

## **EXPORT PERFORMANCE AND DIRECTION OF TRADE OF FRESH AND DRIED GRAPES (RAISIN) FROM AFGHANISTAN**

### **Abstract**

Grapes is one of the most delicious refreshing and nourishing fruits. Afghanistan produces 9.84 lakh tonnes of Grapes during 2018 (FAO statistics). It is one of the important commodities in export basket of Afghanistan. The major export markets for Afghan's fresh grapes are Pakistan and India. The major export markets for dried grapes (raisin) are India, Russia, Belarus, USA, Pakistan and UK. The present study aims to quantify the export performance and changing structure of Grapes and raisin exports from Afghanistan. Secondary data on area, production and country wise quantity exports of fresh and dried grapes was collected from FAO statistics, ITC and APEDA for a period of 13 years from 2006 to 2018. Compound Annual Growth Rate was computed for studying the trend in area, production, yield, export quantity and export value for fresh and dried (raisin) grapes. Markov chain analysis was attempted to assess the direction of change in exports. Markov chain analysis results showed that, Pakistan is the stable market for Afghan fresh Grapes and India and France are less stable markets. The major reasons are geographical advantage for Pakistan which gave competitive advantage over other countries with reference to fresh grapes. India, Russia and Pakistan are stable markets for dried grapes and USA, UK, Germany and Belarus are less stable markets. India is the main country to import dried grapes (raisin) in the next five years. It shows high value in terms of quantity and percentage which is more than 50 per cent of all Afghanistan's dried grapes (raisin) export.

**Keywords:** Grapes, Compound annual growth rate, Direction of trade, Markov chain

### **Introduction**

Afghanistan is a landlocked country that its economy depends on agricultural products. Its economy is largely agrarian and the agriculture sector makes important contributions to economic growth, employment creation, poverty reduction, food

security, and the fiscal health of the nation. Agriculture serves as one of the pillars of the economy. The agriculture sector employs around 40 percent of the country's working force and provides support to approximately 80 percent of its population. Generally, the agriculture sector in Afghanistan is characterized by small-scale farmers, 75 percent of the farmers own one Jereb (one-fifth of a hectare) or less. Afghanistan's climatic and geographical conditions have provided the best ways to produce horticultural products. Horticulture is a key contributor to jobs and economic growth in Afghanistan. Afghan farmers produce apples, pomegranates, apricots, grapes, melons and watermelons.

Along with melons, the grapes and raisin has been the country's most important crop throughout the history. Grapes is grown in 87,517 hectares and produced 9.84 lakh tonnes which accounted for 36 per cent of the total fruit-growing area in Afghanistan and more than half of the production in 2018 (Statistical Year Book, Afghanistan). At Global level, Afghanistan is 18<sup>th</sup> producer, accounting for about 1.24 percent share of the global grapes production. Afghanistan exported 2.91 lakh tonnes of fresh fruits and 1.58 lakh tonnes of dried fruits in the year 2018. Afghanistan exported 1.76 lakh tonnes of grapes in 2018 which accounted for 60.48 per cent of total fresh fruit exports from the country (APEDA). Afghanistan has the greatest potential and demand in domestic as well as in international markets for grapes (fresh and dried). Major grapes growing provinces are Kabul, Parwan, Kandahar, Herat, Ghazni and Takhar. Peak arrival season for Grapes is from July to October.

Raisins are the important high value crop and ranks number one in the export earnings of the country (Zainullah Zahid et al, 2016). The central provinces including Kabul contributes 22 per cent of production and Parwan contributes 15 per cent of total production. The major varieties for raisin are Shondakhanai, Keshmeshi, Black Keshmeshi, Lal and Mehramaldi. Afghanistan produces two main types of raisins. Green raisin (Kishmish) are dried in shaded and ventilated houses while red raisins (Aftabi Kishmish) are type of sun dried on the ground and roofs. Raisin production tends to track grape production closely each year. (Gain report, 2013).

Afghan dried fruit and nuts have a mixed reputation. In India, with potentially the largest demand for Afghan produce, Afghan (dried) fruit and nuts are popular. Indian consumers pay premiums for Afghan dried fruit and nuts. Pakistan and India have a combined population of over 1.5 billion people and represent a rapidly growing market for high value products like fresh grapes, dried grapes (raisin). Export of raisin was 50995 tonnes in 2018 which accounted for 32.27 per cent of total dried fruits exports. The top export destinations of fresh and dried (raisin) grapes are India, Pakistan, Russia, US, UK, Germany and France. The United States, European Union and other destinations with strict standards enforcement are complicated export destinations for Afghan raisins because of poor quality and lack of adherence to international food safety standards by processors. However, the implementation of international Codex standards for raisins has increased the ability to market to such places (GAIN report, 2014). Under this scenario the present study was conducted to analyze the export performance of fresh and dried grapes from Afghanistan.

The specific objectives are:

- to study the trend in area, production and export of fresh and dried grapes (raisin) in Afghanistan
- to analyze the stability in export of fresh and dried grapes (raisin) from Afghanistan
- to study the direction of trade of fresh and dried grapes (raisin) in Afghanistan

### **Data and Methodology**

The study is based on the secondary data on area, production, productivity and exports of fresh and dried grapes (raisin) from Afghanistan, obtained from FAOSTAT for a period of 18 years, from 2001 to 2018 for area, production and productivity. Export data is for a period of 13 years from 2006 to 2018 (APEDA) and Statistical Year books of Afghanistan.

### **Compound Annual Growth Rate**

The compound annual growth rate was used to study the trend in area, production, productivity and exports of fresh and dried grapes (raisin) from Afghanistan. Growth rate of above parameters are estimated by using the exponential growth function of the form:

$$Y_t = a b^t U^t \dots \dots \dots (1)$$

Where,

$Y_t$  = Dependent variable for which growth rate was estimated

$a$  = Intercept

$b$  = Regression coefficient

$t$  = Year which takes values 1, 2... n.

$U_t$  = Disturbance term in year 't'.

The equation (1) will be transformed in to log-linear and written as:

$$\log Y_t = \log a + t \log b + \log U_t \dots \dots \dots (2)$$

Equation (2) will be estimated by using Ordinary Least Square (OLS) technique.

The compound growth rate (g) will be then estimated by the identity given in equation (3)

$$g = (b-1) \times 100 \dots \dots \dots (3)$$

Where,

$g$  = Estimated compound growth rate per annum in percentage.

$b$  = Antilog of log b

### Markov Chain Analysis

Annual export data for the period from 2006 to 2018 were used to analyze the direction of trade and changing pattern of Afghanistan's fresh and dried grapes (raisin) export. The major importing countries considered were India, Russia, Pakistan, USA, UK, Germany and Belarus. Markov chain analysis was employed to analyze the structural change and direction of change in the export of fresh and dried grapes (raisin). In the present study, the dynamic nature of trade patterns, that is, the gains and losses in export of Afghan fresh and dried grapes (raisin) in major importing countries was examined using the Markov chain model. Markov chain analysis involves developing a transitional probability matrix 'P', whose elements,  $P_{ij}$  indicate the probability of exports 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. In the context of current application, structural change was treated as a random process with three importing countries for fresh grapes and seven countries for dried grapes (raisin). The assumption was that the average export of dried grapes (raisin) from Afghanistan amongst importing countries in any period depends only on the export in the previous period and this dependence was same among all the periods. This was algebraically expressed as:

$$E_{jt} = \sum_{i=1}^r E_{it-1} P_{ij} + e_{jt}$$

Where,

$E_{jt}$  = Exports from Afghanistan during the year t to  $j^{\text{th}}$  country,

$E_{it-1}$  = Exports to  $i^{\text{th}}$  country during the year t-1,

$P_{ij}$  = The probability that exports will shift from  $i^{\text{th}}$  country to  $j^{\text{th}}$  country,

$e_{jt}$  = The error term which is statistically independent of  $e_{ij-1}$  and,

$r$  = Number of importing countries

The transitional probability matrix, which can be arranged in a  $(c \times r)$  matrix, has some properties. The diagonal elements of matrix P indicate the probability that the export share of a particular country will remain the same from one period to another. The off-diagonal or transfer probabilities indicate the probability that the export share of a particular country will shift to another country over time. Thus, the export share of a country during the period 't' will be obtained by multiplying the actual exports in the previous period (t-1) with transitional probability matrix. The transitional probability matrix has been estimated in the linear programming (LP) framework by a method referred to as minimization of mean absolute deviation (MAD) which is stated as:

$$\text{Min } OP^* + Ie$$

Subject to:

$$XP^* + V = Y$$

$$GP^* = 1$$

$$P \geq 0$$

Where:

$P^*$  is a vector in which probability  $P$  are arranged,

$0$  is a vector of zeros,

$I$  is an appropriately dimensioned vector of area,

$e$  is the vector of absolute errors ( $|U|$ ),

$Y$  is the vector of export to each country,

$X$  is a block diagonal matrix of lagged values of  $Y$  and

$V$  is a vector of errors,

$G$  is a grouping matrix to add the row-elements of  $P$  arranged in  $P^*$  to unity.

## Results and Discussion

### Trend analysis of grapes area, production and yield in Afghanistan

Compound Annual Growth Rate was used to study the trend in area, production, productivity of fresh grapes from Afghanistan. The results are presented in Table 1.

**Table 1. Compound Annual Growth Rate in Area, production and yield of Fresh Grapes in Afghanistan (2001 to 2018)**

S. No.	Variable	Growth rate (in %)
1	Area	3.58***
2	Production	6.88***
3	Yield	3.17***

(\*\*\* 1% level of significance)

The results showed that increasing trend in area, production and productivity of grapes 3.58, 6.88 and 3.17 per cent per annum respectively. Area, production and productivity of Grapes showed significant increase from 2001 to 2018.

### Trend analysis of fresh and dried grapes (raisin) export from Afghanistan (2006-18)

Compound Annual Growth Rate was used to study the trend in export of fresh grapes and raisin from Afghanistan. The results are presented in Table 2.

**Table 2. Compound Annual Growth Rate in Export of Fresh and Dried (Raisin) Grapes in Afghanistan (2006 to 2018)**

S. No.	Variable	Growth rate (in %)
1	Fresh Grapes Export	20.76***
2	Dried grapes Export	4.48***

(\*\*\* 1% level of significance)

The trend in export showed that from 2006 to 2018 the export quantity increased to 20.76 per cent for fresh grapes and 4.48 per cent for dried grapes. However, export quantity of fresh and dried (raisin) grapes were statistically and positively significant

### Direction of Trade of Fresh and Dried (Raisin) Grapes Export from Afghanistan

Markov chain analysis is employed to find the structural change in any system through time in terms of single outcome variable by using transitional probability matrix which can predict the changes for future year also. The dynamics in the direction of exports and the pattern in the trade of fresh and dried grapes from Afghanistan by shift in export shares from one country to another country over a period of time were analyzed by employing the first order Markov chain model. The trend in sustaining the existing markets and the gains and losses in export share of fresh and dried (raisin) grapes from Afghanistan by the major importing countries were obtained from the transitional probability matrix.

The actual promotion of exports to different countries had been considered in computing the transitional probability matrix for the period under study. The matrix explained the switching behavior of fresh and dried (raisin) grapes among the major importing countries over a period of time indicating the change in direction. The row elements in the transitional probability matrix provided the information on the probability retention in the volume of trade and extent of loss in trade on account of competing countries. The column elements indicated transitional probability of the gains in the volume of trade from other competing countries. The diagonal elements indicated the probability retention of Afghanistan's exports to a particular country as of previous year.

### Transitional Probability Change for Fresh Grapes

The major importing countries taken for the analysis of trade in fresh grapes exports during the 2006-18 were Pakistan, India and France along with the remaining importing countries grouped under others.

**Table 3. Transitional Probability Matrix for Afghanistan's Export of Fresh Grapes**

	Pakistan	India	France	Others
Pakistan	0.9993	0.0006	0.0001	0.0000
India	0.7917	0.0005	0.1672	0.0406
France	1.0000	0.0000	0.0000	0.0000
Others	0.6060	0.2146	0.0000	0.1794

From the Table 3. It could be inferred that in the study period (2006-18) of export, Pakistan remained as the most stable market among the major importers of Afghanistan's fresh grapes as reflected by the higher probability of retention as 0.9993 i.e., the probability that Pakistan retains its export share over the study period was 99.93 per cent. The remaining 0.07 per cent, 0.06 per cent was diverted to India and 0.01 per cent to Others countries put together. At the same time Pakistan gained 79.17 per cent market share of India, 100 percent share of France and 60.6 per cent share of Others. Afghanistan could retain only 0.05 per cent of its previous export to India. India lost 79.17 per cent of its previous market share to Pakistan, 16.72 per cent of its share to France and 4.06 per cent of its share to 'Others' countries put together. It gained 21.46 per cent market share of Others and 0.06 per cent share of Pakistan.

Afghanistan could not retain its previous export share of fresh grapes to France, France lost all its market share to Pakistan and gained 16.72 per cent market share of India and 0.01 per cent share of Pakistan. Afghanistan's previous fresh grapes export to Others could be retained to the tune of 17.94 per cent. Out of the remaining 82.06 per cent, 60.60 per cent was lost to Pakistan and 21.46 per cent to India. However, Others gained 4.06 per cent market share of India. Stringent quality requirements by other countries are also one of the reasons for less stability in exports. (USAID-CHAMP, 2016)

### Projections for fresh Grapes

With the help of transitional probability matrix, market share proportion of Afghanistan's fresh grapes to major importers overseas were computed from 2019 up to 2023 for 5 years. Pakistan remained as a single and largest importer of fresh Grapes from

Afghanistan as shown in Table 4. Pakistan imports Afghan grapes both for home consumption and for resale to other overseas markets. Pakistan also re-exports imported fruits from Afghanistan to other international markets. Over the years it remained as a single largest importer for fresh grapes. (USAID-CHAMP, 2016)

**Table 4. Projections of Fresh Grapes**

Year/ Country	Pakistan	India	France	Others	World Total
2019	135334	508	23	170	136035
	(99.48)	(0.37)	(0.02)	(0.13)	(100)
2020	146869	572	22	186	147649
	(99.47)	(0.39)	(0.02)	(0.13)	(100)
2021	158403	637	22	202	159264
	(99.46)	(0.40)	(0.01)	(0.13)	(100)
2022	169938	701	21	218	170878
	(99.45)	(0.41)	(0.01)	(0.13)	(100)
2023	181473	766	20	234	182493
	(99.44)	(0.42)	(0.01)	(0.13)	(100)

(Figures in parenthesis indicate percent share)

#### **Transitional Probability Change for Dried Grapes (Raisin)**

The major importing countries taken for the analysis of trade in dried grapes (raisin) export during 2006 to 2018 period were India, Pakistan, Russia, USA, UK, Germany and Belarus along with the remaining importing countries grouped under 'Others'.

**Table 5. Transitional Probability Matrix for Afghan's Export of Dried Grapes (raisin)**

	India	Pakistan	Russia	USA	UK	Germany	Belarus	Others
India	<b>0.6127</b>	0.0000	0.0000	0.0000	0.0000	0.0036	0.0000	0.3837
Pakistan	0.0558	<b>0.6093</b>	0.0000	0.2613	0.0081	0.0654	0.0000	0.0000
Russia	0.0836	0.0000	<b>0.8602</b>	0.0003	0.0008	0.0053	0.0499	0.0000
USA	0.0000	0.0000	0.0000	<b>0.0000</b>	0.0000	0.0000	0.0000	1.0000
UK	0.0000	0.0000	0.0000	0.0538	<b>0.5754</b>	0.0000	0.0000	0.3708
Germany	0.0000	0.0000	0.0000	0.0000	0.0000	<b>0.0620</b>	0.0000	0.9380
Belarus	0.0000	0.0000	0.6678	0.0000	0.0000	0.0000	<b>0.3322</b>	0.0000
Others	0.8701	0.0061	0.0000	0.0000	0.0000	0.0000	0.0000	<b>0.1239</b>

From the table 5 it is clearly evident Russia remained as the most and first stable market among the major importers of Afghanistan's dried grapes (raisin) as reflected by the higher probability of retention at 0.8602 i.e., the probability that Russia retains its export share over the study period was 86.02 per cent. The remaining, 4.99 per cent was diverted to Belarus and 8.36 per cent to India, 0.53 per cent to Germany, 0.08 per cent to UK and 0.03 per cent to USA. At the same time Russia gained 66.78 per cent market share of Belarus.

In Afghanistan's export of dried grapes (raisin) during 2006-18, India remained as the second stable market among the major importers of Afghanistan's dried grapes (raisin) as reflected by the higher probability of retention at 0.6127 i.e., the probability that India retains its export share over the study period was 61.27 per cent. The remaining of 38.73 per cent,

38.37 was diverted to 'Others' and 0.36 per cent to Germany. At the same time India gained 5.58 per cent market share of Pakistan, 8.36 per cent share of Russia and 87.01 per cent share of 'Others' countries put together.

Pakistan was the third stable major importers of Afghanistan's dried grapes (raisin) as reflected in probability of retention at 0.6093 i.e., the probability that Pakistan retained its import share from the study period was about 60.93 per cent. Out of the remaining 39.07 per cent, 26.13 per cent of its market share lost to USA, 0.81 per cent to UK, 6.54 per cent to Germany and 5.58 per cent to India. It gained only 0.61 per cent market share of Others.

Afghanistan could not retain its previous export share of dried grapes (raisin) to USA. USA lost its entire market share to 'Others' countries put together. USA gained 26.13 per cent market share of Pakistan, 5.38 per cent share of UK and 0.03 per cent share of Russia. Export of dried grapes (raisin) to UK was retained to the tune of 57.54 per cent. Out of the remaining 42.46 per cent, 37.08 per cent of its previous share lost to Others and 5.38 per cent to USA. UK gained 0.81 per cent market share of Pakistan and 0.08 per cent share of Russia.

Afghanistan could retain only 6.20 per cent of its previous export to Germany. It lost 93.80 per cent of its previous share to 'Others' countries put together. Germany gained 6.54 per cent market share of Pakistan, 0.53 per cent share of Russia and 0.36 per cent share of India. Afghanistan's dried grapes (raisin) export to Belarus was 33.22 per cent. The remaining 66.78 per cent diverted to Russia. It gained 4.99 per cent market share of Russia also. Others could gain 12.39 per cent of its share and the remaining 87.01 per cent of its share lost to India and 0.61 per cent to Pakistan.

#### Projections for dried Grapes (Raisin)

With the help of transitional probability matrix, market share proportion of Afghanistan's dried grapes to major importers overseas were computed from 2019 up to 2023 for 5 years.

**Table 6. Projections of Dried Grapes (raisin)**

Year/ Country	India	Pakistan	Russia	USA	UK	Germany	Others	World Total
2019	18824	1156	2771	2568	464	332	11120	37235
	(50.55)	(3.1)	(7.44)	(6.9)	(1.25)	(0.89)	(29.87)	(100)
2020	19998	1265	1786	2831	475	347	11974	38676
	(51.71)	(3.27)	(4.62)	(7.32)	(1.23)	(0.9)	(30.95)	(100)
2021	21173	1374	800	3094	485	363	12828	40117
	(52.78)	(3.42)	(1.99)	(7.71)	(1.21)	(0.9)	(31.98)	(100)
2022	22347	1482	0	3357	495	378	13682	41741
	(53.54)	(3.55)	0	(8.04)	(1.19)	(0.91)	(32.77)	(100)
2023	23522	1591	0	3620	505	393	14536	44167
	(53.26)	(3.6)	0	(8.2)	(1.14)	(0.89)	(32.91)	(100)

(Figures in parenthesis indicate percent share)

Table 6. shows the estimated shares of dried grapes (raisin) to some selected countries, India is the main country to import dried grapes (raisin) in the next five years. It shows high value in terms of quantity and percentage which is more than 50 per cent of all Afghanistan's dried grapes (raisin) export. USA is the second destination for dried grapes (raisin) export, which shows the value of 6.91 per cent to 8.53 per cent. Pakistan is third destination which shows a consistency value of 3.5 per cent in the next five years.

## Conclusion

Grapes area, production and productivity in Afghanistan showed increasing trend over years. Export of fresh and dried grapes are also in increasing trend from 2006 -18. Pakistan remained as the most stable market among the major importers of Afghanistan's fresh grapes by retaining 99.93 per cent of export share from 2006-18. In case of raisin exports, Russia remained as the most and stable market among the major importers of Afghanistan's dried grapes with retention probability of 86 per cent and India remained as the second stable market among the major importers of Afghanistan's dried grapes (raisin) with 61.27 per cent probability of retention. Various international agencies and the Government of Afghanistan are making efforts to encourage export of raisins to non traditional countries through various schemes and policies (World bank report). Increasing the quality of grapes through proper post harvest methods will helps to explore new markets and retain the share in the existing markets. There is a possibility to find new export market/buyers in Dubai and India for grapes. India is the main country to import dried grapes (raisin) in the next five years. It shows high value in terms of quantity and percentage which is more than 50 per cent of all Afghanistan's dried grapes (raisin) export. It is need to explore more information and facilitate to link local grapes exporters with buyers in Dubai and Indian market (ILO report, 2015). This will helps to improve the trade of Afghanistan and livelihood of farmers.

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