

Econometric Determinants of External Demand for Egyptian Mango Exports to Gulf Cooperation Council “GCC” Markets

Dr. Mona Fouad El-Kashef*
Dr. Hossam Hosny Abdul Aziz*

Dr. Abdel Halim Abdelnaby Abdel Halim**
Dr. Hanan Mohamed Bahgat*

*Senior Researchers, Agricultural Economics Research Institute, Agricultural Research Center, EGY.

**Researcher, Agricultural Economics Research Institute, Agricultural Research Center, EGY.

Correspondence Author: Dr. Hossam Hosny Abdul Aziz

Abstract: This study examines the key economic determinants influencing the external demand for Egyptian mango exports to Gulf Cooperation Council (GCC) countries from 2008 to 2024. Emphasizing the strategic significance of GCC markets for Egypt's agricultural exports and foreign exchange earnings, the research addresses the underperformance of Egyptian mango exports despite the country's comparative advantage in production and quality. Challenges such as price volatility and strong competition from India and Pakistan are analyzed through an econometric demand model incorporating variables like income, price, and exchange rates, alongside assessments of Egypt's price competitiveness. Findings reveal substantial growth in cultivated area and total production, albeit with volatile yield per feddan. Mango exports grew at an average annual rate of 19%, with GCC nations accounting for 61% of export volume and 59% of export value, predominantly directed to Saudi Arabia, the UAE, and Kuwait. Econometric results identify domestic production, population size, income levels, and competitor pricing as principal drivers of external demand, with Egyptian mangoes sustaining a competitive price advantage in global markets.

Keywords: Mango Exports, External Demand, GCC Markets, Price Competitiveness, Econometric Analysis.

I. INTRODUCTION

Recent trends in global trade have positioned the Gulf Cooperation Council (GCC) as a strategic destination for Egyptian agricultural exports (Ahmed & Shelaby, 2014; Gulf Cooperation Council Secretariat General, 2023). Enhancing trade with GCC countries aligns with Egypt's export priorities due to its impact on foreign exchange earnings, balance of payments, and job creation (Abu Hatab, Romstad, & Huo, 2010; CAPMAS, 2024). Mango is one of Egypt's leading export crops, benefiting from increasing demand in GCC markets, fueled by close economic ties and geographic proximity (Mostafa, Ismail, & Abdel Hafeez, 2022; FAO, 2023). Between 2020 and 2024, the average value of Egyptian mango exports to the GCC reached USD 35.59 million—accounting for 43.8% of global mango exports, 37.7% of fruit exports, 28.5% of agricultural exports, and 0.1% of total national exports (International Trade Centre, 2024; CAPMAS, 2024). Export volumes rose from 50.76 thousand tons in 2020 to 107.01 thousand tons in 2024, with Saudi Arabia, the UAE, and Kuwait absorbing over 61% of total mango exports (FAO, 2024; Tridge Intelligence, 2024).

II. Research Problem

Despite Egypt's comparative advantage in mango production and the strategic importance of GCC markets, the performance of Egyptian mango exports to these countries remains below expectations (Mostafa, Ismail, & Abdelhafeez, 2022; Ahmed & Khan, 2022). Export volumes fluctuated significantly between 2008 and 2024, increasing from 3.39 thousand tons in 2008 to 107.01 thousand tons in 2024, with irregular patterns in intermediate years—such as 11.64 thousand tons in 2014 and 36.88 thousand tons in 2019—highlighting market instability (CAPMAS, 2024; FAO, 2024). Key challenges include intense price competition from exporters like India and Pakistan, supported by strong export policies and superior infrastructure, which weakens Egypt's competitiveness in both price and quality (Soliman & Basioni, 2012; Abu Hatab, Romstad, & Huo, 2010). Accordingly, the study seeks to answer: What are the economic factors affecting external demand for Egyptian mango exports to GCC countries? And how have these factors influenced export volumes in recent years?

III. Research Objectives

This study aims to analyze the economic structure of Egyptian mango exports to GCC countries during the period (2008–2024). It examines trends in mango production, consumption, and exports over time, and evaluates export performance in terms of quantity and value to GCC markets. The study also estimates an

econometric export demand model using time series data to determine demand elasticities with respect to income, price, and exchange rate. In addition, it analyzes Egypt's price competitiveness relative to competing countries of origin and provides economic recommendations to enhance competitiveness, strengthen the presence of Egyptian mangoes in GCC markets, and leverage demand elasticity in designing more effective export policies.

IV. Methodology and Data Sources

The study relies on secondary data, both published and unpublished, obtained from official institutions such as the Egyptian Ministry of Agriculture and Land Reclamation (2022, 2023), the Central Agency for Public Mobilization and Statistics (CAPMAS, 2024), the Food and Agriculture Organization (FAO, 2023), the World Bank (2024), the International Monetary Fund, and the International Trade Centre (ITC, 2024), alongside relevant previous studies (Abu Hatab, Romstad, & Huo, 2010; Mostafa, Ismail, & Abdelhafeez, 2022; Soliman & Basoni, 2012). The research employs descriptive and econometric analyses. Growth functions were estimated for key production and export indicators of mango during (2008–2024), while the external demand for Egyptian mango exports to GCC countries was modeled using multiple linear regression with stepwise elimination (Greene, 2018; Wooldridge, 2016). The semi-log growth function $\ln Y_t = a + bt$ was used to analyze general demand trends, where Y_t denotes export quantity, a is the intercept, b is the annual growth rate, and t is time (Wooldridge, 2016). The export demand model describes the relationship between the quantity demanded and relevant economic variables to estimate price and income elasticities (Ahmed & Shelaby, 2014; El-Said & Omran, 2021), based on classical theory which posits that demand depends on the national income of importing countries, relative prices (Mostafa et al., 2022), and the real exchange rate (FAO, 2024; ITC, 2024). The double logarithmic functional form was employed as the most appropriate:

$$\text{Log } Y_i = \alpha + B_1 \text{Log } X_{1t} + \dots + B_n \text{Log } X_{nt},$$

Where: Y_i is the dependent variable quantity, $X_{1t} \dots X_{nt}$ are explanatory variables, and $B_1 \dots B_n$ their coefficients (Wooldridge, 2016). The model addressed issues such as autocorrelation by extending the time series to 17 years (Wooldridge, 2016), and multicollinearity by applying Klein's matrix and excluding variables with correlation coefficients exceeding ± 0.7 (Greene, 2018). The best model was selected based on R^2 , adjusted R^2 , statistical significance, and t and F tests (Greene, 2018). The final model demonstrated statistical and economic validity, effectively explaining the variations in Egyptian mango export volumes to GCC countries, thereby providing a scientific foundation for recommendations aimed at enhancing the product's competitiveness in target markets.

V. Results and Discussion

First: Key Production and Consumption Indicators of Mango Crop in Egypt ((2008–2024)):

Table (1) shows a general growth trend in most production and consumption indicators of the mango crop in Egypt between 2008 and 2024. The cultivated area increased from approximately 204.28 thousand feddans in 2008 to about 329.11 thousand feddans in 2024, with a statistically significant annual growth rate of 3.2% at the 1% level and an R^2 of 0.934, indicating stable temporal growth and continuous expansion contributing to potential production increases. Fruit-bearing areas rose from 132.08 to 310.52 thousand feddans at a 5.4% growth rate with an R^2 of 0.949, reflecting a rise in actual productive land and enhancing real output. Total production grew from 466.44 thousand tons to 1,475.61 thousand tons at a 6.5% annual growth rate ($R^2 = 0.816$), indicating sustained improvement over time driven by expanded area and better production factors. However, yield per feddan fluctuated between 2.60 tons/feddan (2021) and 4.75 tons/feddan (2024), showing weak growth of 1% annually with a low R^2 of 0.068, suggesting instability linked to technical factors that need development for efficiency improvement. Total consumption rose from 457 thousand tons to 1,276.9 thousand tons with a 5.9% growth rate ($R^2 = 0.777$), reflecting increased domestic demand, which directly stimulates production and market expansion. The results indicate that overall production growth was primarily driven by horizontal expansion in cultivated area rather than yield improvements, highlighting the need to focus on enhancing land-use efficiency through modern agricultural technologies to ensure sustainable production and maximize economic returns.

Table 1: Key Production and Consumption Indicators of Mango Crop in Egypt ((2008–2024)):

Year	Total Area (Thousand Feddans)		Fruit-bearing Area (Thousand Feddans)			Total Production (Thousand Tons)		Yield per Feddan (Ton/Feddan)		Total Consumption (Thousand Tons)		
	Area	Relative Index (%)	Area	Relative Index (%)	(%) of Total Area	Total Production	Relative Index (%)	productivity	Relative Index (%)	Consumption	Relative Index (%)	(%) of Total Production
2008	204.28	100.0	132.08	100.0	64.65	466.44	100.00	3.53	100.00	457	100.00	97.98
2009	227.32	111.3	144.97	109.8	63.77	534.43	114.58	3.69	104.39	525	114.88	98.23
2010	209.04	102.3	151.89	115.0	72.66	505.74	108.43	3.33	94.29	489	107.00	96.69
2011	222.84	109.1	169.07	128.0	75.87	598.08	128.22	3.54	100.17	574	125.60	95.97
2012	240.80	117.9	183.34	138.8	76.14	786.53	168.63	4.29	121.48	757	165.65	96.25
2013	241.10	118.0	200.88	152.1	83.32	712.54	152.76	3.55	100.44	685	149.89	96.14
2014	265.35	129.9	210.74	159.6	79.42	927.35	198.82	4.40	124.60	891	194.97	96.08
2015	281.15	137.6	212.27	160.7	75.50	880.88	188.85	4.15	117.51	855	187.09	97.06
2016	283.03	138.5	233.98	177.2	82.67	961.43	206.12	4.11	116.35	921	201.53	95.79
2017	289.29	141.6	264.93	200.6	91.58	1066.40	228.63	4.03	113.98	1000	218.82	93.77
2018	304.85	149.2	272.48	206.3	89.38	1095.24	234.81	4.02	113.82	1062	232.39	96.96
2019	304.12	148.9	265.51	201.0	87.30	1091.54	234.02	4.11	116.41	1047	229.10	95.92
2020	310.02	151.8	279.00	211.2	89.99	1203.74	258.07	4.31	122.17	1135	248.36	94.29
2021	321.04	157.2	294.10	222.7	91.61	766.13	164.25	2.60	73.76	714	156.24	93.20
2022	326.63	159.9	297.19	225.0	90.99	1280.31	274.49	4.31	121.99	1204	263.46	94.04
2023	328.28	160.7	309.49	234.3	94.27	1429.55	306.48	4.62	130.80	1215	265.86	84.99
2024	329.11	161.1	310.52	235.1	94.35	1475.61	316.36	4.75	134.56	1276.9	279.41	86.53
Total	4688.25	2295.0	3932.43	2977.4	1403.49	15781.94	3383.52	67.34	1906.72	14807.90	3240.24	1609.90
Average	275.78	135.0	231.32	175.1	82.56	928.35	199.03	3.96	112.16	871.05	190.60	94.70
Minimum	204.28	100.0	132.08	100.0	63.77	466.44	100.00	2.60	73.76	457.00	100.00	84.99
Maximum	329.11	161.1	310.52	235.1	94.35	1475.61	316.36	4.75	134.56	1276.90	279.41	98.23

Where:

- Relative Index (%) = (Indicator value in year t ÷ Indicator value in base year 2008) × 100.
- Percentage of Total (%) = (Indicator value in year t ÷ Total value of the same indicator in year t) × 100.
- The time series length (t) = 1.....17 years

Sources: MOALR, Economic Affairs Sector. Agricultural Statistics & Food Balance Sheet Bulletins (various issues).

Table 2: Estimation of Growth Functions for Key Production and Consumption Indicators of Mango Crop in Egypt ((2008–2024)):

Crop/Indicator		Equation	Average	Adjusted R ²	F-value	Annual Change Rate (%)
Production and consumption indicators of mango crop	Total Area (Thousand Feddans)	$\ln Y_i = 5.322 + 0.032 x_t$ (248.399)** (15.126)**	275.78	0.934	228.782**	3.20
	Fruit-bearing Area (Thousand Feddans)	$\ln Y_i = 4.919 + 0.054 x_t$ (102.915)** (17.329)**	231.32	0.949	300.296**	5.40
	Total Production (Thousand Tons)	$\ln Y_i = 6.193 + 0.065 x_t$ (79.215)** (8.478)**	928.35	0.816	72.201**	6.50
	Yield per Feddan (Ton/Feddan)	$\ln Y_i = 1.274 + 0.010 x_t$ (17.785)** (1.472)**	3.96	0.068	2.168**	100
	Total Consumption (Thousand Tons)	$\ln Y_i = 6.191 + 0.059 x_t$ (77.472)** (7.540)**	871.05	0.777	56.856**	5.90

Where:

- $\ln \hat{y}_i$: logarithmic value of total area, fruit-bearing area, total production, yield per feddan, and total consumption in Egypt, respectively.
- x_t : time variable, where $i = 1, 2, \dots, 17$ (years).
- Adjusted R²: adjusted coefficient of determination.
- F: calculated F-statistic value.
- Numbers in parentheses below regression coefficients indicate calculated t-values.
- (**) denotes significance at 0.01 level, (*) denotes significance at 0.05 level, and n.s indicates non-significant at 0.05 or 0.01 levels.
- Annual change rate (%) is calculated as the slope coefficient × 100, representing the annual growth or decline rate of the dependent variable.

Sources: Author's calc. from Table (1).

Second: Key Export Indicators of Mango Production in Egypt ((2008–2024))

Tables (3) and (4) reveal a significant upward trend in Egypt's mango-related export indicators during the period (2008–2024). This growth was observed across total exports, agricultural exports, fruit exports, and mango exports, though with varying growth rates and temporal consistency.

Table 3: Key Export Indicators of Egyptian Mangoes ((2008–2024)):

Year	Total value of Egypt's total exports	Total value of Egyptian agricultural exports		Total value of Egypt's fruit exports			Total value of Egypt's mango exports		
	Value (Billions USDs)	Value (Millions USDs)	(%) of the total export value	Value (Millions USDs)	(%) of the total export value	(%) of the total Agricultural exports value	Value (Millions USDs)	(%) of the total Agricultural exports value	(%) of total fruit exports value
2008	26.34	14.35	0.05	9.08	0.03	63.28	4.33	30.17	47.69

2009	24.21	18.85	0.08	14.02	0.06	74.38	9.46	50.19	67.48
2010	26.33	21.09	0.08	17.66	0.07	83.74	10.36	49.12	58.66
2011	31.58	22.67	0.07	19.22	0.06	84.78	7.48	33	38.92
2012	29.42	27.14	0.09	19.84	0.07	73.1	8.17	30.1	41.18
2013	28.78	34.89	0.12	21.11	0.07	60.5	7.02	20.12	33.25
2014	26.81	36.71	0.14	21.47	0.08	58.49	16.66	45.38	77.6
2015	21.86	37.22	0.17	22.29	0.1	59.89	17.15	46.08	76.94
2016	22.97	49.27	0.21	35.14	0.15	71.32	30.4	61.7	86.51
2017	26.43	86.35	0.33	44.72	0.17	51.79	34.11	39.5	76.27
2018	29.3	87.88	0.3	45.92	0.16	52.25	24.53	27.91	53.42
2019	30.51	92.17	0.3	45.96	0.15	49.86	28.84	31.29	62.75
2020	29.32	84.26	0.29	46.91	0.16	55.67	38.26	45.41	81.56
2021	43.64	101.96	0.23	85.13	0.2	83.49	43.18	42.35	50.72
2022	52.12	145.35	0.28	100.18	0.19	68.92	90.61	62.34	90.45
2023	42.05	145.81	0.35	119.22	0.28	81.76	116.82	80.12	97.99
2024	42.06	146.15	0.35	120.56	0.29	82.49	117.13	80.14	97.15
Total	533.73	1152.1	3.44	788.43	2.29	1155.71	604.51	774.92	1138.54
Average	31.4	67.77	0.20	46.38	0.13	67.98	35.56	45.58	66.97
Minimum	21.86	14.35	0.05	9.08	0.03	49.86	4.33	20.12	33.25
Maximum	52.12	146.15	0.35	120.56	0.29	84.78	117.13	80.14	97.99

Where:

- (%) of total = (Value of the export indicator in year t ÷ Total value of the corresponding indicator in the same year t) × 100.
- The time series covers 17 years: t = 1.....17 (i.e., 2008 to 2024)

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

Total exports increased from approximately 26.34 billion USD in 2008 to 42.06 billion USD in 2024, with an annual growth rate of 3.40%, statistically significant at the 1% level and an R^2 of 0.492. This indicates that nearly 49.2% of the variation is explained by time, reflecting a moderate but consistent export expansion over the years. Mango exports as a share of total exports grew from 0.03% in 2008 to 0.29% in 2024, signaling a gradual increase in the crop's strategic role within Egypt's export structure.

Table 4: Estimated Growth Equations for Key Export Indicators of Egyptian Mangoes ((2008–2024)):

Export Indicator		Equation	Mean	R^2	F-Statistic	Annual Growth Rate (%)
Mango export indicators	Total value of Egypt's total exports (Billion USD)	$\ln \hat{Y}_i = 3.111 + 0.034 x_t$ (34.089)** (3.812)**	31.40	0.492	14.529**	3.40
	Total value of Egyptian agricultural exports (Million USD)	$\ln \hat{Y}_i = 2.585 + 0.152 x_t$ (35.122)** (21.183)**	67.77	0.968	448.731**	15.20
	Total value of Egypt's fruit exports (Million USD)	$\ln \hat{Y}_i = 2.194 + 0.151 x_t$ (24.971)** (17.585)**	46.38	0.954	309.240**	15.10
	Total value of Egypt's mango exports (Million USD)	$\ln \hat{Y}_i = 1.383 + 0.190 x_t$ (8.745)** (12.281)**	35.56	0.910	150.381**	19.00

Where:

- $\ln \hat{Y}_i$ represents the natural logarithm of the total, agricultural, fruit, and mango export values, respectively.
- x_t is the time variable (t = 1, 2,, 17).
- R^2 : Coefficient of determination (Adjusted R-squared).
- F: Computed F-statistic value.

- Values in parentheses below the regression coefficients represent the computed t-values.
- (**) Significant at the 0.01 level.
- (*) Significant at the 0.05 level.
- n.s: Not significant at 0.05 or 0.01 levels.
- Annual Growth Rate (%) = Regression Coefficient $\times$ 100

Sources: Author's calc. from Table (3).

Agricultural exports rose from 14.35 million USD in 2008 to 146.15 million USD in 2024, at a significant annual growth rate of 15.20% and a high R^2 of 0.968, indicating strong time-consistent growth. Mango's share in agricultural exports climbed from 30.17% to 80.14%, underscoring its growing significance in this category.

Likewise, fruit exports increased from 9.08 million USD to 120.56 million USD during the same period, with a significant annual growth rate of 15.10% and R^2 of 0.954, showing consistent upward trends. The share of mango within fruit exports rose sharply from 47.69% in 2008 to 97.15% in 2024.

Notably, mango exports alone grew from 4.33 million USD in 2008 to 117.13 million USD in 2024, achieving the highest annual growth rate of 19.00%, with statistical significance and a strong R^2 of 0.910 indicating robust and steady expansion in this sector. Mango's contribution to fruit exports peaked at 97.99% in 2023 and ranged between 20.12% and 80.14% of agricultural exports throughout the study period.

These findings highlight not only the substantial increase in mango export value but also its strong temporal correlation and consistency. This upward trajectory reinforces the potential to maximize the economic return of Egyptian mangoes through enhanced marketing strategies, quality improvement, packaging, and adherence to export standards—measures that are vital to sustaining and expanding Egypt's market share in the coming years.

Third: The Relative Importance of Egyptian Mango Exports to GCC Countries ((2008–2024)):

Tables (5) and (6) high light that the Gulf Cooperation Council (GCC) countries represent the most significant export destination for Egyptian mangoes during the period (2008–2024). On average, these markets accounted for approximately 61.22% of the total exported quantity and 59.20% of the total export value, with annual averages of around 19.57 thousand tons and 17.68 million USD, respectively.

Exports to GCC countries experienced remarkable growth, with volumes increasing from 1.94 thousand tons in 2008 to 45.91 thousand tons in 2024, and values rising from 2.44 million USD to 46.00 million USD. The highest relative contributions were observed in 2012 and 2013.

Estimated growth functions show strong and consistent expansion, with annual growth rates of 20.00% in quantity and 16.00% in value, supported by high coefficients of determination ($R^2 = 0.875$ and 0.907), indicating stable and time-consistent trends.

Across all export destinations, Egypt's total mango exports averaged 43.78 thousand tons annually, with an average export price of 111.75 USD per ton. While the exported quantity increased by 23.70% per year, the average export price declined by 4.70%, possibly reflecting increased competition or a trade-off between volume growth and pricing.

These findings underscore the strategic role of GCC countries as a cornerstone market for Egyptian mango exports, offering strong potential for future expansion. This justifies their selection as the focal point of this research.

Table 5: The Relative Importance of Egyptian Mango Exports to GCC Countries ((2008–2024)):

Year	Total Egypt's mango exports			The most important Egyptian export markets for mangoes			
				Gulf Cooperation Council countries (GCC)			
	Quantity (thousand tons)	Value (million USD)	Export price (USD/ton)	Quantity (thousand tons)	Value (million USD)	(% of total Egyptian mango exports)	
						Quantity	Value
2008	3.39	4.33	127.73	1.94	2.44	57.19	56.28
2009	5.69	9.46	166.26	3.57	6.05	62.76	63.96
2010	9.76	10.36	106.15	6.74	7.26	69.01	70.08
2011	4.62	7.48	161.90	3.19	5.13	68.98	68.59
2012	5.61	8.17	145.63	4.41	6.41	78.73	78.48

2013	4.66	7.02	150.64	3.81	5.40	81.70	76.89
2014	11.64	16.66	143.13	7.66	9.80	65.80	58.85
2015	12.31	17.15	139.32	8.07	10.43	65.52	60.82
2016	28.42	30.40	106.97	16.48	17.99	57.99	59.16
2017	40.39	34.11	84.45	25.70	21.61	63.64	63.35
2018	56.02	24.53	43.79	42.70	14.41	76.22	58.73
2019	36.88	28.84	78.20	21.81	15.69	59.14	54.41
2020	50.76	38.26	75.37	34.13	23.68	67.24	61.88
2021	39.19	43.18	110.18	25.55	22.61	65.20	52.36
2022	221.22	90.61	40.96	35.26	39.78	15.94	43.91
2023	106.65	116.82	109.54	45.69	45.90	42.84	39.29
2024	107.01	117.13	109.46	45.91	46.00	42.90	39.28
Total	744.22	604.52	1899.67	332.62	300.59	---	---
Average	43.78	35.56	111.75	19.57	17.68	61.22	59.20
Minimum	3.39	4.33	40.96	1.94	2.44	15.94	39.28
Maximum	221.22	117.13	166.26	45.91	46.00	81.7	78.48

Where:

- Export price = Total export value (USD) in year t ÷ Total export quantity (tons) in year t.
- (%) of total = (Quantity or value for GCC in year t ÷ Total mango exports in year t) × 100.
- Time series covers 17 years (t = 1.....17).

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

Table 6: Estimated Growth Functions for Egyptian Mango Exports to GCC Countries ((2008–2024)):

crop	Statement	Equation	Mean	R ²	F-Statistic	Annual Growth Rate (%)
Egypt's mango exports	Total Quantity of Egyptian Mango Exports (thousand tons)	$\ln Y_i = 0.922 + 0.237 x_t$ (3.851)** (10.163)**	43.78	0.873	**103.282	23.7
	Export price (USD/ton)	$\ln Y_i = 5.071 - 0.047 x_t$ (28.532)** (2.722)**	111.75	0.331	**7.410	4.70
Egyptian mango exports to GCC	Egyptian Mango Exports Quantity (thousand tons)	$\ln Y_i = 0.721 + 0.200 x_t$ (3.651)** (10.266)**	19.57	0.875	**105.390	20.00
	Egyptian Mango Exports Value (million USD)	$\ln Y_i = 1.119 + 0.160 x_t$ (8.244)** (12.066)**	17.68	0.907	**145.600	16.00

Where:

- $\ln \hat{Y}_i$: Natural logarithm of the dependent variable (quantity, price, or export value of mangoes) to GCC Countries, respectively.
- x_t : Time variable (t = 1, 2,, 17).
- R²: Adjusted coefficient of determination.
- F: Calculated value of the F-statistic.
- Numbers in parentheses represent the t-values of the regression coefficients.
- (**) Significant at the 0.01 level.
- (*) Significant at the 0.05 level.
- n.s: Not significant at 0.05 or 0.01 levels.
- Annual Growth Rate (%) = Regression Coefficient × 100

Sources: Author's calc. from Table (5).

Fourth: Egyptian Mango Exports to GCC Countries ((2008–2024)):

Table (7) indicates that Saudi Arabia represents the most significant market for Egyptian mango exports in terms of both quantity and value, with an average of approximately 10.45 thousand tons and 8.33 million USD, accounting for nearly 24% of total mango exports. It is followed by the United Arab Emirates and Kuwait, which recorded relatively high average export prices of about 1,054 and 1,112 USD per ton,

respectively reflecting a qualitative demand in these markets. Oman and Bahrain ranked fourth and fifth, while Qatar came last in terms of relative importance.

This distribution reveals a clear concentration of mango exports in specific markets, particularly Saudi Arabia and the UAE. This underscores the need for a strategic focus on these key destinations and for enhancing Egypt's market share therein, while also working to expand exports to other GCC markets with lower absorptive capacities.

Table 7: Average Egyptian Mango Exports to GCC Markets ((2008–2024)):

Country/Indicator	Average Quantity (thousand tons)	Average Value (million USD)	Export Price (USD/ton)	Percentage of Total Quantity of Egyptian Mango Exports (%)	Percentage of Total Value of Egyptian Mango Exports (%)	Relative Importance of Countries (Quantity and Value)
Total Egyptian mango exports	43.78	35.80	817.00	—	—	—
Egyptian mango exports to GCC	19.57	17.68	903.00	61.22	59.20	—
Saudi Arabia	10.45	8.33	797.00	23.86	23.27	1
UAE	3.54	3.74	1054.00	8.09	10.45	2
Kuwait	2.41	2.68	1112.00	5.51	7.48	3
Oman	1.52	1.42	934.00	3.47	3.97	4
Bahrain	1.28	0.99	774.00	2.92	2.77	5
Qatar	0.27	0.42	1556.00	0.61	1.17	6

Where:

- Export Price = Total Export Value in Year (t) ÷ Total Export Quantity in Year (t).
- Percentage of Total (%) = (Export Quantity or Value for Each Country in Year (t) ÷ Total Egyptian Export Quantity or Value of the Same Indicator in Year (t)) × 100.
- Where (t) denotes the length of the time series: t = 1..... 17 years

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

Fifth: Price Competitiveness Analysis of Egyptian Mangoes and Key Competing Countries in the GCC Market ((2008–2024))

Table (8) reveals that the export price of Egyptian mangoes in GCC markets has remained consistently lower than those of competing countries over most of the study period, indicating a clear price competitiveness advantage for Egypt. In the Saudi market, for instance, the average export price of Egyptian mangoes was approximately 103 USD per ton, compared to around 638 USD for India and 794 USD for Pakistan, resulting in an average price ratio of only 17.6%. This highlights a substantial price gap in favor of Egyptian mangoes. Similar patterns were observed across other GCC markets, albeit with varying degrees.

In the Qatari market, although Egypt's average export price was relatively higher about 160.59 USD per ton the price ratio compared to Kenya, Pakistan, and India remained below 17% on average, thus preserving Egypt's price advantage. However, in the Bahraini and Emirati markets, price ratios relative to Kenya exceeded 80% in certain years, potentially undermining Egypt's relative competitiveness if quality and marketing conditions were equalized.

Overall, these findings underscore Egypt's strong price-based competitive advantage in most GCC markets. Leveraging this advantage by improving product quality, packaging, and marketing strategies could enhance Egypt's market share and boost future export performance.

Table 8: Price Competitiveness Analysis of Egyptian Mangoes in GCC Markets ((2008–2024)):

Market	Average Egyptian Price (USD/ton)	Highest Egyptian Price (USD/ton)	Lowest Egyptian Price (USD/ton)	Average price ratio compared to competing countries			The Third country
				India	Pakistan	Third country	
Saudi Arabia	103.07	173.48	20.92	0.091	0.141	0.176	Yemen
UAE	121.46	174.29	73.52	0.073	0.133	0.088	Pakistan

Kuwait	130.71	200.00	67.31	0.100	0.369	0.209	UAE
Oman	112.26	250.00	27.80	0.084	0.139	0.577	Kenya
Bahrain	130.40	171.43	81.18	0.110	0.298	0.816	Kenya
Qatar	160.59	277.78	125.00	0.107	0.164	0.968	Kenya

Where:

- Price Ratio = Egypt's Export Price in Year (t) ÷ Export Price of the Competing Country in Year (t).
- The closer the price ratio is to 1 (or 100%), the Lower Egypt's relative price competitiveness. A ratio exceeding 1 indicates that Egypt's export price is higher than that of the competitor, which may reduce its price advantage in the market.
- Where (t) denotes the length of the time series, with t = 1 ... 17 years.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

Sixth: Econometric Estimation of External Demand Model for Egyptian Mango Exports ((2008–2024)):

The external demand model relies on ten independent explanatory variables for the quantity of Egyptian fresh mango exports to GCC countries ($\ln y_i$), measured in thousand tons per year (t), as the dependent variable. The model includes the following logarithmic variables:

- ($\ln X_{1i}$): Natural log of Egypt's total domestic mango production (in thousand tons).
- ($\ln x_{2i}$): Natural log of the importing country's total GDP (in billion USD).
- ($\ln x_{3i}$): Natural log of the exchange rate of the importing country's currency against the US USD.
- ($\ln x_{4i}$): Natural log of per capita income in the importing country (in thousand USD/year).
- ($\ln x_{5i}$): Natural log of the importing country's total population (in millions).
- ($\ln x_{6i}$): Natural log of Egypt's export price to the given market (USD per ton).
- ($\ln x_{7i}$): Natural log of Egypt's total domestic mango consumption (in thousand tons).
- ($\ln x_{8i}$) to ($\ln X_{10i}$): Natural log of the export prices of major competing countries (USD per ton) in each of Egypt's target markets.

The double-log (log-linear) functional form was found to be the most appropriate specification for the external demand model for Egyptian mango exports to GCC markets, and is expressed as follows:

1 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports Saudi Arabia ((2008–2024)):

The regression analysis (Table 9) reveals that variables (X_3 , X_5 , X_8 , X_9 , and X_{10}) were excluded due to statistical constraints, while (X_1 , X_2 , X_4 , X_6 , and X_7) were retained in the final double logarithmic model. The model is highly significant at the 1% level ($F = 24.345$) with an R^2 of 87.9%, indicating that these variables account for the majority of variation in mango export volumes.

Domestic mango production (X_1) emerged as the most influential positive factor; a 1,000 ton increase in production corresponds to an 11,408 ton increase in exports ($p < 0.01$), emphasizing the critical role of exportable surplus. Saudi Arabia's GDP (X_2) positively affects exports, with a one billion USD increase linked to an additional 4,578 tons ($p < 0.05$), reflecting growth-driven demand. Conversely, Saudi per capita income (X_4) shows a significant negative relationship, where a one USD decrease is associated with a 5,420 ton increase in exports ($p < 0.05$), possibly indicating consumer shifts toward lower-priced products.

Egyptian export price (X_6) negatively influences export volumes ($p < 0.01$), with a one USD price reduction leading to an increase of approximately 1,027 tons, suggesting inelastic price responsiveness and the dominance of quality and brand factors. Furthermore, a decrease of 1,000 tons in domestic consumption (X_7) results in a 10,981-ton rise in exports ($p < 0.05$), highlighting the tradeoff between domestic supply and export markets.

Standardized coefficients rank the variables as follows: domestic production ($\beta = 3.581$), domestic consumption ($\beta = 3.202$), GDP ($\beta = 1.028$), per capita income ($\beta = 0.894$), and export price ($\beta = 0.422$). These results confirm that production capacity is the primary driver of Egyptian mango exports to Saudi Arabia, supplemented by macroeconomic and pricing factors, underscoring the importance of enhancing supply chains and aligning policies to support export growth.

Table 9: Results of the External Demand Model for Egyptian Fresh Mango Exports to the Saudi Market ((2008–2024)):

Export Market	Independent variables	Regression coefficients	t-statistic Value	statistical significance		Adjusted R ²	f-statistic Value			D.W Value
							Value	P-value		
Saudi Market	Constant	9.474 -	1.833 -	0.094-	n.s	-	1.833	0.094	n.s	-
	Ln X _{1i}	11.408	2.863	0.015	**					
	Ln X _{2j}	4.578	2.007	0.070	*					
	Ln X _{4i}	5.420 -	2.325 -	0.040	*					
	Ln X _{6i}	1.027 -	3.826 -	0.003	**					
	Ln X _{7i}	10.981 -	2.499 -	0.030	*					

Where:

LnY_i = Log of Egyptian mango exports to Saudi Arabia (1000 tons/year).

LnX_{1i} = Log of Egypt's domestic production (1000 tons).

LnX_{2i} = Log of Saudi GDP (billion USD).

LnX_{4i} = Log of Saudi per capita income (1000 USD).

LnX_{6i} = Log of Egypt's export price to Saudi Arabia (USD/ton).

LnX_{7i} = Log of Egypt's domestic consumption (1000 tons)

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

2 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports to the Kuwaiti Market ((2008–2024)):

The regression analysis (Table 10) of Egyptian mango exports to Kuwait over (2008–2024) utilized a double logarithmic model, excluding variables (X₁, X₃, X₄, X₇, and (X₁₀) due to statistical constraints, while retaining Kuwaiti GDP (X₂), population size (X₅), Egyptian export price (X₆), Indian mango price (X₈), and Yemeni mango price (X₉). The model achieved strong significance at the 1% level (F = 26.393) and an R² of 88.8%, indicating robust explanatory capacity.

Kuwaiti GDP (X₂) showed a significant negative effect at the 5% level, where a one-billion USD decrease corresponded with a 0.736 thousand ton increase in exports, suggesting counter-cyclical demand favoring affordable imports during downturns. Population size (X₅) was the dominant factor, with a one million person increase yielding a 1.446 thousand ton export rise (p < 0.01), underscoring demographic growth as a primary driver.

Egyptian export price (X₆) negatively influenced exports (p < 0.05), with each one USD price reduction linked to a 0.549 thousand ton increase, indicating limited price elasticity and highlighting the significance of non-price attributes like quality perception. The Indian mango price (X₈) positively correlated with Egyptian exports, where a one USD increase led to a 0.424 thousand ton gain (p < 0.05), and reflecting substitution effects. Conversely, the Yemeni mango price (X₉) was negatively associated; a one USD decrease resulted in a 0.385 thousand ton export increase (p < 0.01), highlighting regional price competition's impact on market share.

Standardized coefficients ranked these variables as population size (0.538), Yemeni mango price (0.315), Egyptian export price (0.295), Indian mango price (0.266), and GDP (0.253). These results emphasize demographic factors as primary determinants, with competitive pricing and macroeconomic conditions also significantly shaping export performance.

In summary, population growth chiefly drives demand for Egyptian mangoes in Kuwait, while regional price competition and export pricing further influence market dynamics. GDP plays a secondary role, indicating that export strategies should focus on demographic targeting, competitive positioning, and value-based marketing.

Table 10: Results of External Demand Model for Egyptian Fresh Mango Exports to Kuwait ((2008–2024)):

Export Market	Independent variables	Regression coefficients	t-statistic Value	statistical significance		Adjusted R ²	f-statistic Value			D.W Value
							Value	P-value		
Kuwait Market	Constant	4.550	2.146	0.055	*	0.888	26.393	0.005	**	.2623

	Ln X_{2i}	0.736 -	2.501 -	0.029	*					
	Ln X_{5i}	1.446	3.970	0.002	**					
	Ln X_{6i}	0.549 -	2.168 -	0.053	*					
	Ln X_{8i}	0.424	2.101	0.059	*					
	Ln X_{9i}	0.385 -	3.055 -	0.011	**					

Where:

LnY_i = Log of Egyptian mango exports to Kuwait (1000 tons/year).

LnX_{2i} = Log of Kuwait GDP (billion USD/year).

LnX_{5i} = Log of Kuwait population (million/year).

LnX_{6i} = Log of Egypt's export price to Kuwait (USD/ton).

LnX_{8i} = Log of India's export price to Kuwait (USD/ton).

LnX_{9i} = Log of Yemen's export price to Kuwait (USD/ton).

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant .

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

3 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports to the Omani Market ((2008–2024)):

The regression results (Table 11) estimate the external demand function for Egyptian fresh mango exports to Oman from 2008 to 2024 using a double logarithmic model. Variables (X₁, X₂, X₃, X₅, X₈, and X₁₀) were excluded due to statistical insignificance, while (X₄) (Omani per capita income), (X₆) (Egyptian export price), (X₇) (Omani domestic mango consumption), and (X₉) (Pakistani mango price) were retained. The model demonstrated high statistical significance at the 1% level (F = 113.025), with an adjusted R² of 96.6%, indicating strong explanatory power.

Omani per capita income (X₄) showed a significant negative effect (p < 0.05), where a USD 1 billion increase was associated with a decrease of approximately 2.972 thousand tons in Egyptian mango exports, possibly reflecting consumer shifts toward globally branded or premium fruit products. Egyptian export price (X₆) had a significant negative elasticity at the 1% level; a one USD reduction in price corresponded to a 2.610 thousand ton increase in exports, indicating price sensitivity but also raising concerns regarding potential trade-offs with quality perception and brand positioning.

Conversely, Omani domestic mango consumption (X₇) positively influenced Egyptian exports (p < 0.05), with a 1,000 ton increase correlating with a 1.263 thousand ton rise in imports, highlighting a structural market deficit. Additionally, Pakistani mango prices (X₉) positively affected Egyptian exports; a one USD increase in Pakistani prices resulted in a 1.175 thousand ton increase in Egyptian exports (p < 0.01), underscoring the importance of regional price dynamics.

Standardized regression coefficients ranked the variables as follows: (X₉) (0.454), (X₆) (0.388), (X₇) (0.175), and (X₄) (0.171), indicating that competitor pricing, especially from Pakistan, is the primary driver, followed by Egypt's pricing strategies. Economic and demographic factors play a secondary but relevant role.

In conclusion, price competitiveness is the dominant factor affecting Egyptian mango exports to Oman. Enhancing market share requires adaptive pricing, ongoing monitoring of competitor prices, improved product positioning, and targeted marketing emphasizing both quality and value.

Table 11: Results of External Demand Model for Egyptian Fresh Mango Exports to Oman ((2008–2024)):

Export Market	Independent variables	Regression coefficients	t-statistic Value	statistical significance		Adjusted R2	f-statistic Value			D.W Value
							Value	P-value		
Omani Market	Constant	3.819	0.685	0.506	n.s	0.966	113.025	0.005	**	1.938
	Ln X _{4i}	2.792 -	2.173 -	0.051	*					
	Ln X _{6i}	2.610 -	4.145 -	0.001	**					
	Ln X _{7i}	1.263	.1965	0.050	*					
	Ln X _{9i}	1.175	4.181	0.001	**					

Where:

$\ln Y_i$ = Log of Egyptian mango exports to Oman (1000 tons/year).

$\ln X_{4i}$ = Log of Omani per capita income (1000 USD).

$\ln X_{6i}$ = Log of Egypt's export price to Oman (USD/ton).

$\ln X_{7i}$ = Log of Egypt's domestic consumption (1000 tons).

$\ln X_{9i}$ = Log of Pakistan's export price to Oman (USD/ton).

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

4 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports to the Bahraini Market ((2008–2024)):

The regression analysis (Table 12) estimates the external demand function for Egyptian fresh mango exports to Bahrain from 2008 to 2024 using a multistage regression model. Variables (X_1 , X_2 , X_3 , X_5 , X_8 , and X_{10}) were excluded due to statistical insignificance, while Bahraini per capita income (X_4), Egyptian export price (X_6), Egyptian domestic consumption (X_7), and Pakistani mango price (X_9) were retained. The model demonstrated strong significance at the 1% level ($F = 74.174$), with an adjusted R^2 of 94.8%, indicating robust explanatory power for export volume changes.

Among the predictors, Bahraini per capita income (X_4) had the most pronounced positive effect; a USD 1,000 increase corresponded to an 8.756 thousand ton rise in exports ($p < 0.01$), highlighting purchasing power as a key demand driver. Egyptian export price (X_6) showed significant negative elasticity, with a one USD increase reducing exports by approximately 1.394 thousand tons ($p < 0.01$), reflecting notable price sensitivity in Bahrain. Domestic mango consumption in Egypt (X_7) negatively influenced exports; a 1,000 ton decrease was associated with a 7.024 thousand ton increase in exports, indicating Bahrain's capacity to absorb surplus supply. Pakistani mango prices (X_9) exhibited a negative association; a one USD decrease led to a 0.674 thousand ton increase in Egyptian exports ($p < 0.01$), suggesting Bahraini consumer preferences for product diversity, quality, or other non-price factors.

Standardized partial regression coefficients ranked the variables as follows: (X_4) (2.534), (X_7) (1.888), (X_6) (0.559), and (X_9) (0.180), underscoring the primacy of income effects followed by supply and pricing considerations.

In conclusion, Bahraini demand for Egyptian mangoes is predominantly influenced by macroeconomic factors particularly consumer purchasing power and the availability of exportable surpluses due to declining domestic consumption. While pricing remains important, especially relative to competitors like Pakistan, consumer preferences and market positioning are critical. Accordingly, policy measures should emphasize strategic export planning focused on surplus management, competitive pricing, and targeted income segment marketing.

Table 12: Results of External Demand Model for Egyptian Fresh Mango Exports to Bahrain ((2008–2024)):

Export Market	Independent variables	Regression coefficients	t-statistic Value	statistical significance		Adjusted R ²	f-statistic Value			D.W Value
							Value	P-value		
Bahraini Market	Constant	2.397 -	0.980 -	0.347	n.s	0.948	74.174	0.005	**	1.497
	$\ln X_{4i}$	8.756	3.933	0.002	**					
	$\ln X_{6i}$	1.394 -	8.293 -	0.000	**					
	$\ln X_{7i}$	7.024 -	2.919 -	0.013	**					
	$\ln X_{9i}$	0.674 -	2.448 -	0.031	*					

Where:

$\ln Y_i$ = Log of Egyptian mango exports to Bahrain (1000 tons/year).

$\ln X_{4i}$ = Log of Bahraini per capita income (1000 USD).

$\ln X_{6i}$ = Log of Egypt's export price to Bahrain (USD/ton).

$\ln X_{7i}$ = Log of Egypt's domestic consumption (1000 tons).

$\ln X_{9i}$ = Log of Pakistan's export price to Bahrain (USD/ton).

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

5 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports to the United Arab Emirates (UAE) Market ((2008–2024)):

The regression analysis (Table 13) estimates the external demand function for Egyptian fresh mango exports to the United Arab Emirates (UAE) from 2008 to 2024. The final model retained only two explanatory variables: population size (X_5) and Egyptian export price (X_6), excluding all others due to statistical insignificance. The model demonstrated strong statistical significance at the 1% level ($F = 179.1$), with an adjusted R^2 of 95.7%, indicating that these variables effectively explain export volume fluctuations.

Population size (X_5) was the dominant factor, where an increase of one million people in the UAE is associated with approximately 7.305 thousand tons more in Egyptian mango exports ($p < 0.01$), underscoring the pivotal role of demographic growth in driving import demand. Egyptian export price (X_6) showed a significant negative effect at the 1% level; a one USD price decrease led to a 1.485 thousand ton increase in exports, highlighting the market's price sensitivity and the critical importance of competitive pricing. Standardized partial regression coefficients further confirmed population size ($\beta = 0.790$) as the primary driver of demand, substantially exceeding the influence of export price ($\beta = 0.239$). This underscores that demographic expansion has a stronger impact on demand than marginal price changes.

In conclusion, enhancing Egyptian mango exports to the UAE depends chiefly on aligning export strategies with demographic trends and maintaining competitive pricing. To sustain and grow market share in this dynamic and expanding market, Egypt should focus on affordability and product availability.

Table 13: Results of External Demand Model for Egyptian Fresh Mango Exports to UAE ((2008–2024)):

Export Market	Independ ent variables	Regressi on coefficie nts	t- statistic Value	statistical significance		Adjus ted R2	f-statistic Value			D.W Value
UAE Market							Value	P-value		
	Constant	8.064 -	2.229 -	0.043	*	0.957	179.1	0.005	**	1.424
	Ln X _{5i}	7.305	10.202	0.0001	**					
	Ln X _{6i}	1.485 -	3.085 -	0.008	**					

Where:

$\ln Y_i$ = Log of Egyptian mango exports to UAE (1000 tons/year).

$\ln X_{5i}$ = Log of UAE population (million).

$\ln X_{6i}$ = Log of Egypt's export price to UAE (USD/ton).

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

5 - Econometric Estimation of the External Demand Model for Egyptian Fresh Mango Exports to the Qatari Market ((2008–2024)):

The regression analysis (Table 14) evaluates the external demand function for Egyptian fresh mango exports to Qatar from 2008 to 2024. The final model includes seven statistically significant variables: Qatari local production (X_1), GDP (X_2), per capita income (X_4), Egyptian export price (X_6), Qatari local consumption (X_7), Indian mango price (X_8), and Kenyan mango price (X_{10}), excluding others due to statistical constraints. The model is significant at the 1% level ($F \approx 5.170$), with an adjusted R^2 of 64.6%, indicating moderate explanatory power.

Qatari local consumption (X_7) is the strongest positive determinant; a 1,000 ton increase corresponds to a 39.302 thousand ton rise in Egyptian exports ($p < 0.01$), reflecting a significant local supply-demand gap. Conversely, Qatari local production (X_1) has a significant negative effect, where each additional 1,000 tons reduces Egyptian exports by approximately 27.899 thousand tons, suggesting substitutability between domestic output and imports.

Qatari GDP (X_2) is negatively associated with Egyptian exports (–35.204 thousand tons per USD billion increase), potentially indicating shifting sourcing preferences or increased diversification toward alternative suppliers. In contrast, Qatari per capita income (X_4) positively influences exports, with a USD 1,000 increase linked to a 24.278 thousand ton rise, underscoring purchasing power's role in driving demand.

Egyptian export price (X_6) demonstrates significant negative elasticity (6.318 thousand tons per USD increase), highlighting price sensitivity in Qatar. Among competitors, Indian mango price (X_8) is unexpectedly negatively correlated (5.426 thousand tons), possibly reflecting strong consumer loyalty or perceived quality

favoring Indian mangoes. Conversely, Kenyan mango price (X_{10}) positively affects exports; each one USD increase corresponds to a 15.981 thousand ton gain, emphasizing Egypt's relative competitiveness.

Standardized regression coefficients rank the variables as follows: local consumption (X_7 , 1.391), local production (X_1 , 1.092), GDP (X_2 , 0.905), Kenyan mango price (X_{10} , 0.794), per capita income (X_4 , 0.729), Indian mango price (X_8 , 0.442), and Egyptian export price (X_6 , 0.408). These findings confirm that local consumption and production dynamics primarily drive demand, supplemented by macroeconomic and pricing factors.

In conclusion, Egyptian mango exports to Qatar are mainly influenced by domestic consumption and production deficits, with price and income effects as secondary factors. Export strategies should prioritize managing local supply fluctuations, maintaining competitive pricing, and monitoring competitor prices especially from Kenya and India to optimize market positioning.

Table 14: Results of External Demand Model for Egyptian Fresh Mango Exports to Qatar ((2008–2024)):

Export Market	Independ ent variables	Regressi on coefficie nts	t- statistic Value	statistical significance		Adjus ted R2	f-statistic Value			D.W Value
Qatari market							Value	P-value		
	Constant	76.108 -	3.515 -	0.007	**	0.646	5.170	0.013	**	1.924
	Ln X _{1i}	27.899 -	2.310 -	0.046	*					
	Ln X _{2i}	35.204 -	4.011 -	0.003	**					
	Ln X _{4i}	24.278	4.136	0.003	**					
	Ln X _{6i}	6.318 -	2.435	0.038	*					
	Ln X _{7i}	39.302	3.149	0.012	**					
	Ln X _{8i}	5.426 -	1.987 -	0.099	*					
	Ln X _{10i}	15.981	4.409	0.002	**					

Where:

Ln Y_i = Log of Egyptian mango exports to Qatar (000 tons/year)

Ln X_{1i} = Log of Egypt's local production (000 tons)

Ln X_{2i} = Log of Qatar GDP (billion USD)

Ln X_{4i} = Log of Qatar per capita income (000 USD)

Ln X_{6i} = Log of Egypt's export price to Qatar (USD/ton)

Ln X_{7i} = Log of Qatar mango consumption (000 tons)

Ln X_{8i} = Log of India's export price to Qatar (USD/ton)

Ln X_{10i} = Log of Kenya's export price to Qatar (USD/ton)

(**) Significant at 1% level; (*) at 5% level; (n.s) not significant.

Sources: CAPMAS, FAO, Trade Map, World Bank, ITC.

VI. Recommendations

Based on the quantitative and analytical findings covering (2008–2024), several strategic recommendations are proposed to bolster external demand for Egyptian fresh mango exports to GCC countries. First, increasing farm-level productivity is critical, as the productivity growth rate remained below 1% despite substantial expansion in cultivated area (61.3%) and total production (164%), signaling inefficiencies in yield per hectare. Second, improving product quality, post-harvest handling, and packaging aligned with GCC market standards is essential to mitigate export volatility, exemplified by the drop from 50.7 thousand tons in 2020 to 39 thousand tons in 2021 despite sufficient production. Third, Egypt should capitalize on its competitive price advantage—averaging \$103/ton in the Saudi market compared to \$638/ton and \$794/ton for India and Pakistan respectively—through enhanced marketing efforts. Fourth, prioritizing key markets such as Saudi Arabia (24% of exports), UAE (10%), and Kuwait (8%) while pursuing growth in smaller GCC markets like Oman, Bahrain, and Qatar can optimize market penetration. Finally, strengthening institutional coordination among producers, exporters, and marketers is vital to stabilize export volumes and reduce fluctuations, as demonstrated by the rebound to 107 thousand tons in 2024 following prior sharp declines. These measures

collectively aim to secure sustained export growth and competitiveness in this strategically important regional market.

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