily cultivated in Jammu & Kashmir, Arunachal Pradesh, Himachal Pradesh and Uttarakhand. However, approximately 98 per cent of the country's walnut output comes from Jammu and Kashmir (Malhotra and McNeil, 2009). The state contributes about 86,263 tonnes from an area spanning 61,723 hectares. Walnut cultivation is widespread in regions such as Badrawah, Poonch, Kupwara, Baramulla, Bandipora, Gandarbal, Budgam, Srinagar, Anantanag, and other hilly areas of Jammu and Kashmir. Additionally, walnut cultivation occurs to a limited extent in Himachal Pradesh and Uttarakhand. In Himachal Pradesh, it is primarily grown in a few districts, with approximately 50 hectares under cultivation in Mandi district and just over 55 hectares in Chamba district. Some areas in Shimla district also cultivate this crop.

Walnut holds significant importance in international trade, prompting a focus on adhering to international standards for grading and packing at both field and enterprise levels. Recognizing its substantial export potential, private

enterprises are increasingly engaging in its export trade within the state. India's share in global walnut exports has recently reached approximately US\$ 40 million; however, its export constitutes only 2.73 per cent and 0.10 per cent of the world's shelled and unshelled walnut exports, respectively. In Jammu & Kashmir alone, there has been a notable 44 per cent increase in earnings from walnut exports between 2008 and 2012. Presently, India exports walnuts to around 90 countries, although this number has varied over the years (Qammer and Baba, 2016). The connection between walnut production and its global trade is expected to remain a crucial area of agricultural research in the future. In this context, the current study endeavors to examine the trend in walnut exports in India, including changes in trade direction using the Markov Chain Approach, thereby facilitating the quantification of shifts in shares to different countries.

Data Sources and Methodology

The study relies on secondary data gathered from various sources, as detailed in Table 1.

Instability Indices: The Cuddy Della Valle's method (CDVI) is employed to calculate the instability in the area, production, and export of walnuts, providing an approximation of the average year-to-year percentage variation adjusted for trend. The equation of it as follow:

$$CDVI = CV \times \sqrt{(1 - AdjR^2)}$$

In this context, "CV" represents the coefficient of variation, while "r²" denotes the coefficient of determination obtained from a time trend regression adjusted by the number of degrees of freedom.

The log-lin model: It is used to estimate the growth of the variables in the study.

The equation of log-lin model is as follow:

$$\ln(Y_t) = \beta_1 + \beta_2 T_t + \epsilon_t$$

Where, Y_t is dependent variable, T_t is time variable, ϵ_t is error term. A trend equation are fitted with natural logs of respective dependent variables and time as an independent variable. The compound annual growth rate (CAGR) is calculated as the antilogarithm of the trend coefficient minus one (Gujrati, 2007).

Markov Chain Analysis

To determine the trade direction, specifically the export practices of Indian walnuts, the Markov Chain analysis with first order has been utilized, as described by Bansal *et al.* (2020). The transitional probability matrix 'P_{ij}' has been used, which indicates the probability that the export share of a country will switch from ith country to jth country over a period of time. The matrix explains the retention of export contributions to different countries. In this context, the diagonal element signifies the loyalty and stability of an importing country to a specific country's export. Conversely, the off-diagonal element represents the probability of a shift in export share of a specific country to other countries over time. In the present study, seven major importing countries of walnut for the period of 2011-12 to 2022-23 has been taken. The algebraical expression is as follows

$$E_{jt} = \sum_{i=1}^s E_{it-1} * P_{ij} + \mu_{jt}$$

Where, E_{jt} = export from India to jth country for year 't'

E_{it-1} = export from India to ith country for year 't-1'

P_{ij} = probability of shift of export from ith country to jth country

μ_{jt} = random error term

t = number of year considered for study

s = number of importing countries.

The transitional probabilities (P_{ij}) can be arranged in (c*r) matrix which depicted the export data got multiplied with the previous period 't-1' data to get the expected export share of each country for period 't'.

$$\sum_{j=1}^r P_{ij} = 1$$

Computation of P_{ij}

The Mean Absolute Deviation method is utilized to compute the transitional probability, aiming to minimize the total absolute deviation, as outlined by Fisher (1967) and Gohain *et al.* (2022). Conventional linear programming techniques are employed to fulfill the properties of transitional probabilities, including non-negativity restrictions and row

Table 1 Description of data sources and time period

Sr. No.	Variables	Source	Time period
I	India's Production of walnut	National Horticultural Board	2011-12 to 2022-23
II	State-wise Production of walnut		
III	Quantity of walnut exported and imported	Agricultural and Processed Food Products	2011-12 to 2022-23
IV	Value of walnut export and Imports	Export Development Authority	
V	Walnut producing countries	Food and Agriculture Organization (FAO)	2010-11 to 2021-22

sum constraints in the calculation. The linear programming equations are as follows:

$$\begin{aligned} & \text{Min } OP^* + le \\ \text{Subject to, } & XP^* + V = Y \\ & GP^* = 1 \\ & P^* e > 0 \end{aligned}$$

In these equations:

- O represents a vector of zeros.
- I is an appropriately dimensioned vector of areas.
- e is the vector of absolute errors.
- Y denotes the proportion of export to each country.
- X is a block diagonal matrix consisting of the lagged values of Y.
- V is the vector of random terms.
- G is the grouping matrix used to add row elements of P as arranged in P* to unity.

Forecasting of export

For forecasting the future value of Indian natural honey export share with other countries, transitional probability matrix are used. (Chavan et al., 2023)

$$Y_{jt} = \sum_{i=1}^r Y_{it-1} * P_{ij}$$

Where Y_{jt} is the forecast proportions of j^{th} country's share during 't' year. Y_{it-1} is the experimental proportion of i^{th} country share during 't-1' year and P_{ij} is the estimated value of probability matrix.

Results and Discussion

Area and production of walnut in India (2011-12 to 2022-23)

Walnut cultivation in India holds significant importance within the horticultural sector, primarily concentrated in four major states: Jammu & Kashmir, Himachal Pradesh, Uttarakhand, and Arunachal Pradesh. Notably, Jammu and Kashmir alone contribute nearly 92 per cent of the country's total production, covering over 78 per cent of the cultivation area (Table 1). Jammu and Kashmir is a suitable region for walnut cultivation due to its favourable temperature, altitude soil conditions, water availability, traditional knowledge, economic importance, and market demand (Kumar *et al*, 2012 and Shigaeva & Darr 2020). The average productivity of walnut cultivation in India stands at 2.76 metric tonnes per hectare, with Jammu and Kashmir notably achieving a higher productivity of 3.30 metric tonnes per hectare. In contrast, other states like Uttarakhand, Himachal Pradesh and Arunachal Pradesh exhibit a lower productivity, averaging at 2.16 metric tonnes per hectare. Consequently, Jammu and Kashmir maintain a dominance in both production area and productivity of walnuts within the country. However,

these figures pale in comparison to their European and North American counterparts, where transgenic rootstocks have already demonstrated significant promise (Britton et al., 2009).

During the study period, there are fluctuations in both the production and area under walnut cultivation in India. Initially, from 2011-12 to 2015-16, there is a decline in both area and production (Figure 1 and 2), indicating potential challenges or factors affecting walnut cultivation during those years. However, from 2016-17 onwards, there is a notable increase in both area and production, particularly in 2016-17 and 2017-18. This suggests a potential period of growth or improved conditions for walnut cultivation in India during those years. Subsequently, from 2018-19 to 2022-23, there appears to be relative stability in both area and production, with minor fluctuations observed. The findings highlight the fluctuating nature of walnut cultivation and production in India during the study period. Various factors, including insufficient mechanization, Goods and Service Taxes, inadequate high-quality varieties, subpar orchard management, and the lengthy gestation period, shortage of labour collectively contribute to the challenges experienced by walnut farmers.

According to research, conventional walnut trees are facing numerous diseases and pest infestations, significantly impacting both the yield and quality of walnuts (Gull et al., 2019). Many of these trees, afflicted by diseases and changing climatic conditions, fail to bear fruit and continue to occupy valuable agricultural land (Mir, 2018). Despite these productivity issues, farmers are legally unable to remove or replace these unprofitable trees due to the inclusion of walnuts in the Jammu and Kashmir Preservation of Specified Trees Act of 1969, which was originally enacted with the strict aim of safeguarding walnut trees from indiscriminate cutting.

Production status of Walnut in world

The top 10 walnut producing countries of along with their respective percent contributions to the total world production is presented in table 2. China ranks first with a significant contribution of 46.83%, followed by the USA at 15.74 per cent and Iran at 9.59 per cent. Turkey, Mexico, Ukraine, Chile, Uzbekistan, Romania, and France also make notable contributions ranging from 6.16 per cent to 1.05 per cent, while India follows with a smaller contribution of 0.77 per cent. These figures illustrate the dominance of China in global walnut production, followed by several other countries with varying but significant shares, highlighting the diverse geographical distribution of walnut cultivation and production worldwide.

Export Status of Indian walnut

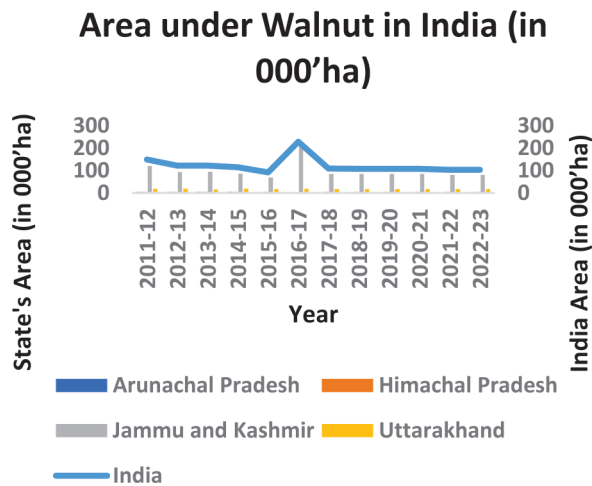
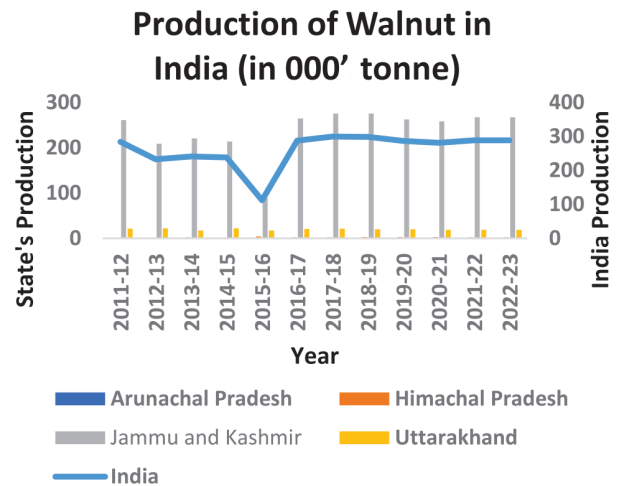
The Table 3 provides an overview of the major importers of Indian walnuts spanning from the year 2011-12 to 2022-23, detailing the quantity and value of walnut exports to each

Table 1: Area and production of walnut in India from 2011-12 to 2022-23

S. No.	States	CDVI (%)	Data of 2022-23	Percentage share of each state
Area (in 000'ha)				
I	Arunachal Pradesh	45.49	0.74	0.72
II	Himachal Pradesh	50.23	4.26	4.11
III	Jammu and Kashmir	96.51	80.73	78
IV	Uttarakhand	44.85	17.76	17.15
	India	93.08	103.5	100
Production (in 000' tonne)				
I	Arunachal Pradesh	101.50	0.42	0.14
II	Himachal Pradesh	66.17	2.27	0.78
III	Jammu and Kashmir	90.82	267.16	92
IV	Uttarakhand	51.53	18.93	6.55
	India	90.83	288.9	100

CDVI-Cuddy Della Valle's Index (Instability Index)

Source: Author's calculation

**Figure 1: State-wise area of walnut in India****Figure 2: State-wise production of walnut**

country and highlighting the changes in export dynamics over the study period. Notably, the UK, Germany, Netherlands, and France emerge as consistent importers of Indian walnuts, maintaining varying levels of import quantities and values throughout the years. Conversely, the USA exhibits a decline in both quantity and value of imports. However, the most significant surge is observed in the United Arab Emirates and New Zealand's, with a remarkable increase in both quantity and value of imports, indicating a growing demand for Indian walnuts in the region. Despite fluctuations in export quantities and values to different countries, the overall trend reflects a negative trajectory in Indian walnut exports. The local production of walnuts in India has encountered significant challenges with the introduction of Californian, Chilean, and

Chinese walnuts into the market. Despite the government's imposition of high import duties, with rates as high as 132 per cent on US-bound shipments and 110 per cent on Chilean shipments, imports have not seen a decline. This situation has posed detrimental effects on Kashmir's walnut sector (Dar 2022). As a result, Indian walnut producers face difficulties in competing in the global market, where there is a demand for uniform size and premium quality.

Growth of Indian Walnut Imports

The Compound Annual Growth Rate (CAGR) figures provided for the major importers of Indian walnuts offer insights into the progress and performance of Indian walnut exports to these countries over the specified period. The negative CAGR values recorded for the UK, Germany,

Table 2: Top 10 Walnut producing countries (2010-11 to 2021-22)

Rank	Country	CDVI	Percent contribution in total world production
1	China	104.39	46.83
2	U S A	39.31	15.74
3	Iran	78.71	9.59
4	Turkey	60.03	6.16
5	Mexico	43.68	3.69
6	Ukraine	67.84	3.14
7	Chile	35.67	2.22
8	Uzbekistan	57.99	1.17
9	Romania	43.07	1.14
10	France	68.66	1.05
11	India	53.52	0.77

Source: FAO 2023

Netherlands, France, USA, and others signify a decline in the import volume from India to these nations. Among these, the USA exhibits the most significant decline with a CAGR of -57.61 per cent, indicating a considerable reduction in Indian walnut exports to the United States. Conversely, UAE and New Zealand stand out with positive CAGR figures of 32.77 per cent and 11.27 per cent, respectively, reflecting substantial growth in imports of Indian walnuts in these regions. The contrasting trends among major importers underscore the evolving dynamics of Indian walnut trade, with shifts in demand patterns and market preferences influencing export performance. Overall, despite facing challenges in certain markets, the positive growth observed in key importing countries like the UAE and New Zealand suggests opportunities for further expansion and diversification in Indian walnut exports. As the value of CDVI is quite high,

unstable trade with major importer has been observed in this period. The details of loyal partners of Indian walnut was analysed using Markov chain analysis.

Direction of Trade of Walnut in India

The study of walnut export trade direction to various destinations was conducted by calculating the transitional probability matrix using Markov Chain Analysis. The transitional probability matrix is detailed in Table 5. The major importing countries namely UK, Germany, Netherland, France, USA, UAE and New Zealand with the remaining importing countries grouped as others. As evident from the findings presented in Table 3, during the study period of exports, the UAE emerged as the most stable market among the major importers of Indian Walnut, indicated by a higher probability retention of 0.6418. This suggests that there

Table 3. Major Importers of Indian walnut (2011-12 to 2022-23)

Particulars	Quantity (tons)			Value (Rs. Lakh)		
	TE 2013-14 (1)	TE 2022-23 (2)	Decrease in export (2÷1)	TE 2013-14 (3)	TE 2022-23 (4)	Decrease in export (4÷3)
U K	0.71	0.25	0.35	2.90	0.73	0.25
Germany	0.51	0.15	0.30	2.05	0.55	0.27
Netherland	0.58	0.04	0.07	2.62	0.13	0.05
France	0.35	0.20	0.57	1.23	0.56	0.46
U S A	0.27	0.00	0.00	1.34	0.00	0.00
U A E	0.09	0.37	4.21	0.42	1.26	3.00
New Zealand	0.03	0.05	1.49	0.17	0.26	1.57
Others	3.41	0.36	0.11	14.44	0.82	0.06
Total	5.95	1.42	0.24	25.17	4.32	0.17

Source: APEDA 2023

Table 4: Growth of Indian Walnut Imports with Major Importers

Countries	Trend ($y=a+bt$)		r^2	CAGR (%)	CDVI (%)
	Intercept (a)	Slope (b)			
U K	3072.87	-218.94	0.67	-13.62	126.55
Germany	2189.56	-141.74	0.43	-10.69	129.10
Netherland	2759.56	-249.20	0.70	-27.05	160.85
France	1366.37	-57.93	0.14	-15.21	125.29
U S A	1672.64	-147.62	0.52	-57.61	169.76
U Arab Emts	-47.51	100.15	0.37	32.77	163.73
New Zealand	146.77	18.51	0.10	11.27	142.36
Others	14373.75	-1384.04	0.66	-32.55	183.41
Total	25534.01	-2080.81	0.68	-17.60	143.32

CAGR: Compound annual growth rate, CDVI-Instability index

Source: Author's calculation

was a 64.18 per cent probability that the UAE retained its export share over the study period. Similarly, the UK retained 17.94 per cent of its original share. The remaining countries (others) collectively retained their export share at 76.70 per cent. Therefore, both the UAE and the UK are identified as the most reliable and loyal markets for Indian Walnut. While UAE lost 30.87 per cent share to UK and 4.96 per cent to Germany where as it gained 100 per cent of New Zealand's share and 14.72 per cent of Germany's share. In case of UK, it has gained major share from Netherland followed by UAE and Germany. The group of other countries gained only from UK but lost more or less same i.e., 11 per cent to Netherland, USA. But countries Germany, France, and the USA would be considered unstable importers as they could not retain their original share.

Projection of Indian walnut to major importing countries

Table 6 evaluates the performance of the first-order Markov Chain model by side-by-side comparing the **Actual (A)** export market shares of Indian walnuts against the

Predicted (P) shares across major importing nations from 2011–12 to 2022–23. Figures 3 and 4 acts as the visual proof of the study's Markov Chain analysis, tracking how traditional trade partnerships have shifted and pinpointing where Indian walnut exports have gained or lost ground. The analysis points out that the actual export proportions did not align perfectly or consistently with the predicted shares derived from the Markov Chain process.

It is noticed from Table 6 that the he actual export share exhibited steep fluctuations over the decade, overall declining from 15.28 per cent to 6.37 per cent. In contrast, the Markov model predicted a smoother, slight upward trend moving from 16.65 per cent to 17.86 per cent, capturing the U.K.'s underlying structural capacity to absorb Indian walnut exports despite year-to-year market disruptions. In case of Germany, Both actual and predicted shares demonstrated an upward trajectory over the historical period, with the actual share rising from 6.28 per cent to 7.43 per cent and the predicted model tracing an increase from 7.26 per cent to 14.28 per

Table 5: Direction of trade of Indian Walnut (probabilities)

Countries	U K	Germany	Netherland	France	U S A	U A E	New Zealand	Others
U K	0.1794	0.2664	0.1411	0.0317	0.0000	0.0000	0.0000	0.3814
Germany	0.1956	0.0000	0.0000	0.6572	0.0000	0.1472	0.0000	0.0000
Netherland	0.9450	0.0000	0.0550	0.0000	0.0000	0.0000	0.0000	0.0000
France	0.1248	0.5257	0.0000	0.0000	0.0000	0.0000	0.3494	0.0000
U S A	0.0000	0.3997	0.2462	0.3541	0.0000	0.0000	0.0000	0.0000
U Arab Emts	0.3087	0.0496	0.0000	0.0000	0.0000	0.6418	0.0000	0.0000
New Zealand	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
Others	0.0000	0.0000	0.1140	0.0000	0.1190	0.0000	0.0000	0.7670

Source: Author's calculation

Table 6: Actual And predicted value of Indian Walnut export (%)

Countries	U K		Germany		Netherland		France		U S A		U A E		New Zealand		Others		Total
	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	
2011-12	9.74	0.00	11.80	0.00	11.42	0.00	6.63	0.00	2.56	0.00	3.16	0.00	0.24	0.00	54.45	0.00	100.00
2012-13	15.28	16.65	6.28	7.26	7.01	8.84	3.73	8.97	5.51	6.48	0.19	4.00	0.25	2.32	48.27	45.48	86.51
2013-14	14.67	12.85	9.89	9.53	17.98	10.87	6.55	7.58	10.78	6.64	2.43	1.49	1.94	1.51	98.12	49.53	162.36
2014-15	5.99	14.24	1.76	7.25	4.38	10.41	2.23	6.64	5.35	7.19	0.04	3.05	0.27	1.41	22.02	49.80	42.04
2015-16	12.42	13.90	14.96	11.67	9.61	11.69	6.66	7.71	8.35	6.23	0.00	1.33	1.75	1.86	32.68	45.61	86.43
2016-17	6.88	17.43	3.96	11.74	4.83	9.33	7.58	15.25	1.39	4.50	5.61	4.58	0.41	2.69	16.14	34.48	46.81
2017-18	42.00	19.76	37.88	14.21	17.86	7.30	39.66	7.08	13.35	4.10	5.87	9.82	13.17	5.66	60.75	32.05	230.54
2018-19	8.78	16.74	10.04	16.34	5.55	7.43	4.47	13.43	5.97	3.14	2.39	9.77	3.16	6.01	12.13	27.16	52.49
2019-20	15.18	19.20	14.41	13.70	6.63	8.38	18.04	17.13	0.00	2.75	13.50	11.75	6.23	2.97	5.05	24.11	79.04
2020-21	13.01	23.05	9.27	17.96	0.66	3.90	7.11	12.59	0.00	0.76	9.34	21.53	8.40	7.97	8.64	12.23	56.44
2021-22	34.68	15.14	20.79	13.58	7.68	5.06	43.20	11.53	0.17	1.82	69.36	27.93	8.80	4.40	63.68	20.54	248.36
2022-23	6.37	17.86	7.43	14.28	1.77	5.08	0.38	5.97	0.00	3.05	16.47	22.70	1.06	6.08	1.44	24.99	34.92

Source: Author calculations

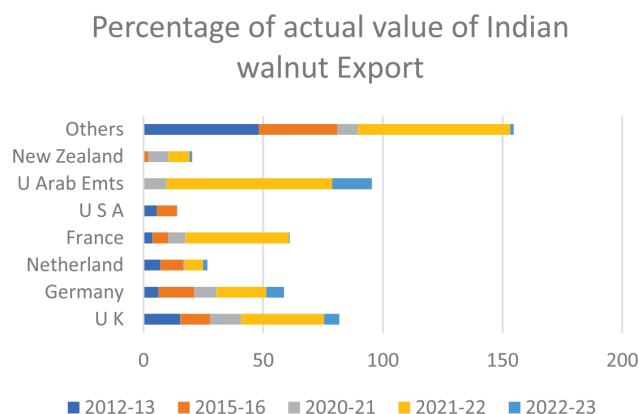


Figure 3. Percentage of actual value of Indian walnut export

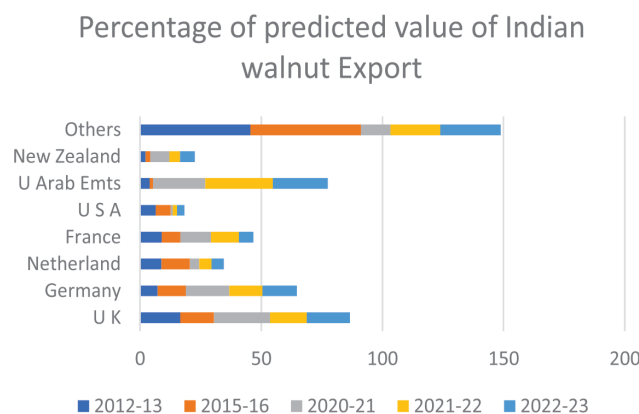


Figure 4. Percentage of actual value of Indian walnut export

Table 7: Forecasting value of Indian walnut export (Rs. Lakh)

Countries	U K	Germany	Netherland	France	U S A	U Arab Emts	New Zealand	Others
2023-24	18.55	10.24	6.40	11.03	2.97	22.75	2.09	25.98
2024-25	19.78	13.06	6.66	8.37	3.09	18.19	3.85	27.00
2025-26	19.06	11.81	7.00	10.30	3.21	17.45	2.93	28.25
2026-27	19.01	12.64	7.09	9.50	3.36	15.86	3.60	28.93

Source: Author's calculation

cent. on the other hand, UAE and New Zealand served as vital growth spots up to 2022–23, both their actual and predicted baseline shares showed definitive gains, validating the narrative that the UAE has grown into India's most stable and high-retention market (64.18 % retention probability). For these three nations (Netherlands, France, and the USA), both the actual and predicted metrics consistently trended downward. Although, the visual plots in Figures 3 and 4 depict a clear downward slope. The USA completely zeroed out in actual share by 2022–23, heavily impacted by domestic production drops in India and

Table 7 uses the calculated transitional probability matrix to forecast the nominal export market distribution (expressed in value, Rs. Lakh) up to the fiscal year 2026–27. Projections suggest a contraction in these markets (UAE and France) over the coming years. While the UAE remains a massive baseline consumer, its projected share experiences a gradual contraction from 22.75 per cent in 2023–24 down to 15.86 per cent by 2026–27. France similarly falls from 11.03 per cent to 9.50 per cent. The U.K. is slated to anchor its position as a highly reliable destination, with its projected share stabilizing firmly around 19.01 per cent by 2026–27. Germany's projected trade value is estimated to grow from 10.24 per cent (2023–24) to 12.64 per cent (2026–27). The Netherlands climbs modestly from 6.40 per cent to 7.09 per cent. Both countries (USA and New Zealand) exhibit

minor but positive growth trajectories in their projected future shares, with New Zealand reaching 3.60 per cent and the USA climbing marginally to 3.36 per cent by 2026–27. The “Others” category captures a significant bulk of the forecast (28.93% by 2026–27), highlighting market dispersion. Because the overall growth rate of Indian walnut exports is facing a downward trend globally, these projections emphasize that policy interventions—like introducing high-yielding, disease-resistant varieties—must be fast-tracked to help India capture the growth projected in markets like the U.K. and Germany.

Conclusions and Policy Implications

Walnut cultivation holds significant importance in India's horticultural sector, with Jammu & Kashmir being the primary contributor, accounting for 92 percent of total production and over 78 percent of the cultivation area nationwide. Although there have been fluctuations in walnut area and production over the study period, the years from 2018-19 to 2022-23 have shown relative stability in both aspects. Despite India's modest 0.77 percent contribution to global walnut production, its exports have witnessed a downward trend from 2011-12 to 2022-23. However, there has been a notable surge in exports to the United Arab Emirates and New Zealand, indicating increasing demand in these regions. UAE stands out as the most stable market for Indian walnuts, followed by the UK,

both retaining significant portions of their original import shares. On the contrary, Germany, France, and the USA have proven to be unstable importers, failing to maintain their initial shares. Projections suggest that France and UAE may experience a decrease in their import shares, while the UK, Germany, the Netherlands, USA, and New Zealand are expected to witness an increase. Given the declining growth rate estimates, it is imperative to prioritize the promotion and stabilization of exports. The study underscores the importance of enhancing export earnings by focusing on providing high-yielding varieties and ensuring the quality of walnuts.

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