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# Analyzing the Growth, Market Instability and Export Competitiveness of Afghanistan Raisins Compared to Leading Global Exporters

FAHIMULLAH WARDAK[1], M. N. VENKATARAMANA[2], B. N. PRADEEPA BABU[3] AND MAHIN SHARIF[4]
[1,2&4]Department of Agricultural Economics, College of Agriculture, UAS, GKVK, Bengaluru - 560 065
[3]Coffee Board of India, Bengaluru - 560 001
e-Mail : fahimullah.wardak123@gmail.com

**AUTHORS CONTRIBUTION**

FAHIMULLAH WARDAK:
Conceptualization, analysis of data and interpretation, preparation of manuscript

M. N. VENKATARAMANA:
Conceptualization & design, supervision and review of manuscript

B. N. PRADEEPA BABU & MAHIN SHARIF:
Manuscript editing and guidance

***Corresponding Author :***
FAHIMULLAH WARDAK

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**ABSTRACT**

The study explores the growth, instability and competitiveness of Afghanistan's raisin exports. Employed various tools like Compound Annual Growth Rate (CAGR), Cuddy-Della Valle Index (CDVI), Revealed Comparative Advantage (RCA), Revealed Symmetric Comparative Advantage (RSCA), Markov Chain Analysis and Bai-Perron test. During 2008 - 2023, Afghani raisin exports grew at a CAGR of 7.20 per cent in quantity, which significantly higher than Türkiye (1.79%) and Iran (1.42%). However, Afghanistan exhibited high export instability with a CDVI of 70.11, while Türkiye (7.27) and Iran (17.28) showed much lower instability. Export value analysis revealed a 9.73 per cent growth for Afghanistan, yet this growth came with the highest instability among competitors with a CDVI of 74.87. Afghanistan's strong export performance was further underscored by its RCA, averaging 128.91, signifying a dominant comparative advantage compared to other major raisin-exporting countries. Iran also showed a notable RCA (34.62), while Türkiye and USA trailed with RCA values of 22.94 and 1.83, respectively. Afghanistan's RSCA values (0.98 to 0.99) reinforced its competitiveness in the global market, driven by low production costs and favorable conditions. Nominal Protection Coefficient (NPC) analysis highlighted competitive pricing for Afghanistan with values below one in early years, suggesting an export advantage. However, NPC exceeded one from 2015, indicating rising domestic prices relative to international prices. Markov Chain Analysis revealed that India as Afghanistan's most stable market, with a retention probability of 84.62 per cent. Afghanistan's raisin exports faced two significant break points in quantity surged in 2020 from increased global demand and a value decline in 2021 due to political instability disrupting trade.

*Keywords* : Growth, Instability, Export competitiveness, Market access, Structural breaks, Afghanistan raisins

AFGHANISTAN'S diverse climate and geographical features create perfect conditions for growing horticulture crops. While the climate varies across different provinces and regions, Afghan farmers mainly grow apples, pomegranates, apricots, grapes, almonds and watermelons. Approximately 78 per cent of Afghanistan's workforce is directly (or) indirectly employed in agriculture sector, yet this sector contributed only 31.50 per cent to the country's annual Gross Domestic Product (GDP) (Zainullah *et al*., 2016). Raisins hold a significant place in Afghanistan's agricultural history and remain the country's top export by value among high-value horticultural products. Grapes are the primary source of raisins. Raisins are widely cultivated across Afghanistan, covering approximately 60,832 hectares.

Grape cultivation accounts for 34 per cent of the total fruit-growing area with the central provinces of Kabul (22%) and Parwan (15%) being the largest producers, contributing to 37 per cent of the total grape production. The country produces two main types of raisins, green raisins (Kishmish), dried in shaded and ventilated rooms and red raisins (Aftabi Kishmish), sun-dried on rooftops or on the ground. Raisin production closely follows grape production trends each year Gain, 2011. Afghanistan's raisins are among the most significant agricultural exports, famous for their special quality and natural sweetness. During 2007-2016, the quantity of Afghan raisins increased from 18,262 metric tonnes to 19,172 metric tons; however, the growth rate was, showed a slight decline of 0.15 per cent. Despite that, the export value of raisins saw a substantial raise from US$ 17.86 million in 2007 to US$ 56.62 million in 2016, reflecting a robust growth rate of 11.41 per cent.

Türkiye led the world raisins production in 2015, holding a 29.63 per cent share, followed by the USA and Iran with shares of 27.91 per cent and 10.28 per cent, respectively. Afghanistan, produced 9,10,000 metric tonnes of grapes in 2022, contributed 2.54 per cent of global production and ranked among the top grape producing countries. The cumulative production share of top eight countries was 86.63 per cent with top ten accounting for 90.46 per cent of the world's total grape production. In 2016-17, Türkiye also led the global grape export market with a 30.17 per cent share of export value, followed by USA and Iran with shares of 16.69 per cent and 16.05 per cent, respectively. Afghanistan exported 30,800 metric tonnes of grapes, representing 3.95 per cent of global exports and ranked among the top raisin exported countries. The cumulative export value share of top seven countries was 84.15 per cent with top ten countries contributing 91.21 per cent of global exports. In 2016-17, Afghanistan exported 19,171.73 metric tonnes of raisins with a value of US$ 56.62 million. The primary destination for Afghan raisins was India, which received 63.78 per cent of the quantity and 63.09 per cent of the value, followed by Pakistan and Kazakhstan. Together, these three countries accounted for 84.86 per cent of Afghanistan's raisin exports (Rafiq *et al*., 2018).

## METHODOLOGY

The present study relies on secondary data and focuses on a comprehensive analysis of Afghanistan's raisin exports in comparison with the world's major raisins exporting countries. To evaluate the growth and instability of Afghanistan's raisins export relative to other leading exporters, data from 2008 to 2023 was utilized, source from Trade Map, United Nations Comtrade (UN Comtrade), Ministry of Commerce and Industry (MOCI) and the Customs and Revenue Department (CRD) of Afghanistan. Additionally, the same annual export data from these sources, covering the period from 2008 to 2022 was employed to analyze the trade direction of Afghanistan's raisins export along with other major exporters.

### Compound Annual Growth Rate (CAGR)

It measures the annual growth rate over a specified period, assuming steady, compounded growth each year. This provides a smoothed rate for easy comparison across time periods. The growth rate of Afghanistan's raisins exports, compared to other major exporters was analyzed using the exponential function:

$$Y_t = ab^t e^u$$

where;

$Y_t$ = Dependent variable for which growth rate is to be estimated (raisins exports)

a = Intercept

$b$ = trend co-efficient

$e$ = Napierian base

t = Time trend

u = Disturbance or error term

The CAGR is obtained from the linearly transformed estimating form of the above equation (1), as stated below:

$$\ln Y_t = \ln a + t \ln b + u$$

The per cent compound annual growth rate (g) was computed by using the relationship

$$(CAGR)\ g = (\text{antilog of } b - 1) \times 100$$

**Standard Deviation**

Standard deviation is a statistical measure that indicates the variability or dispersion of a dataset. In export analysis, it assesses how export quantities and values fluctuate around their mean. A low standard deviation suggests stability, while a high standard deviation indicates greater variability. By calculating the sample standard deviation, we can gain insights into the trends in Afghanistan's raisins export, aiding in the understanding of factors affecting export performance.

$$\sigma = \sqrt{\frac{\Sigma(\chi_i - \mu)^2}{N}}$$

where;

$\sigma$ = standard deviation

$\chi_i$ = value of raisins export

$\mu$ = Average value of raisins export

$N$ = Total number of observations in the data (years)

**Instability Analysis**

Degree of variability in export of raisins from Afghanistan *vis-à-vis* other major exporting countries was estimated using instability index given by Cuddy-Della Valle Index (CDVI) recommend by Cuddy and Della (1978). The usually coefficient of variation (CV) over estimates the variable in time series data due to presence of trend. The CDVI corrects this trend and it is thus more reliable method as compared to CV.

**Cuddy-Della Valle Index (CDVI)**

Is obtained through CV which is computed as,

$$CV = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

CDVI is estimated as follows,

$$CDVI = CV \times \sqrt{1 - \overline{R}^2}$$

Where,

CV : Coefficient of variation in percentage

$R^2$ : Adjusted r squared

This index indicates the real direction of the instability and is a better measure to find out the instability in raisins export. If the index values are below 15 per cent, then it is categorized as low instability, if it lies between 15 to 30 per cent, then it is categorized as medium instability and more than 30 per cent is categorized as high instability.

**Export Competitiveness Indices**

Competitiveness indices compare a country's actual export growth to the growth that would have occurred if its market share had persisted constant. A positive residual indicates improved competitiveness, while a negative sign suggests a loss of market share due to declining competitiveness. However, this measure can be biased by factors such as commodity composition and market distribution. In fast-growing markets, a country may see its global share shrink if it cannot match market growth, with a negative sign reflecting competitiveness despite favorable market and commodity conditions.

**Revealed Comparative Advantage (RCA)**

Balassa (1965) defines RCA as a ratio comparing a country's exports of a specific product to global exports, based on actual trade patterns. It measures the export share of a commodity relative to the country's total exports and global export performance. RCA index can indicate as:

$$RCA_{ij} = \frac{\frac{x_{ij}}{x_{it}}}{\frac{x_{wj}}{x_{wt}}}$$

Where,

$RCA_{ij}$ = Revealed comparative advantage for country $i$ in product $j$.

$x_{ij}$ = Value of Afghanistan raisins export

$x_{it}$ = Value of total agricultural export of Afghanistan

$x_{wj}$ = Value of world export of the raisins

$x_{wt}$ = Value of world total agricultural exports

The RCA index value ranges between zero and positive infinitive (+∞). If it is greater than one, then the country has a comparative advantage in those products and vice versa.

**Revealed Symmetric Comparative Advantage (RSCA)**

In 1998, Laursen enhanced the RCA index by creating the RSCA index, which produces scores between –1 and +1 and is centered around zero. Countries with RSCA scores near + 1 exhibit a higher revealed comparative advantage, while those with scores near –1 show a lower revealed comparative advantage.

$$\text{RSCA} = \frac{RCA - 1}{RCA + 1}$$

**Nominal Protection Coefficient (NPC)**

NPC is a straight forward measure of competitiveness. It is calculated as a ratio between domestic prices to the international price. It measures the extent to which domestic prices diverge from border equivalent prices. NPC was calculated by using the formula,

$$\text{NPC} = \frac{\text{Pd}}{\text{Pb}}$$

Where,

Pd : Domestic price

Pb : Border equivalent price

If the NPC is <1, it indicates that the country has a competitive advantage in exporting of raisins and suggests an incentive for promoting its exports. This means the commodity is not protected. Conversely, if the NPC ratio is >1, it signifies a lack of competitive advantage, which discourages the export of raisins.

**Markov Chain Analysis**

The Markov chain analysis was used to know competitiveness of the export of raisins composition from Afghanistan to other major importing countries. Annual export data from 2008 to 2023 in value terms realized were used for the analysis. The trade direction of Afghanistan raisins exports was analyzed using the first order markov chain approach. Central to markov chain analysis is estimation of the transitional probability matrix 'P' whose element '$P_{ij}$' indicate the probability of export switching from country 'i' to country 'j' over time. The diagonal element '$P_{ij}$' where i = j, measures the probability of a country retaining its market share or in other words, the loyalty of an importing country to a particular country's exports.

$$E_{jt} = \sum_{j=1}^{r} E_{jt} - 1 * p_{jt} + e_{jt}$$

Where,

$E_{jt}$ = Exports from Afghanistan to $j^{th}$ country during the year 't'.

$E_{it-1}$ = Exports to $i^{th}$ country during the period t-1.

$P_{ij}$ = Probability that the exports will shift from $i^{th}$ country to $j^{th}$ country.

$e_{jt}$ = The error term which is statistically independent of $E_{it-1}$.

t = Number of years considered for the analysis.

r = Number of importing countries.

**Bai-Perron Test**

In econometrics, a structural break is an unexpected shift in a time series data. There are many tests used to check for structural change, Chow test, CUSUM test, Quandt- Andrews Sup/ Wald F test and Bai Perron test. Bai-Perron test was used to identify the multiple breaks in time series data. CUSUM, CUSUM square and Quandt-Andrews tests are also used to find the unknown single break in the time series data. Hence, Bai-Perron is the most suitable test to find the multiple breaks in the model. This test uses the HAC variance technique and it corrects itself for the serial correlation in the time series data.

According to Bai and Perron (2003), the structural change is of considerable importance in the analysis of macroeconomic time series data. Structural change occurs in many time series data for number of reasons, including economic crises, policy changes, changes in institutional arrangements and regime shifts.

**Model and Estimators**

For the purpose of simulation study, Bai and Perron considered the following multiple linear regression with m breaks *i.e.,* m+1 regimes.

$$Y_t = z_t\delta_j + u_t$$

Where, $t = T_{j-1} + 1, \ldots \ldots, T_j$

For j = 1……m + 1 is a special case of general model considered in Bai and Perron corresponding to a pure structural change model. Here $Y_t$ is the observed dependent variable at time; $z_t$ (q*1) is a vectors of covariates and $\delta_j$ (j=1,…..m+1) is the corresponding vector of coefficients; $u_t$ is the disturbance at time t. The purpose is to estimate the unknown regression coefficients together with the break points when T observations ($Y_t$, $z_t$) are available. The method of estimation is based on least squares principle. For each m partition (T1,…..Tm), the associated least-squares estimates of are obtained by minimizing the sum of squared residuals.

$$S_T(T_1, \ldots \ldots, T_{m+1}) = \sum_{i=t}^{m+1} \sum_{t=T_{t=1}+1}^{Ti} [Y_t - z^l{}_t\delta_j]^2$$

Let δ^({ $T_j$} the resulting estimates based on the given m-partition by { $T_j$}. Substituting these estimates in the objective function, the estimated break points are such that,

$$(T_1, \ldots . T_m) = \text{argmin}T, \ldots \ldots, \text{Tm}\, S_T\ (T_1, \ldots \ldots \ldots, T_m)$$

Where, the minimization is taken over all partitions ($T_1$, … . $T_m$) such that $T_i$- $T_{i-1}$≥h≥q. Thus, the break point estimators are global minimizers of the objective function. Finally, the regression estimates are obtained using associated least squares estimates at the estimated m partition.T

Bai and Perron (1998) concerns the convergence of the break fractions $\hat{Y}_i = \hat{T}_i/T$ and the rate of convergence. The results obtained show not only that $Y_i$ converges to its true value $\lambda_i^o$ but that it does so at the fast rate *T*, *i.e.,* T($\lambda_i - \lambda_i^o = O_p(1)$ for all i. This convergence result is obtained under a very general set of assumptions allowing a wide variety of models. It, however, precludes integrated variables (with an autoregressive unit root) but permits trending regressors; for example, with a trend of the form $gt = a + b\,(\frac{t}{T})$. The assumptions concerning the nature of the errors in relation to the regressors {$z_t$}, are of two kinds. First, when no lagged dependent variable is allowed in {z_t}, the conditions on the residuals are quite general and allow substantial correlation and heteroscedasticity. The second allows lagged dependent variable as regressors but then, of course, no serial correlation is permitted in the errors {$u_t$}. In both cases, the assumptions are enough to allow different distributions for both the regressors and the errors across segments.

The process involves fitting different models with varying numbers of break points to the data. To choose the best fit model and interpret the results, it is essential to understand key metrics like the Residual Sum of Squares (RSS) and the Bayesian Information Criterion (BIC). The RSS measures the total variance in the data that the model cannot explain with lower values indicating a better fit. The BIC is used to select the best model by balancing fit and complexity with lower BIC values suggesting a better model. The BIC is typically the most crucial factor in model selection, as it accounts for both goodness of fit and model complexity. The model with the lowest BIC is generally preferred, as it balances fit with simplicity, avoiding overfitting while capturing significant changes in the time series. In interpreting breakpoints, each breakpoint should correspond to a known event, policy change, or external factor-such as the introduction of new trade policies-that likely caused a structural change in the series. A simpler model with fewer breakpoints may be preferred if additional breakpoints do not significantly decrease the BIC. Finally, visualizing the time series with vertical lines at the breakpoints allows for inspection of changes in trend level or variability and analyzing each segment between breakpoints helps to understand the behavior during different periods. This approach provides insights into how specific trade policies and trade agreements between Afghanistan and other countries may have influenced the export trends of Afghanistan's raisins over the years.

## Results and Discussion

The growth and instability of raisins exports can be measured by using different methods, such as the Compound Annual Growth Rate (CAGR), Standard deviations, Coefficient of Variation (CV), dispersion,



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**Table 1**

**Growth and Instability of raisins export from Afghanistan *vis-à-vis* other major exporting countries during 2008 - 2023**

| Particulars | | Afghanistan | Türkiye | USA | Iran |
|---|---|---|---|---|---|
| Quantity (t) | CAGR (%) | 7.20 *** | 1.79 *** | -6.77 *** | 1.42 NS |
| | Mean | 47,092.69 | 2,45,414.38 | 1,15,251.06 | 1,22,418.72 |
| | Standard deviation | 38,561.76 | 26,668.68 | 36,505.04 | 21,986.51 |
| | CV (%) | 81.88 | 10.86 | 31.67 | 17.96 |
| | CDVI | 70.11 | 7.27 | 11.56 | 17.28 |
| Value (000' US$) | CAGR (%) | 9.73 *** | 1.37 ** | -3.81 *** | -2.39 NS |
| | Mean | 1,07,999.69 | 4,70,241.00 | 3,04,301.50 | 2,31,290.43 |
| | Standard deviation | 1,11,023.23 | 57,806.67 | 70,514.64 | 66,703.18 |
| | CV (%) | 102.80 | 12.29 | 23.17 | 28.83 |
| | CDVI | 74.87 | 10.96 | 15.77 | 27.53 |

*Source* : Trade map and Food & Agriculture Organization (FAO), 2023

*Note* : ***, **, NS denote significant at 1 %, 5 % and non-significant levels, respectively

Instability Index (II) Cuddy Della Valle Index (CDVI), etc. The present study employed CAGR to find growth rate and CDVI to find instability.

Over the period from 2008 to 2023, Table 1 shows that, the growth rate and instability, that in terms of quantity and value. In terms of quantity, Afghanistan's raisin export increased at a notable growth rate of 7.20 per cent, However, this growth comes with high instability as indicated by a CDVI value of 70.11. In contrast, Türkiye, showed a lower growth rate of 1.79 per cent, demonstrated lower instability (CDVI of 7.27) during the same period. Iran exhibited diffident growth in terms of quantity with 1.42 per cent with moderate instability by CDVI of 17.28. USA faced a decline in export quantity, with a CAGR of 6.77 per cent and significant instability (CDVI of 11.56) over the years. The results are similar to the study of Rafiq *et al.* (2018). His findings revealed that, during 2015, Afghanistan was among the top 10 raisin producing nations in the world, Türkiye led with a 29.63 per cent share, followed by the USA 27.91 per cent and Iran 10.28 per cent.

Regarding export value, Afghanistan showed a remarkable growth rate of 9.73 per cent and significant at the 1 per cent level, highlighting substantial expansion in raisins export value compared to other countries. However, this growth comes with high instability, as indicated by a CV of 102.80 per cent and a CDVI 74.87, the highest among the countries analyzed. Türkiye exhibits slight growth in export value with a 1.37 per cent, significant at 5 per cent level and low instability with a CV of 12.29 per cent and a CDVI of 10.96. Iran faces challenges with a decline in export value, shown by a CAGR of 2.39 per cent. USA also struggles with a decline in export value, experiencing a CAGR of 3.81 per cent and significant at 1 per cent level with a medium instability. The results of the study are in line with the similar research methodology work of Soujanya *et al.* (2023). The study analyzed the growth in production and export performance of Indian coffee in international market.

**Major Exporting Countries of Raisins in the World**

The leading exporting countries of raisins during 2008 to 2023 in the world provided in Fig. 1. Türkiye was the top raisins exporter with export values peaked at US$ 3,49,539 thousand in 2008 and stabilizing around US$ 4,78,211 thousand in 2022. USA ranked second

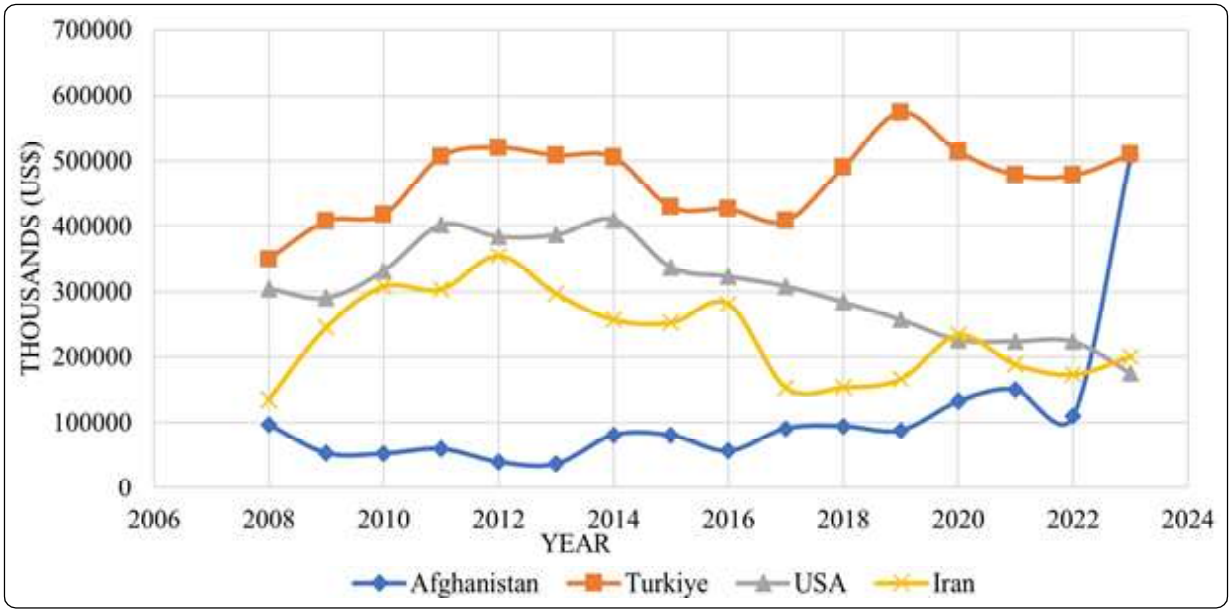


Fig. 1 : Export of raisins from Afghanistan *vis-à-vis* other major exporting countries (in US$) during 2008 to 2023

but found a decline in export values from US$ 3,04,507 thousand in 2008 to US$ 2,23,795 thousand in 2022. Iran experienced significant growth, increasing its export value from US$ 1,34,273 thousand in 2008 to US$ 1,72,787 thousand in 2022. Afghanistan, ranked sixth place, shows an upward trend in export values from US$ 96,439 thousand in 2008 to US$ 1,49,924 thousand in 2021, with a 36.60 per cent increase during 2008 to 2021, though it dropped to US$ 109,748 thousand in 2022. Similar findings were reported by Mohammad *et al.* (2022). Who studied the top raisins exporting countries, including Afghanistan, Türkiye, USA, Iran, Chile, South Africa, China, Greece, Argentina, Netherlands, and Germany from 2006-07 to 2020-21.

### Revealed Comparative Advantage (RCA) for Raisins Export from Afghanistan and other Major Exporting Countries

Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) are the important tools for assessing the global competitiveness of specific commodities. RCA values above one indicates a country's competitive advantage in exporting with a particular commodity, while values below one indicates to a comparative disadvantage in the global market.

**TABLE 2**

**Revealed Comparative Advantage (RCA) of export of raisins from Afghanistan and other major exporting countries (000' US$) during 2008-2022**

| Year | Afghanistan | Türkiye | USA | Iran |
|---|---|---|---|---|
| 2008 | 224.54 | 26.43 | 2.15 | 32.98 |
| 2009 | 117.25 | 25.90 | 1.97 | 38.21 |
| 2010 | 122.60 | 23.51 | 1.93 | 39.66 |
| 2011 | 198.22 | 25.43 | 2.11 | 39.50 |
| 2012 | 100.74 | 24.13 | 1.89 | 40.74 |
| 2013 | 94.41 | 21.13 | 2.00 | 42.68 |
| 2014 | 151.81 | 20.37 | 2.12 | 30.01 |
| 2015 | 140.79 | 20.19 | 1.92 | 33.28 |
| 2016 | 87.31 | 20.77 | 1.82 | 35.36 |
| 2017 | 118.16 | 23.63 | 2.10 | 23.29 |
| 2018 | 111.59 | 24.52 | 1.73 | 21.41 |
| 2019 | 98.39 | 24.06 | 1.51 | 23.62 |
| 2020 | 104.42 | 22.51 | 1.38 | 34.43 |
| 2021 | 134.50 | 21.16 | 1.41 | 39.50 |
| 2022 | 128.90 | 20.35 | 1.48 | 44.66 |
| Mean | 128.91 | 22.94 | 1.83 | 34.62 |

Table 2, presented a detailed analysis results of RCA for export of raisins from Afghanistan as compared against other major exporting countries during 2008 to 2022. The Revealed Comparative Advantage (RCA) analysis highlighted significant trends in the global raisins export market. Afghanistan, with an average RCA value of 128.91, exhibited a strong and reliable comparative advantage, it plays major role in global raisins exports, high RCA can be attributed to favorable growing conditions, lower production costs, and a long tradition of raisins production. Although Afghanistan's RCA in 2008 and showed some fluctuations, it has consistently remained well above one, indicated sustained global competitiveness despite domestic challenges. The similar study was conducted with the same methodology, by Fahimullah *et al.* (2024). They analyzed production trend and export performance of apple from Afghanistan. The study examined that, the export of apples from Afghanistan showed comparative advantage, as indicated by positive RCA value between 6.47 to 56.39 and RSCA values was greater than zero.

Iran also demonstrated a strong comparative advantage with an averaging value of 34.62 in RCA. Like Afghanistan, Iran benefits from favorable climatic conditions and cost-efficient production, allowing it to compete effectively in world markets. Though its RCA values fluctuated, particularly between 2017 and 2019, Iran's ability to rebound with an RCA of 44.66 by 2022 showed its resilience and strategic position in the market.

Türkiye, with a mean RCA value of 22.94, remains an important but has seen a gradual decline in its comparative advantage. This trend may be due to increasing competition from Afghanistan, Iran. Nevertheless, it still holds a significant position in global raisins export.

In contrast, USA showed a lower but positive comparative advantage with an average RCA of 1.83, indicating it remains competitive but far behind Afghanistan, Iran and Türkiye. USA declined RCA trend could be attributed to higher production costs, increased focus on domestic consumption and reduced emphasis on export markets. Overall, Afghanistan and Iran dominate in the raisins export market, while Türkiye and USA face competitive pressures and evolving market dynamics. The results of the study are in line with the work of Seyed *et al*. (2013), where they analyzed the comparative advantage in raisins export for Iran and the top five exporters from 1980 to 2010.

**Revealed Symmetric Comparative Advantage (RSCA) for Raisins Export from Afghanistan *vis-a-vis* other Major Exporting Countries**

In 1998, Laursen expanded upon the RCA index and developed the RSCA index which generate scores ranging from -1 to 1 and is symmetric around zero values. Positive values indicating a comparative advantage and negative values showing a comparative disadvantage in the world market with the particular commodities.

As per the results presented in Fig. 2, revealed that, symmetric comparative advantage for export of raisins from Afghanistan as compared against other major exporting countries from 2008 to 2022 and Afghanistan consistently exhibited a strong comparative advantage in raisins export. Afghanistan's RSCA values, between 0.98 and 0.99, underscore its robust and stable advantage in the raisins market, supported by favorable natural resources, climate and low production costs. In comparison, Türkiye had a solid but lower RSCA of 0.92, while USA showed a much lower average RSCA value of 0.29, reflecting a less competitive position. Iran had a strong competitive stance with an RSCA of 0.94, ranking second to Afghanistan.

**Nominal Protection Coefficient (NPC) of Raisins Export from Afghanistan *vis-à-vis* other Major Exporting Countries**

The NPC was worked out for raisins export, data analyzed during 2008 to 2022. NPC confines the deviation between the domestic price and the international price. If NPC was less than one (domestic price is less than international price), the commodity is competitive (it's worth exporting),

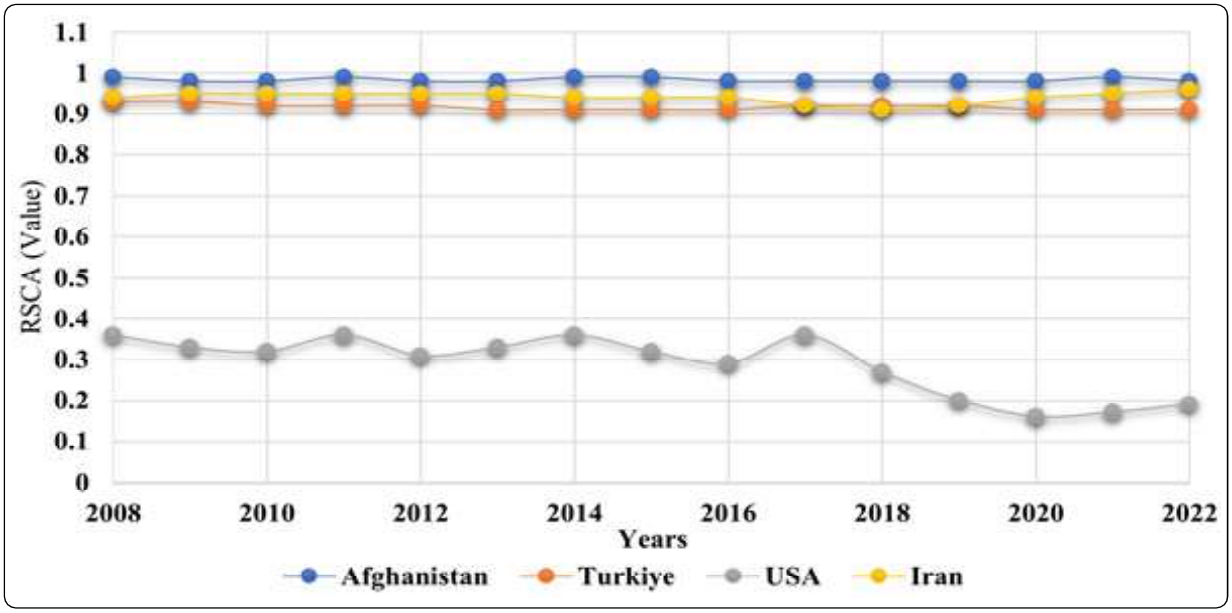


Fig. 2 : Revealed Symmetric Comparative Advantage (RSCA) of export of raisins from Afghanistan and other major exporting countries (000' US$) from 2008-2022

suggesting the absence of protection or even negative protection (taxes on exports). If the NPC is greater than one (the domestic price is greater than international price) the commodity is not competitive (not worth exporting), suggesting the presence of protectionist policies such as tariffs or subsidies. Further these aids to know the level of protection given to the commodity.

The NPC results for raisin exports are showed in Table 3, during 2008 to 2014 (excluding 2010). Afghanistan's NPC values for raisins were consistently below one, indicated a competitive pricing advantage in the export market. However, from 2015 onwards, NPC values exceeded one, suggesting that, the domestic raisins prices were significantly higher than international prices. This could be attributed to factors like domestic subsidies, high production costs, export barriers or inefficiencies in the supply chain. Elevated NPC values reflect market protection or distortions leading to higher domestic prices relative to global levels.

For Türkiye, NPC values remained relatively stable around one, fluctuating between 0.85 in 2017 and 1.03 in 2020. This stability indicates that, the domestic prices were generally in line with international prices. Values below one indicates a competitive market advantage, while values above one suggests a competitive disadvantage. In the case of USA, NPC

**TABLE 3**

**Nominal Protection Coefficient (NPC) of raisin export from Afghanistan and other major exporting countries (000' US$) during 2008-2022**

| Year | Afghanistan | Türkiye | USA | Iran |
|---|---|---|---|---|
| 2008 | 0.82 | 1.00 | 1.07 | 0.98 |
| 2009 | 0.92 | 0.87 | 1.08 | 1.34 |
| 2010 | 1.06 | 0.95 | 1.02 | 1.15 |
| 2011 | 0.90 | 1.01 | 1.15 | 1.03 |
| 2012 | 0.82 | 0.96 | 1.22 | 1.06 |
| 2013 | 0.84 | 0.96 | 1.23 | 0.94 |
| 2014 | 0.97 | 0.93 | 1.17 | 0.95 |
| 2015 | 1.45 | 0.93 | 1.37 | 1.10 |
| 2016 | 1.49 | 0.91 | 1.37 | 1.05 |
| 2017 | 1.33 | 0.85 | 1.35 | 0.88 |
| 2018 | 1.03 | 0.89 | 1.68 | 0.68 |
| 2019 | 1.05 | 1.01 | 1.54 | 0.64 |
| 2020 | 1.25 | 1.03 | 1.46 | 0.69 |
| 2021 | 1.05 | 1.00 | 1.57 | 0.70 |
| 2022 | 1.22 | 0.92 | 1.77 | 0.86 |

values consistently remained above one, ranging from 1.02 in 2010 to 1.77 in 2022, signifying that the domestic prices for raisins were higher than international prices throughout the period. This trend likely reflects strong protectionist measures, such as tariffs or subsidies or high domestic demand pushing up prices. Iran's NPC values showed a declining trend over the years. Between 2008 and 2012, the values were around one, indicating price parity with the international market. However, starting in 2013, NPC values began to fall, dropping below one and reaching as low as 0.64 in 2019. This suggested that, Iran adopted competitive pricing strategies or reduced protectionist measures, making domestic prices lower than international prices. These findings were aligned with the study conducted by Israrullah, *et al.* (2023). The study showed nominal protection coefficients for raisins in global markets. Russia and UAE had lower coefficients of 0.71 and 0.83, representing higher export competitiveness compared to India, Pakistan, Türkiye, Kazakhstan and Iran. All coefficients were below 1 for 2022-23. Higher international raisins prices versus domestic prices favored Afghanistan during this period.

**Direction of Exports of Raisins from Afghanistan**

Regarding the direction of trade of raisins from Afghanistan to different countries and to study the shift in the export of raisins, markov - chain analysis was employed using the time- series data for the period from 2008-2023. The transition probability matrix from the markov chain to study the shifts in exports of raisins from Afghanistan is depicted in Table 4, that India was one of the most stable markets among the major importer of Afghanistan raisins as reflected by the probability of retention at 84.62 per cent *i.e.,* the probability that India retains its export share over the study period. India was the most reliable and loyal market for Afghani raisins and the remaining 15.38 per cent. India had lost import to other major importing nations, 12.03 per cent to Pakistan 2.38 per cent to Kazakhstani and remaining 0.97 per cent to other countries. Türkiye had also moderate probability of retention *i.e.,* 64.32 per cent of the previous year's import share Afghanistan the current period. During the same period, Türkiye had lost 35.68 per cent of its import to the other major importing countries. Rusia was the next in order in retaining 80.22 per cent of the previous year's share and gaining mainly from India (9.86%), Pakistan (2.02%) and from other countries (7.90%).

Kazakhstan had also moderate probability of retention of 0.346. This implies that, had lost 65.36 per cent of its share to other importing countries, of the remaining 65.36 per cent market share, 57.21 per cent to Pakistan, 5.08 per cent to UAE and 3.07 per cent Türkiye. UAE could retain its original share of 69.33 per cent, whereas it had lost

**TABLE 4**

**Transitional probability matrix of raisins export from Afghanistan (2008 to 2023)**

| Country | India | Türkiye | Kazakh stan | Iran | Russian | UAE | Pakistan | Saudi Arabia | Canada | Others |
|---|---|---|---|---|---|---|---|---|---|---|
| India | 0.846 | 0.000 | 0.024 | 0.000 | 0.000 | 0.000 | 0.120 | 0.000 | 0.000 | 0.010 |
| Türkiye | 0.015 | 0.643 | 0.093 | 0.073 | 0.116 | 0.059 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kazakhstan | 0.000 | 0.031 | 0.346 | 0.000 | 0.000 | 0.051 | 0.572 | 0.000 | 0.000 | 0.000 |
| Iran | 0.000 | 0.038 | 0.268 | 0.354 | 0.077 | 0.000 | 0.000 | 0.263 | 0.000 | 0.000 |
| Russian | 0.099 | 0.000 | 0.000 | 0.000 | 0.802 | 0.000 | 0.020 | 0.000 | 0.000 | 0.079 |
| UAE | 0.000 | 0.000 | 0.000 | 0.289 | 0.000 | 0.693 | 0.000 | 0.000 | 0.018 | 0.000 |
| Pakistan | 0.597 | 0.135 | 0.077 | 0.000 | 0.000 | 0.000 | 0.190 | 0.000 | 0.002 | 0.000 |
| Saudi Arabia | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.268 | 0.732 | 0.000 |
| Canada | 0.000 | 0.000 | 0.000 | 0.180 | 0.000 | 0.000 | 0.000 | 0.546 | 0.274 | 0.000 |
| Others | 0.427 | 0.147 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.420 |

28.92 per cent to Iran and 1.75 per cent to Canada. Other countries had also lost its previous year's share substantially to India 42.73 per cent, 14.68 per cent to Türkiye and 0.64 per cent to Russian and the maintaining 41.96 per cent its previous year import from Afghanistan. The results were found in accordance with the research methodology conducted by Thejaswi and Gajanana, (2023) on transitional probability matrix of cereal crops in Karnataka.

**Structural Breaks of Raisins Export from Afghanistan**

Structural breaks in the export of raisins from Afghanistan between 2008 to 2023 is provided in Fig. 3. The structural break in the quantity of raisins export observed in 2020 can be attributed to the COVID-19 pandemic. After the pandemic, global demand for dried fruits, especially raisins, surged due

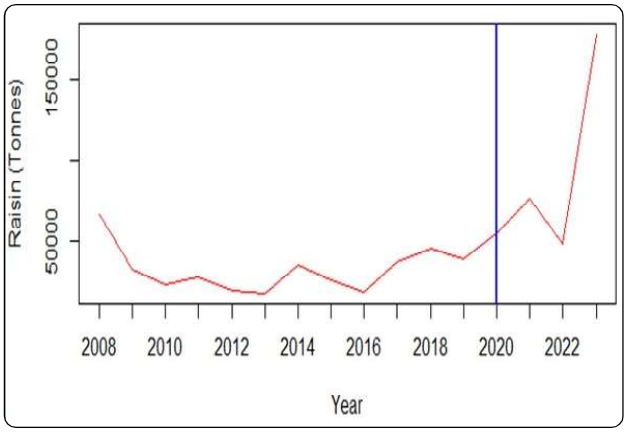


Fig. 3: Structural breaks of raisins export from Afghanistan (Tonnes) during 2008 to 2023

*Note* : Red colour line -trend line, Blue colour line -Structural breaks

to their perceived health benefits, including supporting immune function and overall wellness, which became a priority for many consumers. Raisins increased demand for both domestically and internationally. Furthermore, as consumers shifted towards healthier diets during the pandemic, raisins gained popularity as a natural, shelf-stable snack. Improved export policies and efforts to stabilize supply chains in post-pandemic also contributed to the positive shift in raisin exports.

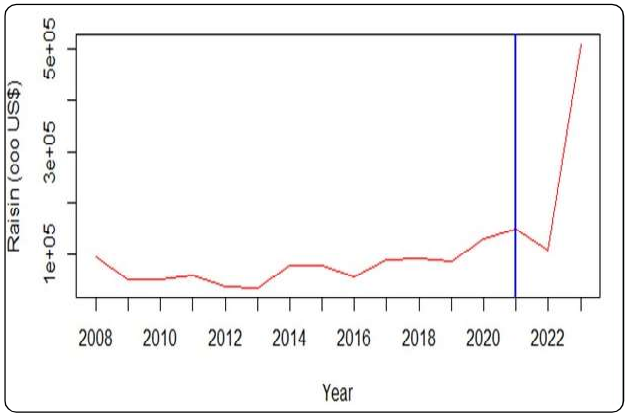


Fig. 4 : Structural breaks of raisins export from Afghanistan (000' US$) from 2008 - 2023

*Note* : Red colour line -trend line, Blue colour line -Structural breaks

Fig. 4, indicates a decline in the value of Afghanistan's raisin exports, particularly in 2021. This drop can be linked to the major political shift in the country, as it transitioned from the Islamic Republic to the Islamic Emirate. This change resulted in significant disruptions in international relations, trade policies, and economic activities. During the period, export operations were largely halted, with trade agreements and logistics either suspended or undergoing renegotiation, contributing to a sharp decrease in the value of raisin exports.

The analyse of Afghanistan's raisins export during 2008 to 2023 reveals significant growth accompanied by high instability in both quantity and value. Afghanistan demonstrated a notable Compound Annual Growth Rate (CAGR) of 7.20 per cent in quantity, though the Cuddy Della Valle Index (CDVI) of 70.11 indicating considerable instability. This contrasts with Türkiye and Iran, which showed lower growth but also lower instability. In terms of value, Afghanistan achieved a remarkable growth rate of 9.73 per cent, yet this growth was similarly marked by high instability, as indicated by a CDVI of 74.87. The study also highlighted Afghanistan's strong competitive advantage in the global raisins market, with an average RCA value of 128.91, out performing other major exporters like Iran and Türkiye. While Afghanistan and Iran dominated in terms of comparative advantage, USA declining RCA

underscores its diminished competitiveness in this market. Moreover, Afghanistan's Nominal Protection Coefficient (NPC) values, which shifted from below one to above one after 2015, reflecting rising domestic prices relative to international price levels, that indicates challenges in maintaining competitive pricing. Market retention analysis revealed that India remains the most stable importer for Afghani raisins, with an 84.62 per cent probability of retaining its import share, followed by Russia and Türkiye. These findings demonstrate Afghanistan's potential as a leading global raisin exporter, though challenges remain in managing instability and maintaining competitive pricing strategies. The structural breaks in Afghanistan's raisin exports during 2008 to 2023 reveal a post-pandemic surge in quantity in 2020, due to increased raisins demand in world marker and a sharp decline in value in 2021, caused by political instability disrupting trade.

## References


Bai, J. and P. Perron, 1998, Estimating and testing linear models with multiple structural changes, *Econometrica*, **66** : 4 7 - 78.

Bai, J. and Perron, P., 2003, Computation and analysis of multiple structural change models. *Journal of applied Econometrics*, **18** : 1 - 22.

Balassa, B., 1965, Trade liberalization revealed comparative advantage. *The Manchester School of Economic and Social Studies*, **33** : 99 - 123.

Cuddy, J. D. A. and Valle, P. A. D., 1978, Measuring the instability of time series data. *Econ. Statist*., **40** : 53 - 78.

Fahimullah, W., Lokesha, H., Mahin, S. H. and Venkataramana, M. N., 2024, Production trend and export performance of apple from Afghanistan. *Inter. J. Agriculture Extension and Social Development*, **7** (3) : 123 - 128.

Gain, 2011, Afghanistan raisin annual report, pp. : 01 - 11.

Israrullah, Y., Yeledhalli, R. A., Sonnad, J. S., Kulkarni, G. N. and Patil, S. L., 2023, Relative comparative advantage and direction of trade of raisins from Afghanistan. *Inter. J. Financial Management and Economics,* **6** (2) : 148 - 153.

Mohammad, A. N. P. and B. L. Patil, 2022, Growth and instability of export and import in the trade of selected agricultural commodities: India *vis-a-vis* Afghanistan. *Inter. J. Financial Management and Economics*, **5** (2) : 109 - 113.

Rafiq, A., Noorulhaq, N., Nagaraja, G. N. 2018, An overview of production and export trade performance of raisins in Afghanistan. *Environment and Ecology,* **36** (4A) : 221 - 1225.

Seyed, A. M., Sina, A. K., Marzieh, A. and Reza, H., 2013, Iran raisins export comparative advantage and top five raisins exporter countries. *Int. J. Agriculture and Crop Sciences (IJACS)*, **5** (15) : 1606 - 1611.

Soujanya, M. N., Venkataramana and Pradeepa Babu, B. N., 2023, Growth in production and export performance of Indian coffee in international market., *Mysore J. Agric. Sci.*, **57** (2) : 395 - 402.

Thejaswi, K. J. and T. M. Gajanana, 2023, Spatio-temporal dynamics of growth, instability and crop diversification in Karnataka. *Mysore J. Agric. Sci*., **57** (1) : 374 - 387.

Zainullah, Z., Seema and P. Radhika, 2016, Production and export of raisins from Afghanistan. *The J. Res. PJTSAU,* **44** (1&2) : 69 - 72.