

# Economic study of supply chain management of pomegranates from Arghandab district, Kandahar, Afghanistan

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## ABSTRACT

### Purpose:

The purpose of this study is to conduct a comprehensive analysis of the supply chain management practices of pomegranate in Arghandab district, Kandahar province, Afghanistan, with a focus on identifying marketing channels, farmers' channel preferences, and the factors influencing their marketing decisions.

### Method:

The study was conducted in Arghandab district, Kandahar province, Afghanistan, selected for its significance in pomegranate production. Five villages (Nagahan, Khaisrow, Tabin, Khaishki, and Kowack) were purposively selected, and 30 farmers were randomly chosen (six from each village). Primary data were collected in 2023 through structured interviews. Secondary data were obtained from the Central Statistics Organization (CSO), Afghanistan Chamber of Commerce and Industries (ACCI), and relevant sources. Descriptive statistics (percentages and averages) were used for data analysis, and Microsoft Excel was employed for tabulation and interpretation of results.

### Results:

Five marketing channels were identified, with Channel I (Producer–Wholesaler–Retailer–Consumer) dominating (53.3%), followed by Channel II (20%) and Channel III (15%). Most farmers sold through market yards, mainly due to spot payment and proximity (70%), while 46.6% preferred Channel III because of credit facilities. Market information was primarily obtained from neighbours and friends (80%). Over half of the farmers (56.6%) were satisfied with their marketing channels. Quality assessment by traders mainly focused on colour, size, taste, and durability.

### Practical Implications:

The study indicates the need to strengthen organized marketing channels in Arghandab district by improving market yard facilities and ensuring timely spot payments to farmers. Expanding access to formal credit could encourage greater participation in export-oriented channels. Establishing reliable market information systems would reduce farmers' dependence on informal sources and improve decision-making. Furthermore, promoting standardized quality criteria, such as colour, size, taste, and durability, can enhance market efficiency and increase competitiveness in both domestic and international markets.

### Originality/Novelty:

This study provides empirical evidence on the supply chain structure and marketing practices of pomegranate producers in Arghandab district, Kandahar province, Afghanistan. It offers updated field-based data (2023) on marketing channels, farmer preferences, and quality assessment practices, an area with limited documented research in the Afghan context. The study contributes localized insights that enrich the existing literature on agricultural marketing and supply chain management in developing economies.

**Keywords:** Supply chain analysis, markets, quality indicators

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## 1. Introduction

The pomegranate (*Punica granatum* L.), a associate of the botanical household Punicaceae, is categorized as a tropical and sub-tropical fruit found in numerous areas transversely the world. Its farming dates back to earliest times, and it is indigenous to Iran while being extensively grown in Mediterranean countries including Spain, Egypt, Iran, Burma, China, India, and Afghanistan. In Afghanistan, pomegranate production holds important position as an energetic contributor to the country's agricultural economy. It helps as a main fruit crop in many provinces such as Kandahar, Helmand, Wardak, Ghazni, Paktia, Farah, Kapisa, and Balkh, as long as a sustainable source of livelihood for a substantial number of persons. Afghanistan has earned the reputation of being recognized as "the nation renowned for its cultivation of the pomegranate fruit," not solely due to its conventional agricultural practices, but also owing to the exceptional quality of the fruit it produces. Speculation has arisen suggesting that an effective strategy for countering opium production within the country would involve an increased focus on expanding Afghan fruit production for the international market. Encouragingly, demand for Afghan pomegranates is progressively growing on the global stage. As an example, in 2010, Afghanistan commenced exporting the fruit to the esteemed French company Carrefour, based in Dubai. This development has sparked significant competition with Turkish and North African counterparts, as the Afghan pomegranate is reputed to be larger, redder, and more succulent. Carrefour has further expressed interest in procuring Afghan pomegranates for their stores in various Middle Eastern countries, signalling promising opportunities for market expansion. Presently, pomegranates constitute a mere 2 percent of Afghanistan's overall agricultural output. The primary region responsible for pomegranate production is the Kandahar Province, encompassing an expansive cultivation area of 806 hectares as of 2015. Notably, the Arghandab districts within this province exhibited exceptionally high productivity rates, with an impressive yield of 9.21 tons per hectare in 2018. Throughout history, pomegranates originating from the Kandahar province have gained widespread recognition for their superior quality and desirability. The Kandahar region boasts a distinctive assortment of pomegranates renowned as the jumbo, ruby-red Kandahari variety, while the seedless variation is referred to as Badana, primarily favoured for its suitability in table consumption or the production of refreshing juices. Afghanistan showcases a diverse range of pomegranate cultivars, catering to the demands of the local markets. Although the ripening period of this crop fluctuates in accordance with prevailing climatic conditions, typically, the fruit becomes available in the market during the summer months of July and August, extending into the autumn season of September. Notably, the quantity of pomegranates supplied experiences a notable surge during the autumn, coinciding with a relative decline in prices. Due to the absence of cold storage facilities, farmers face the compulsion of selling their harvested fruit promptly, without the option to store it for extended periods. Inadequate supply chain management persists within the context under consideration. Studies have highlighted the progress of banana cultivation in North Karnataka and identified two pivotal marketing channels that facilitate the transfer of bananas from producers to end consumers. The first channel, denoted as Channel-I, involves a sequence of transactions from the producer to a commission agent who also operates as a wholesaler, subsequently reaching the retailer and ultimately the consumer. The second channel, referred to as Channel-II, encompasses a direct transfer of bananas from the producer to village-level traders, and subsequently to the consumer. It is worth noting that approximately 70% of farmers chose to sell their produce through commission agent cum-wholesalers, while the remaining 30% opted for village-level traders as their distribution avenue (Gangal, 2002). Upon analysis of consumer preferences, it was observed that the Bhagva variety commanded the highest proportion (65.22%) of the consumer's expenditure, while the Ganesh variety held the lowest share (53.32%) in consumer spending. In the case of Channel-IV (producer-retailer-consumer), the Arakta variety yielded a 60.95% share for the producer in terms of the consumer's expenditure. Although Channel-IV demonstrated greater suitability compared to other channels, marketing the entire produce through this particular channel proved challenging due to insufficient demand within the local market (Chavan, 2004).

Owing to its popularity and export demand, Afghanistan hosts the annual World Pomegranate Fair. This event serves as a pivotal platform for producers, buyers, packaging companies, logistics and cold storage technology providers, equipment vendors, international pomegranate experts, processing specialists, and government agencies. It functions as a roadshow showcasing the Afghan pomegranate industry, creating new avenues for business opportunities and benefiting the people of Afghanistan.

## 2. Methods and Materials

The focus of pomegranate cultivation within the Kandahar province primarily centers on the Arghandab district due to its favorable conditions for pomegranates production and marketing. Consequently, the district was purposefully chosen as the study area. Within the Arghandab district, five villages were purposively selected based on their substantial grape cultivation areas. These villages include Nagahan, Khaisrow, Tabin, Khaishki, and Kowack. To form a representative sample of pomegranate farmers, six farmers were randomly chosen from each of the selected villages, resulting in a total sample size of 30 farmers. The collection of primary data was carried out through personal interviews using a structured questionnaire. It is important to note that the primary data collected pertains specifically to the year 2021.

### 2.1 Samples Collection

The sample collection of 30 farmers from the Arghandab district was conducted with the aim of capturing a representative snapshot of the agricultural practices and perspectives within the local farming community. The selected farmers offer a range of insights and experiences, bringing forth valuable information related to pomegranate cultivation in the region.

### 2.2 Statistical Analysis

For statistical analysis, the Excel program was employed to analyze the collected data, enabling detailed examination and interpretation of the findings. Descriptive statistics were worked out for the data collected from primary and secondary sources and the results were tabulated. The collected data was presented in tabular form to facilitate easy comparison. Simple percentages and averages were worked out to present the general characteristics of sample farmers.

### 2.3 Primary Data

The collection of primary data involved conducting personal interviews with farmers using a structured interview schedule. The interview schedule encompassed various aspects related to the marketing of pomegranates, focusing specifically on details regarding specific channels and general marketing practices

### 2.4 Secondary Data

The current study emphasizes the examination of various elements concerning the marketing of pomegranates in the designated study area. To gather relevant information on exports, road freight, certification of origins, as well as courier and communication, secondary data was obtained from reputable sources such as the Central Statistics Organization (CSO) of Afghanistan, the Afghanistan Chamber of Commerce and Industries (ACCI), and relevant websites. These sources were relied upon to ensure the availability of comprehensive and reliable data for the study.

### 2.5 Marketing Channels

The marketing channel serves as a framework that outlines the pathways through which agricultural products are transported from producers to consumers. The length of the marketing channel varies based on the specific commodity, considering factors such as the quantity of goods to be transported and the nature of consumer demand.

### 2.6 Supply Chain

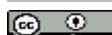
The supply chain is characterized as the comprehensive process encompassing the transformation, processing, and transportation of agricultural produce from farmers, with the assistance of input suppliers and market intermediaries, to the end users or consumers.

## 3. Results

Agricultural marketing encompasses the entirety of activities associated with the transfer of agricultural produce from the farmer to the end consumer, facilitated by a range of market intermediaries. The progression of the commodity from the farmer-producer to the consumer is facilitated through a sequence of intermediaries, constituting the marketing channel. Throughout each stage of the marketing process, intermediaries incur costs for their operations, resulting in the realization of marketing margins. The supply chain of pomegranates is illustrated below.

Marketing channels followed by pomegranate farmers

Pomegranates in the study area were distributed through five distinct channels, facilitating their movement from producers to ultimate consumers. These channels are as follows:



Channel I: Producer - Wholesaler - Retailer - Consumer (53.3%)

Channel II: Producer - Market Yard - Wholesaler - Retailer - Consumer (20%)

Channel III: Producer - Exporter - Retailer - Consumer (15%)

Channel IV: Producer - Consumer (7.7%)

Channel V: Other (Specify) - Producer - Retailer - Consumer (4%)

In Channel I, producers sold pomegranates to wholesalers just before harvesting. The wholesalers then assumed responsibility for packing and subsequently sold the produce to retailers, who in turn sold them to consumers. This channel accounted for 53.3% of the total sales.

In Channel II, producers themselves transported their produce to the market yard and engaged in open auctions to sell to wholesalers. The farmers were responsible for packing the pomegranates. The wholesalers then sold the produce to retailers, who ultimately sold them to consumers. This channel accounted for 20% of the total sales.

In Channel III, farmers directly sold their produce to exporters, who exported the pomegranates to international markets. From there, the produce made its way to retailers and consumers. This channel represented 15% of the total sales.

In Channel IV, producers directly sold their produce to consumers, either on-site or elsewhere in the city. This channel was utilized when farmers were unable to sell their produce through traditional traders. Approximately 7.7% of the total sales occurred through this channel.

In Channel V, farmers sold their produce through retailers. Retailers directly contacted the farmers and made purchases, subsequently selling the pomegranates to consumers.

As observed from Table 1 that 20 farmers out of 30 selected farmers disposed pomegranates in the market yards. The particulars presented in the table showed the disposed pattern in various markets available.

**Table 1. Distribution of pomegranate respondents based on markets**

S.N.	Category	No. of farmers	Percentage
1	Afghan Agricultural Produce Market	14	46.6
2	Afzal Market (exported)	3	10
3	Karachi Market (exported)	3	10
4	Lahore Market (exported)	4	13.3
5	Mohmand Market	6	20
	<b>Total</b>	<b>30</b>	<b>100</b>

According to Table 2, the findings reveal that 70% of the farmers identified both spot payment and proximity as influential factors in their preference for specific channels. Additionally, 26.6% of the farmers specifically highlighted that the spot payment offered by the buyer played a significant role in their decision to opt for these channels.

**Table2. Distribution of pomegranate respondents based on the reasons for selling through marketing channels I and II**

S.N.	Category	No. of farmers	Percentage
1	Proximity	1	3.3
2	Spot Payment	8	26.6
3	For both proximity and spot payment	21	70
	<b>Total</b>	<b>30</b>	<b>100</b>

Regarding preference to channel III credit facility provided by the buyer was the major factor for 46.6 per cent of the producers (Table 3).

**Table 3. Distribution of pomegranate respondents based on the reasons for selling through marketing channel III**

S.N.	Category	No. of farmers	Percentage
1	Provided credit facilities	14	46.6
2	Services rendered by them	1	3.3
3	Not applicable (Other channels)	15	50
	<b>Total</b>	<b>30</b>	<b>100</b>

The source of market information is reported in Table 4. Pomegranates farmers reported that they consulted neighbours and friends (80%) followed by commission agents (20%).

**Table 4. Distribution of pomegranate respondents based on the source of market information**

S.N.	Category	No. of farmers	Percentage
1	Commission Agent	6	20
2	Neighbors and friends	24	80
	<b>Total</b>	<b>30</b>	<b>100</b>

It is observed from Tables 5 that 56.6 per cent of pomegranate respondents were satisfied from the particular channels that they sold the produce.

**Table 5. Distribution of pomegranate growers based on the satisfaction of marketing channels**

S.N.	Category	No. of farmers	Percentage
1	Satisfied	17	56.6
2	Unsatisfied	13	43.3
	<b>Total</b>	<b>30</b>	<b>100</b>

Based on the information provided in Table 6, it can be inferred that among wholesalers for Pomegranate Crops, 40% considered colour, size, taste, and durability as crucial indicators for assessing fruit quality. Additionally, 20% of the wholesalers emphasized colour, taste, and size as important parameters. Another 20% of the wholesalers focused on colour and size, while an additional 20% regarded all quality indicators as significant for judging the quality of the fruit.

**Table 6. Opinion of pomegranate wholesaler on quality indicators**

S.N.	Category	No. of wholesalers	Percentage
1	Color, size, taste and durability	4	40
2	Color, taste and size	2	20
3	Color and size	2	20
4	All quality indicators	2	20
	<b>Total</b>	<b>10</b>	<b>100</b>

According to 50 per cent of retailers, it was all quality indicators that was important to judge quality (Table 7). 20 per cent each of retailers felt that size and colour were important, while 20 per cent expressed durability and 10 per cent size, colour and taste as the parameters.

**Table 7. Opinion of pomegranates of retailer based on quality**

S.N.	Category	No. of retailers	Percentage
1	All quality indicators	5	50
2	Size and color	2	20
3	Durability	2	20
4	Size, Color and taste	1	10
	<b>Total</b>	<b>10</b>	<b>100</b>

#### 4. Discussion

The cultivation of fruits has been a longstanding practice in Afghanistan, evolving into a skilful and commercially viable endeavour. Fruits have played a vital role in the nation's economy and overall prosperity. The per capita production and consumption of fruits are often used as indicators to assess the standard of living in a country. Fruits are universally recognized for their importance in the human diet, as they are chief sources of essential vitamins and minerals necessary for maintaining good health and disease resistance. Supply chains have emerged as integral components of both the economy and society, establishing intricate connections between the two interlinked entities (Ivanov, 2020). Research findings indicate the presence of five marketing channels for pomegranates. The highest percentage of sales occurred through Channel I, which involves the progression of Producer - Wholesaler - Retailer - Consumer. Previous studies have also identified that 20 out of 30 selected farmers sold their pomegranates in market yards (Acharya). Marketing of agricultural produce serves as a crucial link between the farm sector and other sectors. An efficient marketing system contributes to optimal resource utilization, effective output management, increased farm incomes, expanded market reach, growth of agro-based industries, value addition to national income, and job creation (Acharya, 2006). Approximately 70% of pomegranate farmers indicated that spot payment and proximity were influential factors in their channel preference, while 26.6% specifically emphasized the significance of spot payment by the buyer.

For 63.33% of the farmers, access to credit facilities played a role in their preference for Channel II. Additionally, 6.63% of the farmers were influenced by the services provided in this channel. It is worth noting that increased agricultural production holds little value without an efficient marketing system. The marketing of agricultural products involves both the physical transfer of goods and the commercial terms under which these transfers occur. In the study area, pomegranates were marketed through three distinct channels from producers to ultimate consumers: Channel I (Farmer - Pre-Harvest Contractor - Commission Agent cum Wholesaler - Retailer - Consumer), Channel II (Farmer - Distant Market Wholesaler - Retailer - Consumer), and Channel III (Farmer - Exporter). Channel I emerged as the most popular marketing channel in the study area, mainly due to the higher net price received by producers compared to other channels (Rede, 2018). Pomegranate farmers reported consulting neighbours and friends (80%) and commission agents (20%) for market information. While most respondents expressed satisfaction with the channels available, they often felt compelled to sell their produce through these channels due to limited alternatives. According to Tinebra's report, the Wonderful cultivar, with its intense colour and uniform appearance, tends to attract consumer attention. However, the physicochemical properties of the juice indicate its suitability for industrial production and marketing as fresh-cut arils. On the other hand, the Molar de Elche cultivar, despite its smaller size and less intense colour, possesses a lower woody part index and a high TSS/TA ratio, making it suitable to meet consumer preferences for fresh fruit (Tinebra, 2021). Regarding the quality evaluation by wholesalers for pomegranate crops, approximately 40% considered color, size, taste, and durability as important indicators. Another 20% emphasized colour, taste, and size, while an additional 20% focused on colour and size. Similarly, 20% of wholesalers regarded all quality indicators as significant. Among retailers, 50% considered all quality indicators important, while 20% each highlighted size and colour, and 20% expressed durability. Finally, 10% of retailers emphasized size, colour, and taste as determining parameters.

#### 5. Conclusion

In conclusion, this study examined the supply chain management practices within the Pomegranate industry in Kandahar province, Afghanistan. The analysis identified five distinct marketing channels operating in the market, with Channel I (Producer-Wholesaler-Retailer) being the most prevalent, accounting for the highest percentage of sales. Additionally, the findings revealed that a majority of

farmers preferred selling their goods through the market yard, with spot payment and proximity playing significant roles in their decision-making process. Furthermore, the study highlighted that Channel III was favored by 46.6 percent of producers, primarily due to the credit facilities provided by buyers. Farmers were found to rely heavily on consultations with neighbors and friends (80 percent) and commission agents (20 percent) for guidance and support in their marketing decisions. Regarding the quality assessment of Pomegranates, the analysis indicated that 40 percent of wholesalers considered color, size, taste, and durability as important indicators to judge the fruit's quality. Additionally, 20 percent of wholesalers emphasized the importance of color, taste, and size, while another 20 percent regarded all quality indicators as significant factors in assessing the fruit's quality. These findings provide valuable insights into the supply chain dynamics and marketing preferences within the Pomegranate industry in Kandahar province, Afghanistan. The identification of the dominant marketing channel, along with the factors influencing farmers' selling decisions and quality evaluation by wholesalers, contributes to a better understanding of the market dynamics in the region. Policymakers, industry stakeholders, and farmers can leverage these findings to optimize supply chain strategies and enhance overall market performance in the Pomegranate industry. Further research and analysis in this area can lead to improved marketing practices and increased profitability for both farmers and stakeholders involved in the supply chain.

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### Conflict of Interest

No conflicts of interest were present in this research, ensuring the integrity and objectivity of the findings.

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