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Constraints Faced by Farmers and Traders in the Production and Marketing of Grapes in the Districts of Guldara and Mir Bacha Kot – Kabul

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Abstract

Grape (*Vitis vinifera* L.) production plays a significant role in rural livelihoods and employment in Afghanistan. However, limited empirical evidence exists on the combined production, infrastructural, and marketing constraints affecting grape value chains at the district level. This study aimed to identify and prioritize the major production, infrastructural, and marketing constraints affecting grape farmers and traders in the Guldara and Mir Bacha Kot districts of Kabul Province. The study collected primary data from 150 respondents, including 110 farmers and 40 traders, using structured questionnaires. The Garrett Ranking Technique was employed to identify and rank key constraints. The findings indicate that inadequate transportation infrastructure, water scarcity, pest and disease incidence, poor post-harvest handling, unreliable electricity supply, and price fluctuations were the principal factors limiting productivity and profitability. Educational differences between farmers and traders further highlight the need for targeted capacity-building programs. The study recommends integrated policy and investment measures to improve productivity, market efficiency, and the grape sector's overall competitiveness.

Keywords: Grape value chain, Production constraints, Marketing constraints, Garrett ranking technique, Kabul Province

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Introduction

Grape (*Vitis vinifera* L.) is one of the world's most important horticultural crops and plays a significant role in agricultural production, food security, rural employment, and international trade. It is grown in temperate and subtropical climates for fresh consumption and for processing into wine, juice, raisins, and other value-added products. Grape production supports a range of activities across the agricultural value chain, including input supply, production, harvesting, processing, transportation, storage, and marketing, and it significantly boosts farm household incomes because of its high economic value and strong market demand. Through both domestic and international markets, the grape industry also boosts rural employment and

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advances the country's economy. Despite its economic significance, grape farming in many developing nations still faces production, infrastructure, and marketing obstacles that lower farmers' earnings and limit productivity. Major production constraints include climate variability, water scarcity, declining soil fertility, pest and disease pressure, inadequate irrigation systems, and limited access to high-quality agricultural inputs.

Furthermore, the competitiveness of grape farmers is diminished by inadequate storage and cold chain facilities, poor transportation infrastructure, ineffective market systems, poor extension services, and limited access to agricultural credit. These limitations often raise production costs, cause significant post-harvest losses, and weaken producers' negotiating position in agricultural markets. As a result, improving the effectiveness of grape value chains has become a key policy goal in many developing nations seeking to boost agricultural competitiveness and rural livelihoods. The concept of the agricultural value chain highlights that activities before and after production are as important to agricultural success as farm-level output. Reliable infrastructure, strong connections among producers, traders, processors, and consumers, access to financial services, efficient market institutions, and timely market information are all necessary for efficient value chains. Any weakness in the value chain lowers final-product quality, raises transaction costs, and eventually reduces farmers' profitability. Therefore, to design successful interventions that improve agricultural output and market performance, it is crucial to identify the most significant bottlenecks across the value chain.

Afghanistan has long been acknowledged as one of Central and South Asia's major suppliers of fine grapes. Grapes have become one of the nation's most valuable fruit crops, thanks to favorable climatic conditions, a variety of agro-ecological zones, and a long history of horticultural production. Grapes are a major source of revenue for thousands of farming families, and the horticultural industry contributes substantially to agricultural jobs and household earnings. Afghan grapes are used domestically and exported in both fresh and dried forms, especially as raisins, which have historically been a significant agricultural export. The Food and Agriculture Organization states that grapes make up a significant amount of Afghanistan's fruit-growing land, underscoring their significance to the nation's agricultural economy (FAO, 2003).

Despite Afghanistan's advantageous grape-producing environment, the industry still faces structural issues that limit output and profitability. Many farmers still use conventional farming methods, marked by limited mechanization, low uptake of improved production technology, and insufficient access to modern farm inputs and certified planting materials. Recurrent droughts, declining groundwater supplies, and inadequate investment in irrigation infrastructure have worsened water scarcity. For grape growers, these challenges have increased production risks and reduced vineyard yields. Additionally, limited access to agricultural extension services hampers farmers' ability to implement climate-smart agricultural practices, pest management plans, and improved production techniques (Afif, 2015; Mirwais and Yamada, 2017).

Marketing constraints also reduce the competitiveness of Afghanistan's grape sector. Inadequate rural roads, poor transportation infrastructure, insufficient cold storage, a dearth of processing companies, and inefficient post-harvest management techniques all contribute to

significant quantitative and qualitative losses after harvest. Because grapes are highly perishable, delays in grape harvesting, shipping, storage, and marketing can drastically reduce product quality and market pricing. Smallholder farmers often have little negotiating leverage because they depend on local merchants and lack access to financial services, coordinated marketing channels, and accurate market information. As a result, when market prices are low, farmers often sell their products immediately after harvest, reducing household income and limiting opportunities for value addition (Mirwais and Yamada, 2019; Mlay, 2021).

In Kabul Province, where grape production is a significant source of income for many rural people, especially in the districts of Guldara and Mir Bacha Kot, these challenges are most apparent. Although the agro-climatic conditions in these areas are ideal for growing grapes, farmers and dealers must overcome several production and marketing obstacles. Inadequate irrigation infrastructure, storage facilities, transportation networks, processing capacity, and institutional support all reduce the grape value chain's efficiency. Similarly, traders face significant post-harvest losses, inadequate storage infrastructure, poor market facilities, and high transportation expenses, all of which reduce marketing profitability and efficiency. These interconnected restrictions affect every stage of the value chain and lower the overall competitiveness of the province's grape sector.

In Kabul Province, where grape production is a significant source of income for many rural people, especially in the districts of Guldara and Mir Bacha Kot, these challenges are most apparent. Although the agro-climatic conditions in these areas are ideal for growing grapes, farmers and dealers must overcome several production and marketing obstacles. Inadequate irrigation infrastructure, storage facilities, transportation networks, processing capacity, and institutional support all reduce the grape value chain's efficiency. Similarly, traders face significant post-harvest losses, inadequate storage infrastructure, poor market facilities, and high transportation expenses, all of which reduce marketing profitability and efficiency. These interconnected restrictions affect every stage of the value chain and lower the overall competitiveness of the province's grape sector. (Lodin & Naseri, 2025). Afghanistan's agricultural value chains, horticulture development, and grape production have all been the subject of several studies. However, most current studies have focused on characterizing marketing strategies, industrial systems, or general sectoral issues. Few studies have systematically measured the relative significance of production, infrastructure, and marketing constraints from the perspectives of farmers and traders. Furthermore, empirical data at the district level remain scarce, especially for Kabul Province. Policymakers and development organizations struggle to allocate scarce financial resources effectively and prioritize initiatives without a clear understanding of which limitations have the greatest impact. Therefore, to establish targeted policies that address the most important obstacles affecting grape production and marketing, a systematic ranking of restrictions is necessary. This study uses the Garrett Ranking Technique to identify and rank the main production, infrastructure, and marketing barriers that grape farmers and dealers in Kabul Province's Guldara and Mir Bacha Kot districts face to close this knowledge gap. The Garrett Ranking Technique, unlike traditional descriptive methods, enables more objective prioritization of constraints by converting respondents' ranks into numerical scores. Policymakers, agricultural extension agencies, development organizations, and private sector stakeholders can use the evidence-based findings to design

interventions that strengthen post-harvest management, improve irrigation infrastructure, increase market access, broaden financial services, and support farmer organizations. Ultimately, the study adds to the growing body of research on Afghanistan's agricultural value chains and offers useful suggestions for improving the grape industry's sustainability, profitability, and productivity.

Methods and Materials

The study was conducted in Guldara and Mir Bacha Kot districts of Kabul Province, purposively selected for their grape production and representative agro-climatic conditions. Rivers, canals, wells, and kareezes are examples of irrigated agricultural systems that support the studied area. With an average productivity of 1.77 tons per jerib, these irrigation sources support about 302 jeribs of grape vineyards, yielding a total of 535.557 tons of grapes yearly (NSIA, 2024–25).

Sample Size and Sampling Procedure

A stratified random sampling technique was employed to ensure appropriate representation of the two heterogeneous groups in the study area. The total sample size was determined using Cochran's formula.

$$n = \frac{Z^2 \times p \times q}{e^2} \dots\dots\dots (1)$$

Where,

$Z = 1.96$ at 95% confidence level

$p = 0.5$

$q = 0.5$

$e = 0.08$, resulting in a total sample size of 150 respondents.

The sample was then proportionally distributed into two strata: grape growers ($n = 110$) and traders ($n = 40$). Furthermore, the respondents were equally selected from the two districts, with 55 grape growers and 20 traders from each district. Primary data were collected through face-to-face interviews using a pre-tested structured questionnaire, while secondary data provided background information and supported the analysis. Respondents were selected from official lists obtained from local agricultural extension offices and district authorities.

Data Analysis

The Garrett Ranking Technique was used to identify and prioritize grape production and marketing constraints by converting respondent ranks into percent positions and Garrett scores via standard tables, transforming ordinal data into quantitative values for ranking. Percent position was calculated using:

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_j} \dots\dots\dots (2)$$

Where,

R_{ij} = Rank given to the i th item by the individual.

N_j = Number of items ranked by the individual.

The total Garrett score for each factor was then calculated as:

$$\text{Total Garrett Score} = \sum S_{ij} \dots\dots\dots (3)$$

Where,

- S_{ij} = Garrett score assigned to the i th factor by the j th respondent
- $\sum S_{ij}$ = Sum of Garrett scores of a particular factor across all respondents

The mean score for the final ranking was calculated as:

$$\text{Mean Score} = \frac{\sum S_{ij}}{N} \dots\dots\dots (4)$$

Where,

$\sum S_{ij}$ is the total Garrett score for each constraint

N is the total number of respondents.

Finally, constraints were ranked according to mean Garrett scores, where the highest mean score represented the most severe constraint faced by respondents (Kothari, 2004; Zalkuwi *et al.*, 2015; Dhanavandan, 2016; and Azimi *et al.*, 2025).

Findings

This section presents the empirical findings derived from data collected from grape farmers and traders in the Guldara and Mirbacha Kot districts of Kabul Province. Using the Garrett Ranking Technique, the study identified and prioritized major production, infrastructural, marketing, and value-chain constraints. The results were presented in tables with brief explanations to address the study objectives.

Demographic Characteristics of Respondents

Table 1: Age-wise Distribution of Respondents of Farmers and Traders in the Study Area

Age	Farmers		Traders	
	Frequency	Percent%	Frequency	Percent%
20–29	13	11.8	5	12.5
30–39	12	10.9	10	25
40–49	24	21.8	11	27.5
50–59	29	26.4	9	22.5
60–69	32	29.1	5	12.5
Total	110	100.00	40	100.00

Table 1 shows that most farmers (26.4%) were between the ages of 50 and 59, with those between 40 and 49 coming second (21.8%). The 30–39 and 40–49 age groups comprised the majority (30%) of dealers. There were relatively fewer younger responders.

Table 2 demonstrates that only 21.8% of farmers had higher education, whereas the majority (57.3%) were illiterate. In contrast, most dealers (57.5%) were more educated. (27.5%) Some traders were illiterate. Farmers had a lower level of education than dealers.

Table 2: Educational Level of Grape Producers and Traders in the Study Area

Educational Level	Farmers		Traders	
	Frequency	Percent%	Frequency	Percent%
Illiterate	63	57.3	11	27.5
Primary Education	16	14.5	3	7.5
Secondary Education	7	6.4	3	7.5
Higher Education	24	21.8	23	57.5
Total	110	100.00	40	100.00

Table 3 shows that 24.5% of farmers had between 30–39 years of experience in agriculture. Most farmers (30%) had less than ten years of experience growing grapes. Many also had more than 40 years of experience in agriculture. Overall, both categories showed a high range of experience levels.

Table 3: Farmers' Experience in Agriculture and Grape Cultivation in the Study Area

(Year)	Farmers		Farmers	
	Experience in Agriculture		Experience in Grape Cultivation	
	Frequency	Percent%	Frequency	Percent%
≤ 10	7	6.4	33	30.00
10 – 19	16	14.5	27	24.55
20 – 29	17	15.5	20	18.18
30 – 39	27	24.5	14	12.73
40 – 49	35	31.8	6	5.45
50 <	8	7.3	10	9.09
Total	110	100	110.00	100.00

Constraints Faced by Grape Farmers

Table 4 shows that Poor irrigation Infrastructure ranked as the most severe infrastructure constraint (mean score 74.1), followed by banking network coverage (72.0) and access to credit/microfinance (71.4). Functioning markets and road networks ranked fourth and fifth, respectively. Mobile phone coverage and usage were the least severe infrastructure constraint in the study area.

Table 4: Infrastructure-Related Constraints Faced by Grape Farmers in the Study Area

Production-related Constraints	Total Garret Score	Mean Score	Rank
❖ Poor irrigation canal Infrastructure	8,152	74.1	I
❖ Banking network coverage	7,924	72.0	II
❖ Access to credit & microfinance	7,852	71.4	III
❖ Functioning markets	5,884	53.5	IV
❖ Road networks	5,776	52.5	V
❖ Internet access & broadband penetration	5,728	52.1	VI
❖ Reliability of electricity supply	5,524	50.2	VII
❖ Electricity access	5,104	46.4	VIII
❖ Public transport systems	4,828	43.9	IX
❖ Mobile phone coverage & usage	4,624	42.0	X

Table 5 indicates that water scarcity ranked as the most severe production constraint (mean = 70.7), followed by pests and diseases (59.3) and lack of training (55.2). Lack of credit and high input costs were also important constraints. Poor planting material and labor shortage were the least severe production constraints in the study area.

Table 5: *Production Constraints Faced by Grape Farmers in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ Water scarcity	7,780	70.7	I
❖ Pests/Diseases	6,520	59.3	II
❖ Lack of training	6,076	55.2	III
❖ Lack of credit	5,632	51.2	IV
❖ High input costs	4,936	44.9	V
❖ Poor planting material	3,556	32.3	VI
❖ Labour shortage	3,520	32.0	VII

Table 6 shows that poor farmer organization ranked as the most severe marketing constraint with a mean score of (79.3), followed by price fluctuations and market volatility (79.2) and inadequate government support (78.0). Quality standards and certification issues were also major constraints. Limited market access, high transportation costs, and non-availability of packaging materials were the least severe marketing constraints in the study area.

Table 6: *Marketing Constraints Faced by Grape Farmers in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ Poor farmer organization	8,728	79.3	I
❖ Price Fluctuations & Market Volatility	8,716	79.2	II
❖ Inadequate government support	8,584	78.0	III
❖ Quality standard & certification issues	8,416	76.5	IV
❖ Lack of access to finance	7,324	66.6	V
❖ Weak bargaining power	7,280	66.2	VI
❖ Limited value addition	6,940	63.1	VII
❖ Poor post-harvest handling & storage	5,788	52.6	VIII
❖ Limited market access	3,652	33.2	IX
❖ High transportation cost	3,580	32.5	X
❖ Non-availability of packaging material	3,520	32.0	XI

Constraints Faced by Grape Traders

Table 7 below shows that Losses due to seasonal rain ranked as the most severe harvesting constraint for traders (mean = 42.8), followed by lack of proper harvesting knowledge among farmers (40.7) and Inadequate harvesting tools & equipment (33.2).

Table 7: *Harvesting Constraints Faced by Traders in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ Losses due to seasonal rain	1,712	42.8	I
❖ Lack of proper harvesting knowledge among farmers	1,628	40.7	II
❖ Inadequate harvesting tools & equipment	1,328	33.2	III
❖ Labor shortages during harvest season	1,304	32.6	IV
❖ Lack of knowledge or tools to determine the optimal harvest time	1,280	32.0	V

Labour shortages during the harvest season were also an important challenge. Lack of knowledge or tools to determine optimal harvest time was the least severe harvesting constraint in the study area.

Table 8 illustrates that high and unstable transportation costs ranked as the most severe transportation constraint for traders (mean = 80.0), followed by lack of loading/unloading facilities (43.1) and losses from delays or rough handling (34.4). Limited transportation service availability and poor road conditions were also important constraints. Poor road conditions affecting delivery and product quality were the least severe transportation constraint in the study area.

Table 8: *Transportation Constraints Faced by Traders in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ High/unstable transportation costs	3,200	80.0	I
❖ Lack of loading/unloading facilities	1,724	43.1	II
❖ Losses due to delays or rough handling	1,376	34.4	III
❖ Limited availability of transportation	1,328	33.2	IV
❖ Poor road conditions affecting delivery and product quality	1,304	32.6	V

Table 9 shows that poor hygiene and sanitation practices during post-harvest handling ranked as the most severe constraint for traders (mean = 41.0), followed by lack of worker training in post-harvest handling (38.3) and high post-harvest product losses (33.5). Limited access to proper packaging materials was also an important constraint. Lack of proper sorting and grading after harvest was the least severe post-harvest handling constraint in the study area.

Table 9: *Post-Harvest Handling Constraints Faced by Traders in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ Poor hygiene or sanitation practices during handling	1,640	41.0	I
❖ Lack of worker training in post-harvest handling	1,532	38.3	II
❖ High post-harvest product loss after harvest	1,340	33.5	III
❖ Limited access to proper packaging materials	1,316	32.9	IV
❖ Lack of proper sorting or grading after harvest	1,280	32.0	V

Table 10: *Market Access & Sales & Sales-related Constraints Faced by Traders in the Study Area*

Constraints	Total Garret Score	Mean Score	Rank
❖ Poor market facilities (shade, water, sanitation)	2,132	53.3	I
❖ Insufficient space to display/sell produce	1,832	45.8	II
❖ Unstable or unpredictable prices	1,712	42.8	III
❖ Difficulty in coordination with market authorities	1,448	36.2	IV
❖ Lack of market information	1,424	35.6	V
❖ Delays in receiving payments	1,316	32.9	VI
❖ Limited urban market access	1,304	32.6	VII

Table 10 showed that poor market facilities, including inadequate shade, water, and sanitation, were the most severe market access and sales constraint faced by traders, with a mean score of 53.3. Insufficient space to display and sell produce was ranked second (45.8), followed by unstable and unpredictable prices (42.8). Difficulties coordinating with market authorities and a lack of market information were also identified as notable constraints. In contrast, delays in receiving payments and limited urban market access were ranked as the least severe constraints in the study area.

Discussion

The results answer the main research question by showing that the efficiency and competitiveness of the grape value chain are limited by several interconnected constraints that grape producers and traders in Kabul Province must address. Farmers identified the most significant obstacles as water scarcity, poor irrigation infrastructure, limited access to financing, and ineffective farmer groups. Merchants' biggest obstacles were excessive transportation costs, subpar post-harvest processing, inadequate market facilities, and a lack of storage infrastructure. These results suggest that advances in grape production alone are unlikely to yield significant benefits unless marketing and infrastructural barriers are addressed concurrently, as production and marketing limits are intimately linked. The growing strain on agricultural output from climate variability, dwindling groundwater availability, and inadequate investment in irrigation systems is reflected in the prevalence of water scarcity and poor irrigation infrastructure. Inadequate irrigation lowers yields, fruit quality, and farmers' revenues because grape cultivation is heavily reliant on consistent water supplies. Similarly, limited access to banking services hampers farmers' ability to invest in vineyard management techniques, adopt modern production methods, and buy better inputs. By restricting access to market knowledge, extension services, marketing opportunities, and collective bargaining power, weak farmer groups further impede producers.

These findings suggest that institutional flaws weaken grape producers' resilience and amplify the effects of production-related challenges. The marketing limitations identified in this study significantly affect the grape industry's competitiveness. Inadequate market infrastructure and high transportation expenses raise transaction costs, decrease marketing effectiveness, and lower producer prices. Because grapes are highly perishable, poor post-harvest handling and inadequate storage facilities lead to severe quality deterioration and post-harvest losses. These results suggest that improving physical infrastructure, cold storage facilities, and transportation

systems across the value chain could significantly improve product quality, reduce losses, and boost market returns. These results align with earlier research in developing nations, which found that inadequate access to financing, weak market institutions, limited extension services, and poor infrastructure considerably lower agricultural productivity and profitability (Asfaw et al., 2020; Anderson and Feder, 2004; Davis et al., 2010). Similarly, this study's findings about the significance of transportation, post-harvest management, and market infrastructure align with those of Baraka, Mburu, and Muriithi (2019) and Cheruiyot, Mboya, and Wafula (2024), who stressed the importance of effective logistics and marketing systems for enhancing horticultural value chain performance.

However, this research uses the Garrett Ranking Technique to objectively rank the relative importance of each limitation, in contrast to many earlier studies that characterize production and marketing constraints in general terms. By highlighting the initiatives that should be given top priority, this method provides policymakers with more convincing evidence. Overall, by methodically classifying the most important barriers to grape production and sales in Kabul Province, this study adds to the scant empirical literature on Afghanistan's horticultural sector. The results indicate that policies that focus only on raising agricultural output are unlikely to deliver long-term gains unless they are combined with investments in post-harvest facilities, rural transportation, irrigation infrastructure, access to agricultural finance, and the development of farmer organizations. Therefore, increasing market efficiency, lowering post-harvest losses, increasing production, and ultimately raising the standard of living for grape growers and merchants all depend on an integrated value chain approach.

Conclusion

This study identified and prioritized the major constraints affecting grape production and trade in Guldara and Mir Bacha Kot districts of Kabul Province. The findings revealed that water scarcity, inadequate infrastructure, limited access to finance, weak farmer organizations, and marketing inefficiencies were the most critical challenges. In addition, high transportation costs and poor post-harvest handling constrained traders' performance. The results suggest that improving infrastructure, strengthening extension services, enhancing access to credit, and promoting efficient market systems are essential for increasing productivity and profitability. Addressing these constraints through integrated interventions can contribute to a more competitive and sustainable grape value chain in Afghanistan.

The results indicate that the most important production restriction, water shortage, should be addressed by prioritizing irrigation infrastructure and water management systems. To increase productivity and encourage better grape production techniques, access to agricultural loans, extension services, and farmer training programs should be expanded. To increase access to financial services, market coordination, and negotiating power, the government should encourage farmer cooperatives and producer associations. To lower losses and enhance product quality, investments in post-harvest facilities, packaging, storage, transportation, and market infrastructure are also crucial. Government assistance should also focus on promoting value addition and export-focused grape marketing, strengthening quality certification programs, and stabilizing market conditions.

Future research should employ sophisticated analytical techniques to examine how production and marketing constraints affect grape farm profitability. Comparative studies across Afghanistan's grape-producing regions would help identify regional differences in potential and constraints. To improve the competitiveness and sustainability of Afghanistan's grape marketing, further research on the effects of climate change, value-chain development, market integration, and the effectiveness of farmer groups would be beneficial.

Authors' Contributions

Mohammad Omar Areeb Malikzada conducted the research, collected and analyzed the data, and drafted the manuscript. Dr. Mohammad Ismail Hashime supervised, reviewed, and revised the study.

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