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Export Trends and Market Diversification of Medicinal and Aromatic Plants from Nepal: A Five-Year Analysis

BY

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Abstract

This study examines export trends and market diversification of medicinal and aromatic plants (MAPs) from Nepal over five fiscal years (FY 2077/78 to 2081/82), drawing on official records from Tribhuvan International Airport, the Department of Plant Resources, and the Trade and Export Promotion Centre, covering 76 commodities exported to 41 countries. Nepal exported a cumulative 24.72 million kilograms of MAPs, growing at a compound annual growth rate of 3.68 %, yet India's volume share rose from 93.14 % to 99.24 %, and the Herfindahl-Hirschman Index worsened from 0.87 to 0.98, while non-India exports collapsed by 87.1 %. Ritha, Timur, and Chutro dominate the commodity basket, and unit values reveal an eighty-eight-fold gap between India-bound bulk exports and air-freighted essential oils to the United States. Findings indicate deepening India-dependency rather than diversification, and the study recommends targeted policy and commodity-level interventions to build high-value, diversified export corridors for Nepal's MAP sector.

Keywords: *Medicinal and Aromatic Plants, Nepal, Export Trends, Market Diversification, Herfindahl-Hirschman Index, India Dependency, CAGR*

1. INTRODUCTION

1.1 Background

With its five ecological zones, stretching from the sub-tropical Terai to the trans-Himalayan mountains, Nepal possesses one of the world's highest levels of diversity of medicinal and aromatic plants (Shrestha et al., 2022). Nepal commercially trades about 300 species of MAPs, fungi, and lichens annually, and these products represent some of the country's most valuable non-timber forest exports and a major livelihood for rural and mountain families (Smith-Hall et al., 2025). Commercialization of wild high-altitude species averages about 12% of household income in the country's mountains, with higher values in communities focused on trade of highly valued species such as Yarsagumba (Olsen & Larsen, 2003). The official export value of MAP products grew from approximately USD 27.49 million in 2005 to USD 60.09 million in 2014, despite a reduction in trade volumes over that period (Ghimire et al., 2016). The global markets for herbal products are also continuing to grow, valued at 70.57 billion USD in 2023, with a forecast of USD 328.USD 328.72 by 2030 at a compound annual growth rate (CAGR) of 20.91% (Grad View Research, 2024).

But even with these prospects, Nepal's MAP export composition faces an important limitation. Nepal's relative exports to India (as a proportion of its MAP exports) are steadily increasing in terms of volume, from 93.14 % of total MAP exports from Nepal in FY 2077/78 to 99.24 % of total MAP exports in FY 2081/82, as shown in this report, further reinforcing instead of diluting the dependence. An estimated 80-90% of Nepal's MAPs continue to exit in crude, raw form (Pyakurel et al., 2022; Smith-Hall et al., 2025).

1.2 Problem Statement

1. **Market Concentration and India Dependency:** The overwhelming concentration of Nepal's MAP exports in a single destination market exposes the sector to severe economic and geopolitical vulnerability. This study finds that the HHI score increased from 0.8723 in FY 2077/78 to 0.9849 in FY 2081/82.
2. **Raw Commodity Export Trap:** Nepal exports most of its MAPs unprocessed, forfeiting the value-addition margin captured by Indian and Chinese processors. India-bound bulk MAPs generate only

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NPR 194/kg, against NPR 17,035/unit for air-freighted exports to the USA.

3. **Data and Research Gap for the Recent Period:** The most comprehensive national-level export analysis (Ghimire et al., 2016) covers only through 2014. This study addresses a ten-year empirical gap encompassing the COVID-19 pandemic, post-pandemic recovery, and the commodity shifts of FY 2081/82.

Of these, the market-concentration and India-dependency problem is the central empirical concern this paper investigates in depth; the raw-commodity and data-gap problems are addressed as directly related dimensions of the same structural pattern.

1.3 Research Objectives

Main Objective: To analyze the export trends and market diversification of medicinal and aromatic plants from Nepal over five fiscal years, FY 2077/78 to FY 2081/82, using TIA, DPR, and TEPC records.

Specific Objective 1: To examine the year-wise export volume trend, commodity composition, and destination-market structure of Nepal's MAP exports over the study period.

Specific Objective 2: To assess Nepal's degree of export market concentration and India-dependency using the Herfindahl-Hirschman Index, and to quantify the unit-value differential between India-bound and diversified export corridors.

2. LITERATURE REVIEW

2.1 Global and Nepal's MAPs Trade

International trade in medicinal and aromatic plants (MAPs) is growing at an extremely rapid pace. Data sourced from the International Trade Center on HS code 1211 indicated that global exports of MAPs grew to nearly USD 4.18 billion in 2023, up nearly 98% from 2010 levels, with China, India, and Germany identified as the top exporting nations and the USA, Germany, Hong Kong, and Japan the biggest importers (Zamani et al. 2025). In return, the primary end-use industry for these products, the herbal medicines market, is projected to grow from USD 70.57 billion in 2023 to USD 328.72 billion in 2030, at a CAGR of 20.91% (Grand View Research 2024). Domestically, Smith-Hall et al. (2025) documented trade in approximately 300 commercially exploited species of MAPs, fungi, and lichens per year, with exports reaching nearly 10,770 tonnes valued at USD 86 million by 2014 in Nepal. Foundational livelihood research on MAPs indicated that the trade provides roughly 12% of household income in the Nepali mountain regions, helping households survive through product sales (Olsen and Larsen 2003).

2.2 Export Trends, India Dependency, and Value Addition

A seminal national analysis by Ghimire et al. (2016) demonstrated that between 2005 and 2014, Nepal's MAP trade value increased from USD 27.49 million to USD 60.09 million, while quantities decreased, indicating price increases and scarcity. They found India and China to be leading export destinations, that most trade occurs under a generic HTS code (HS 12119090), which hides information by masking country-to-country information in aggregated commodity trade statistics, and thus provides no insight into which MAP commodities are exported to which destinations, and between which countries. District-level studies corroborate the strong orientation towards India. According to Bhattarai et al. (2022), the vast majority of MAP from Makawanpur district is traded (mostly with little to no value-add in Nepal, except for Berberis and Taxus, which are traded as semi-finished products) to India. Another district-level study from western Nepal reported similarly high dependence on buyers in India (Pyakurel et al., 2018). This ease of trading into India, given established trading routes and networks of traders between the countries, gives rise to a structural dependency that is proving difficult to step back from once these networks are formed.

From a processing perspective, Smith-Hall et al. (2025) reported that nearly all MAPs are exported from Nepal to India and China for processing into secondary products, with a significant percentage of the value created by these MAPs occurring as a processing margin external to Nepal. Using soapnut, wild-apricot and Nepalese pepper oil species, Pyakurel et al. (2022) concluded that secondary processing opportunities for these MAPs "are quite apparent from a market perspective. However, in-country processing in volume is limited. Further complicating this trade policy challenge is the potential for climate change to alter the range of critical Nepalese MAPs of commercial value" (Shrestha et al. 2022).

2.3 Research Gap

There are three motivations for the present paper. First, none of the extant published works examined Nepal's MAP export performance during the FY 2077/78-2081/82; the most detailed national examination to-date extends no further than to 2014 (Ghimire et al., 2016). Second, the existing body of work lacks recent empirical HHI data that could shed light on whether MAP exports from Nepal have become more concentrated or more diversified post-pandemic. Third, national analyses to date have typically relied on data from UN COMTRADE or aggregate customs data, whereas this paper instead merges air-side records from Tribhuvan International Airport (TIA) with DPR commodity-level data to generate a more detailed commodity- and destination-level breakdown than currently exists at the national level.

3. RESEARCH METHODOLOGY

The present study design is descriptive-analytical, derived from secondary quantitative data, covering cross-sectional data (five fiscal years) yet analyzed longitudinally. The study combined three official data sources: (a) TIA export records indicating HS code and destination of export, volume and CIF value of individual shipment, by air and land customs points, (b) DPR commodity export record giving volumes of 76 species of MAP by commodity at India as against other destinations, (c) Mechi Customs records providing total volume for different HS-code level by overland entry route.

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The study period spans five fiscal years, FY 2077/78 (2020/21) through FY 2081/82 (2024/25), with FY 2077/78 corresponding to the later stage of COVID-19 trade disruption.

Calculations of growth rate year-on-year, YoY (%) = [(V t-V t-1)/V t-1] x 100 and the five year compound annual growth rate, CAGR (%) = [(V 4/V 0)^(1/4) - 1] x 100 were applied, both at the aggregate and commodity level, according to the accepted methods of describing trends in natural resource exports (Vasisht et al., 2016). Commodities were ranked by five-year cumulative export volume, and the distribution by destination was analyzed using CIF value and volume, as well as unit value (CIF per liter or kilogram), to reflect the value premium for each export corridor. Concentration was measured by the Herfindahl-Hirschman Index, calculated both at the binary level (India versus the rest of the world), HHI= sIndia+ sOthers, and at the country level from TIA data, HHI=si, where si represents the share of each destination market in total CIF value (an HHI close to 1 indicates extremely high monopoly concentration, while an HHI near 0 indicates perfect diversification). All values expressed are in Nepalese Rupees (NPR), all oils (HS 3301) in liters and other MAPs in kilograms. The primary limitation of this approach is that informal trade into India via cross-border routes does not appear in official trade figures, and that the size of India-bound exports, and in fact their concentration, is most likely underestimated rather than overestimated.

4. RESULTS AND DISCUSSION

Results are organized around the study's two specific objectives: export volume, commodity, and destination trends (Section 4.1), and market concentration, India-dependency, and value differentials (Section 4.2).

4.1 Export Volume, Commodity, and Destination Trends (Objective 1)

Fiscal Year	India (kg)	Other Countries (kg)	Total (kg)	YoY Growth	India Share
FY 2077/78	4,518,777	332,634	4,851,411	-	93.14%
FY 2078/79	4,220,228	393,714	4,613,942	-4.89%	91.47%
FY 2079/80	4,698,813	252,686	4,951,499	+7.32%	94.90%
FY 2080/81	4,658,886	42,572	4,701,458	-5.05%	99.09%
FY 2081/82	5,563,770	42,750	5,606,520	+19.25%	99.24%
Total / CAGR	23,659,774	1,064,356	24,724,830	CAGR: 3.68%	95.69%

Table 1: Annual Nepal MAP Export Volume, FY 2077/78-2081/82. Source: DPR Commodity Export Data.

Over the five-year period, Nepal sold a total of 24.72 million kg of MAPs, with the volume increasing from 4.85 million kg (FY 2077/78) to 5.61 million kg (FY 2081/82), representing 15.57% growth and a 3.68% CAGR. The total amount, however, belies two very different trends: the steady upward journey towards India posting 5.34% CAGR, and the plummet from 332,634 kg to 42,750 kg for the rest of the world, representing an 87.1% decline and a -40.13% CAGR. The progression was bumpy and non-linear: a 4.89% decline in FY 2078/79 (a mild aftermath of COVID-19), a 5.05% dip the following fiscal (2080/81), and its greatest single-year performance in FY 2081/82, at 19.25%, due to the booming market for Chutro.

Rank	Commodity	5-Year Total (kg)	% of Total
1	Ritha (Soapnut)	5,578,471	23.58%
2	Timur (Szechuan Pepper)	3,389,816	14.33%
3	Chutro (Berberry)	3,234,909	13.67%
4	Pine Buds/Knots	2,163,330	9.14%
5	Pashanved	2,063,499	8.72%
6	Cinnamon Leaf (Tejpat)	1,512,541	6.39%
7-15	Kaulo, Padamchal, Jatamansi, and 6 others	3,895,141	16.44%

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Table 2: Top MAP Commodities Exported to India, Five-Year Cumulative Volume. Source: DPR Export Data, "Export to India" sheet. These 15 commodities account for approximately 91% of total India-bound volume.

One of Nepal's main commodities is Ritha (Sapindus mukorossi), which increased by 64.2% (CAGR 13.2%) due to growing demand in India for cosmetics. Although it is exported completely raw from Nepal, it has the potential to be value-added and not exported in its raw state to benefit producers and the country. Similarly, despite being a major commodity for Nepal, Timur (Zanthoxylum armatum) declined by 32.4% in raw form, while exports of Timur oil increased from 161 kg to 2970 kg, showing early potential for value-added products within the same commodity chain. The largest increase is observed in Chutro (Berberis spp.), increasing by 357% from 415,470 kg in FY 2077/78 to 1,898,194 kg in FY 2081/82 due to increased demand for berberine for pharmaceutical uses from India, and the growth was responsible for 34.1% of the total export growth in FY 2081/82.

Pine Buds appeared rapidly in the market in FY 2078/79 and then decreased again, indicating a typical boom-bust pattern driven by episodic shocks in demand for the product in China. Other traditionally traded and traded commodities decreased drastically and are of concern for sustainability. The jatamansi market decreased by 97.2% and Black Musli by 99.2%; these patterns are aligned with climate change impacts and harvesting pressure, as explained by Shrestha et al. (2022).

Rank	Country	CIF Value (M NPR)	% of Value	% of Volume	Unit Value (NPR)
1	India	7136.31	53.72%	83.29%	221
2	USA	1149.79	8.65%	0.17%	17,035
3	Hong Kong	950.53	7.15%	0.50%	4,850
4	China	755.65	5.69%	4.09%	476
5	France	735.49	5.54%	0.22%	8,649
6	Cambodia	454.48	3.42%	0.00%	250,279
7	Belgium	291.85	2.20%	0.09%	8,522

Table 3: Nepal MAP Export Destinations by CIF Value and Volume, Five-Year Total. Source: TIA Export Records.

India exports the majority of bulk MAPs by both volume (83.29%) and value (53.72%), however the mismatch between these two figures is important: India imported bulk MAPs at an average value per unit of just NPR 221/kg, compared to NPR 17,035/kg with USA imports, NPR 8,649/kg with France imports and NPR 8,522/kg with Belgium imports (almost all of which are essential oil corridors), whereas Yarsagumba exports have been dominated by Hong Kong, Cambodia and China, at an average value per unit of NPR 531,595/kg over the time, which shows the vastly higher value per kg of Nepal's low-volume, non-Indian trade by size.

4.2 Market Concentration, India Dependency, and Value Differentials (Objective 2)

Fiscal Year	India Share	Other Share	HHI Score	Concentration Status
FY 2077/78	93.14%	6.86%	0.8723	Very High Concentration
FY 2078/79	91.47%	8.53%	0.8439	Moderate-High
FY 2079/80	94.90%	5.10%	0.9031	Very High Concentration
FY 2080/81	99.09%	0.91%	0.9821	Critical - Extreme
FY 2081/82	99.24%	0.76%	0.9849	Critical - Extreme

Table 4: Export Market Concentration (HHI), FY 2077/78-2081/82. HHI = s^2India + s^2Others, using DPR volume shares. TIA country-level HHI (CIF-based) rose from 0.3175 to 0.5252 over the same period.

The HHI reveals no signs of improvement in concentration, which deteriorated from 0.8723 for 2077/78 to 0.9849 for 2081/,82, with India's volume share at 99.24% for 2081/82 – practically close to a single-buyer scenario. The country-level HHI computed using TIA CIF shows the same pattern: nearly

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doubling from 0.3175 in FY 2077/78 to 0.5252 in FY 2081/82. The country-level HHI value exceeds the widely understood threshold of 0.25 associated with a highly concentrated market structure. This evidence would serve as a striking example of an outright failure of Nepal's attempts at trade diversification, resulting in a significant decrease in the non-India trade share of total volume, from 6.86% in 2077/78 to 0.76% in 2081/82. This is directly opposed to the expected result of increased levels of trade diversification, rather representing a reversal of earlier efforts to overcome overreliance that started from where Ghimiree et al. (2016) and Pyakurel et al. (2018) ended the trade-off from increased dependence on India, close to total reliance.

In addition, this research attempts to quantify the per unit value of opportunity cost of Nepal's India-oriented export structure based on raw government data, NPR 194–221 per kg for Indian bound bulky MAPs versus NPR 17,035 for US bound essential oil and NPR 531,595 per kg Yarsagumba an 88-fold difference while that for essential oils is high value per kg NPR3630 million earned during 5 years 27.32% of TIA value from low volume but dropped by 42.4% in 5 years. Nepal's value-addition efforts were seriously threatened by the loss of a diversified, high-value market, but it seems there was an implementation problem (Pyakurel et al., 2022 & Smith-Hall et al., 2025).

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The following represents Nepal's first systematic empirical investigation of MAP export trends over the period FY 2077/78 – 2081/82. Regarding Objective 1: Total MAP exports of 24.72m kgs over the five years, a relatively slow 3.68% CAGR, driven by growth in a few high-volume, India-bound bulk products: Ritha, Timur, and the extremely fast-growing Chutro. Significant contractions were recorded across several relatively high-value and important species, however. On Objective 2: The empirical results are stark and clear; Export share for the India market grew by over 6 percentage points from 93.14% to 99.24%, its HHI (improving) score declining from 0.8723 to 0.9849, thus confirming growing and not decreasing concentration in exports for their main market while the unit-value gap against other destination markets, e.g. To the USA or France expands to nearly 88 times. By this metric alone, Nepal's MAP export industry is, structurally, more precarious and not more diverse than its own evidence suggests.

5.2 Recommendations

Policy Recommendation (addressing Objective 2 - concentration and dependency): For the Government of Nepal, TEPC and MFE, to integrate the HHI as a regular metric for annually monitoring market diversification of MAPs and to institute a distinct market- linkage, value chain development fund to develop adequate and affordable infrastructure, quality assurance and direct marketing facilities with EU and USA Markets where values for products are often 10- fold above those from Indian suppliers.

Commodity Recommendation (addressing Objective 1 - export trends and commodities): Preference must be given to the creation of berberine-extraction facilities associated with the fast-expanding Chutro trade and to natural-cosmetics production for Ritha, turning Nepal's largest raw export volumes into higher-value goods and immediately installing emergency sustainable harvest quotas for species collapsing rapidly to prevent export Collapse.

Way Forward: In order to reverse the path observed in this study, Nepal will have to deal with market diversification and value addition as one single, monitored policy objective instead of two separate aspirations, the follow-up study has to examine whether the HHI trend will be reversed, and to estimate the magnitude of informal cross-border trade that is acknowledged, but not measured, in this paper and previous studies.

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Full Form
CAGR	Compound Annual Growth Rate
CIF	Cost, Insurance and Freight
DPR	Department of Plant Resources
FY	Fiscal Year (mid-July to mid-July, Nepal)
HHI	Herfindahl-Hirschman Index
HS	Harmonized System (Code)
kg / LTR	Kilogram / Liter
MAPs	Medicinal and Aromatic Plants
NPR	Nepalese Rupee
TEPC	Trade and Export Promotion Centre, Nepal
TIA	Tribhuvan International Airport, Kathmandu
YoY	Year-on-Year

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