



Available Online

Journal of Economic Impact

ISSN: 2664-9764 (Online), 2664-9756 (Print)

<https://www.scienceimpactpub.com/jei>

APPLE VALUE CHAIN INDUSTRY MAPPING VALUE ADDITION AND MARKETING OPTIONS IN MASTUNG AND KALAT BALOCHISTAN

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ARTICLE INFO

Article history

Received: January 11, 2024

Revised: April 18, 2024

Accepted: April 27, 2024

Keywords

Apple

Balochistan

Value chain addition

Marketing

ABSTRACT

Present work was conducted to assess the apple value chain, and marketing margin to propose policy recommendations for apple production in Balochistan. The population of the study consists of the Kalat division; districts Mastung and Kalat were selected randomly for conducting research. A total of 120 respondents were interviewed. 25 growers, 15 wholesalers, 15 retailers, and only 10 commission agents were interviewed separately in each district. The results showed that 24.0% of the apple growers in both districts were illiterate, about 80.0% had experience of 35 to 50 years in apple production, and about 80% of the orchards were established for 20 to 25 years. Producers' profit share for different varieties of apple Tor Kulu 46.66%, Shin Kulu 34.44%, and Kaja 48.55%. Wholesalers profit share for Tor Kulu 10.31%, Shin Kulu 7.94%, and Kaja 10.29%. and the retailers' profit share for Tor Kulu was 7.50%, Shin Kulu 4.94%, and Kaja 6.27%. Further, there were no facilities for cold storage and roads. Probably, the grower's knowledge regarding apple production and the lack of facilities for wholesalers and retailers are the main obstacles to apple production. The major problems noted during the survey were the improper infrastructure, lack of markets in the study area, illegal smuggling of apples, less availability of natural resources and credit, and the lack of market intelligence and extension services. It is suggested that there should be a good possibility to develop a policy that supports the marketing of apples, especially through agricultural cooperatives, besides further enhancing the exploitation of state subsidies for apple production.

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<https://doi.org/10.52223/econimpact.2024.6111>

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INTRODUCTION

Balochistan is the largest province of the country position in the South-West region of Pakistan. The province is blessed with various agroecological conditions, capable of a unique environment for the production of an ample variety of fruits with good quality, while fruit crops are grown over an area of 14.97 million hectares with a yield production of about 0.9 million tons yearly. The main fruits such as Apple, Cherry, Peach, and Apricot are taken as high delta fruits, while Olive, Pomegranate, Grape, and Pistachio need less irrigational water (Khan and Khan, 2018). Apple (*Malus domestica*, L) belongs to the Rosaceae family and is botanically classified into the Pyrinae which is a subtribe of the Spiraoideae subfamily (Potter et al., 2007). Apple (*Malus domestica*) is the most popular as well as economically important fruit worldwide in the temperate region, well known for its tremendous source of minerals and vitamins. (Mimida et al., 2009; Musacchi and Serra, 2018). The primary components in apples, sugars, organic acids, and phenolic compounds, contribute taste qualities such as bitterness, flavor, and astringency to the fruits (Mihailovic et al., 2018) the flavor, as well as the juice's stability, nutritional value, acceptability, and storage quality (Alberti et al., 2017). Apple fruits of Balochistan are well-known because of their special taste and unique quality (Shah et al., 2011). Baluchistan is the

largest fruit producer in Pakistan and production and marketing of apple was extended in Kalat, Mustang, Pishin, Ziarat, Qilla Saifullah, Quetta and Loralai. Balochistan is considered 1st largest producer of apples followed by dates in Pakistan and 576.40 tons of production was retained to be 215.48 acres from all temperate apple-growing districts of Balochistan (Agricultural Statistics of Pakistan, 2019). A total of 1573 tonnes, worth \$477,000, were exported (Government of Pakistan, 2013).

More than 20 varieties are being grown in Balochistan Red delicious, Golden delicious, Kashmiri, Amri, Kaja, and Mashahdi. Some low-chilling varieties are also grown in Tropical Beauty and Enna. Shin-Kulu (Golden Delicious), Tur-Kulu (Red Delicious), and Kaja, are renowned cultivars for their very attractive taste and color predominantly grown in Pakistan. About 17% of losses overhead in apple processing may be expected during postharvest activities and ample storage. (Shah, 2002; Ilyas et al., 2007). Variety influences the quality of post-harvest apple fruits. (Saleh et al., 2009), harvesting stage (Vielma et al., 2008), nutritious position (Hernandez et al., 2005), and becoming an interesting business for both rural and urban smallholders (Girmay et al., 2014). Agricultural product production costs are

divided into two categories: fixed and variable costs. Chemical fertilizers, pesticides, casual hired labour, farm machinery, tractors, other tools, and interest rates on working capital are examples of variable costs. Interest on investment, asset depreciation, utility payments, equipment storage, insurance payments, farm vehicle purchases and repairs, and other equipment maintenance costs of all moveable and non-movable assets are all part of the fixed costs (Allan-Wotjas et al., 2003). The margin of markets are depending on the sort of product; the higher the fresh product, the greater the trader's contribution (Haji, 2008). Rent of land, planting construction, ploughing, constructions, and other different infrastructural facilities, establishing of irrigation system, tools, bagging, seeds, supportive poles (fir or bamboo), fertilizers, insecticides, pesticides, energy charges, salaries, daily wagers salaries, management cadres' wages, and other accompanying expenditures are all parts of production and management costs.

METHODOLOGY

This mechanism was concluded by the survey in detail. It explains the process of selecting the area, the villages and the respondents for the collection of data in the study area. The core objective of the study was to estimate the cost of producing apples in the area, identifying the margins of different growers, retailers and wholesalers, intermediaries and commission agents in the supply chain of apple and the farmer's share in the amount paid by the final consumer. The study was also conducted to identify the apple supply chain and suggest the appropriate policy for solving the problems of producers and other actors and achieving stability in the market.

Data Sources

The primary data were collected directly from the respondents through well-structured questionnaires. The questionnaire was pre-tested in the field before collecting data to ensure the accuracy of the questionnaire. A total of 120 sample size were selected among which a total of 50 respondents were producers from two districts, where these actors lie in the supply chain of apples which include the retailers, wholesalers (15+15) 30, with commission agents 10 respondents each. All respondents were directly interviewed to obtain information about the market system and the production cost. The secondary data was gathered through published reports from private and government sources.

Marketing Margins

Marketing margin can be characterized as the function of the difference between the price paid by the consumer for any good and the price received by the producer for the goods that are produced. It is also known as the profit margin as it is the share of the amount that is paid by the consumer for the good received by the producer after excluding all the expenses incurred in the production of the product and the expenses incurred in the marketing process of that product which include the share of all the intermediaries or actors present in the marketing of the product i.e., the share of the commission agent, wholesaler, retailer and the other costs like packaging, processing, grading, transportation, etc. It is mostly represented in the form of percentages. These margins are mostly influenced by a shift in demand, marketing prices, and farm supply but there are some other factors that can also influence the profit margins such are, market power, quality of the product, technical change, risk, change in the demand due to taste and preferences or delay in supply, etc. The marketing margin of different actors has been calculated by employing the following methods:

Total marketing cost

The total cost spent by the producers and other intermediaries in the marketing process of any good taking it from the place of production and making. The total marketing cost is the sum of the cost incurred by the producer and the cost incurred by intermediaries including the storage cost, transportation cost, sorting, picking, packaging, grading, agent fee, and loading and unloading charges. It is calculated for each actor by employing the simple formula:

$$CM = CG + CI \quad (1)$$

Where; CM denotes the total cost of marketing,
CG denotes the expenses that are incurred by the producer in marketing of his product,
CI denotes the expenses incurred by an intermediary.

Producers margin

Producer margin is the profit that the producer receives after excluding all the cost he spent in the process of marketing of apple and in the production of apple. The final share that is received by him is the producer margin. The formula that is employed to calculate the per crate producer margin is as follows:

$$PM = WP - CP \quad (2)$$

Where; PM in the formula denotes the margin received by the producer,
WP denotes the price that is paid to the wholesaler in the market for apple,
CP denotes the amount that is spent by the producer in the process of marketing and production of apples.

Wholesaler margin

The wholesaler margin is the share of the price that he receives from the retailer for his product after excluding the cost he paid to other actors. It is estimated by the formula.

$$WM = RP - WC \quad (3)$$

Where; WM is the wholesaler share paid by the retailer,
RP is the amount that the retailer paid,
WC is the cost which is incurred by the wholesaler.

Retailer margin

The price paid by consumers in less amount depends on the good for buying and marketing the products which is estimated by following the formula.

$$RM = PC - RC \quad (4)$$

Where; RM represents the profit of retailer receives for selling apples,
PC represents the price that a consumer paid for apples,
RC represents the retailer's cost incurred on apples.

Gross margin

Percentage Gross margins for each intermediary have been calculated by employing the formula:

$$\% \text{ Gross Margin} = \text{Gross Margin} \times 100 / \text{Turnover} \quad (5)$$

Total cost of production

The production is the combination of a variety of expenses that are incurred in the production of apples including the cost of fertilizer, insecticide, pesticide, planting cost, price of land, labor, cost of

irrigation, etc. It can be influenced by several reasons such as an increase in the price of land, and machinery, an increase in the price or wage rate of labor leading to an increase in the production cost, utility bills, increase in taxes, and increase in the prices of fertilizer and chemicals etc. The cost incurred in the production of apples has been estimated by using the formula.

$$TC = FC + VC \quad (6)$$

Where; TC represents the total cost,
FC represents the fixed cost,
VC represents the variable cost.

Fixed Cost

The fixed cost is the cost that is fixed at any level of output whether you produce or not it remains the same at any level of output. In apple production, the fixed cost includes the cost of land and the cost of planting. Mathematically it can be estimated by:

$$FC = LC + PC \quad (7)$$

Where; FC explains the fixed cost,
LC explains the cost or the price of land,
PC is the planting cost.

Statistical Analysis

The Microsoft Office Excel software package and the package SPSS 17 were used for the data analysis. Data were analyzed and interpreted according to statistical procedures.

RESULT AND DISCUSSION

Marketing Margin

The profit received by the producer and other actors from the price that the consumer pays for the product.

The profit share of producers in district Kalat

Table 1 shows the producer's margin from different varieties of apples grown in Kalat. The overall cost for Tor Kulu was Rs. 550/crate, the selling price was Rs. 970/crate, an average profit of Rs. 420/crate and the total share of producer in consumer's rupee was 46.66%, while the Shin Kulu variety was sold on Rs. 760/crate, total cost, Rs. 450/crate and the net profit was Rs. 310/crate which is 34.44% of the total profit from consumer rupee. The Kaja variety was sold for Rs. 880/crate, the total production cost/crate was Rs. 500, while the estimated profit was Rs. 380/crate, which is 48.55% share of the price paid by consumers. The Amri variety has less margin and lower selling price and it has also grown less in both regions the cost per crate of Amri was Rs. 390, while the selling price was Rs. 450/crate the total profit earned by the producer was Rs. 56 which is the 6.67% of consumer rupee. The Mashadi variety also has the lowest profit and selling price of Rs. 420/crate, the cost of Mashadi Rs. 380, and the net profit earned by the producer was Rs. 40/crate, which is only 5.71% of the consumer amount. Shah et al. (2011) concluded that producers share in marketing margins with respect to Kaja,

Shin Kulu (Golden delicious), Mashadi Tur Kulu (Red Delicious), Kashmiri and Amri apple cultivars were exhibiting different percentages from 24%, 24.19, 20, 29 and 31% correspondingly. While for all apple varieties, the consolidated marketing margins were 73 percent, which indicates that producers earn 27 percent.

Profit share of producer in district Mastung

The selling price of Tor kulu in Mastung was Rs. 900/crate, production cost was Rs. 500/crate. The net profit earned by the producer was Rs. 400/crate which is 44.4% of the consumer amount also lower than the share in Kalat. The cost of Shin Kulu was Rs. 480/crate, selling price was Rs. 720/crate. The estimated profit for producers from shin kulu is Rs. 240/crate, which is 26.66%. Kaja also grew at a lower rate than Kalat the selling price of Kaja was found to be Rs. 840.8/crate, the cost of Kaja was Rs. 500/ crate where the earned profit was Rs. 340/crate which is 46.6% of consumer amount. Amri was also less grown, the selling price was Rs. 410/crate where the production cost was Rs. 380/crate the total earned profit was found to be Rs. 30/ crate which is 3.11% of consumer price. The Mashadi was sold at Rs. 390/crate with a production cost of Rs. 370/crate, an average profit, of Rs. 20/crate which in percent form was 1.81% of consumer price. The Amri and Mashadi in both districts have lower prices as well as lower production costs it is because they are less grown in both regions and give a low yield on average which is not profitable for the growers. Similar results were observed by Khair et al. (2002) who stated that farmers' share for shin kulu and kaja in consumer price was 24 and 31% which showed that the apple growing farmer got 7% much higher price in shin kulu and kaja apple varieties as shown in Table 2.

Commission Agent

Table 3 shows the share of commission agents from selling apples produced in both districts. The charges of the commission agent are fixed for each variety of apples whether it is produced in Mastung or from Kalat they charge only 10% on a crate. The average selling price of apple in Kalat was Rs. 970.8/crate where the profit of the agent was Rs. 97.50/crate, the Shin Kulu was sold for Rs. 760/crate where he charged Rs. 76.79/ crate. The Kaja price was Rs. 880.53/crate and the fee of the agent was Rs. 80.83/crate. Amri was sold for Rs. 450 and the share of the agent was Rs. 45.25/crate, the selling price of Mashadi was Rs. 420/crate where he charged Rs. 42.1/crate. While in Mastung average selling price was Rs. 900Rs where the profit of the agent was Rs. 90.53, Shin Kulu was sold on Rs. 720/crate where the charge was Rs. 72.67, Kaja sold in Rs. 840/crate profit of the agent was Rs. 84.34/crate, Amri sold in Rs. 410/crate agent profit was Rs. 41.44/crate and for mashadi sold price was Rs. 390/crate the profit of agent was Rs. 39.55/crate. Shah et al. (2011) stated that for marketed apple varieties commission Agent received the highest net margin of Rs. 25/crate for Kaja while the lowest is Rs. 11 for Amri. However, for other varieties the final margin ranges between Rs. 12 and 15/ crate.

Table 1. Distribution of the respondents according to the profit share of producers in district Kalat.

| Varieties | Selling price/crate | Cost/crate | Profit/crate | Profir % |
|-----------|---------------------|------------|--------------|----------|
| Tor kulu | 970 | 550 | 420 | 46.66% |
| Shin kulu | 760 | 450 | 310 | 34.44% |
| Kaja | 880 | 500 | 380 | 48.55% |
| Amri | 450 | 390 | 56 | 6.67% |
| Mashadi | 420 | 380 | 40 | 5.71% |

Table 2. Distribution of the respondents according to the profit share of producers in district Mastung.

| Varieties | Selling price/crate | Cost/crate | Profit/crate | Profit % |
|-----------|---------------------|------------|--------------|----------|
| Tor kulu | 900 | 500 | 400 | 44.4% |
| Shin kulu | 720 | 480 | 240 | 26.66% |
| Kaja | 840 | 500 | 340 | 46.6% |
| Amri | 410 | 380 | 30 | 3.11% |
| Mashadi | 390 | 370 | 20 | 1.81% |

Table 3. Distribution of the respondents according to the profit share of the commission agent.

| District Kalat | | District Mastung | |
|----------------|--------|------------------|--------|
| Variety | Profit | Variety | Profit |
| Tor kulu | 970 | Tor kulu | 900 |
| Shin kulu | 760 | Shin kulu | 720 |
| Kaja | 880 | Kaja | 840 |
| Amri | 450 | Amri | 410 |
| Mashadi | 420 | Mashadi | 390 |

Wholesaler's Margin

Wholesaler margin in district Kalat

The result in Table 4 defines the auction price of Tor kulu was Rs. 970/crate where the Shin kulu was Rs. 760/crate, Kaja was auctioned at Rs. 880/crate, Amri Rs. 450/crate while, the Mashadi was on Rs. 420/crate. The transportation, storage, and packing charges were Rs. 9.33/crate. Kalat Apple was sold at higher prices than Mastung the/of Tor Kulu was Rs. 1070.66/crate, the Shin Kulu was sold at Rs. 820.64/crate, Kaja prices were higher than Shin Kulu but lower than Tor Kulu it was sold on Rs. 970.46/crate. The selling price of Amri was Rs. 484.25 and Mashadi was sold at Rs. 463.5/crate. The estimated profit for Tor kulu was Rs. 80.53/crate and the profit share was 10.309% of the consumer rupee while the Shin kulu profit was Rs. 60.384/crate and the share of profit from consumer rupee was 7.945%. per crate profit of Kaja was Rs. 90.60/crate and the share were 10.295% from consumer price, Amri's share from consumer price was 7.648% which was Rs. 34.42/crate, and the estimated profit in rupee for Mashadi was Rs. 20.17/crate which was the 4.9% of consumer price. These

findings are in accordance with the work of Shah et al. (2011) who concluded that through marketed apple the wholesaler received a net margin of Rs. 32.35/crate for Kaja and the lowest net margin of Rs. 11.35 for Amri.

Wholesaler margin in district Mastung

Table 5 represents the wholesaler margin from Mastung apple. The auction price of Tor kulu was Rs. 900/crate, Shin Kulu was auctioned at Rs. 720/crate, Kaja Rs. 840 /crate, Amri Rs. 410/crate, and Mashadi price was auctioned at Rs. 390/crate. The selling price of Tor Kulu was Rs. 970/crate, Shin Kulu was sold at Rs. 760.642/crate, Kaja was sold at Rs. 900.466/crate, Amri Rs. 430.25/crate, and the selling price of Mashadi was Rs. 410.52/crate. The estimated profit on/crate for Tor kulu was Rs. 70.536/crate which was 7.77%, Shin kulu profit was Rs. 40.384/crate which was 5.55%, Kaja profit was Rs. 60.603/crate while its share in consumer price was 7.14%, the Amri having the higher profit among all the varieties its share was 4.87% where the profit/crate was Rs. 20.42/crate profit on Mashadi was Rs. 20.17 where the share was 5.12%.

Table 4. Distribution of the respondents according to wholesaler margin in district Kalat.

| Kalat | Tor kulu | Shin kulu | Kaja | Amri | Mashadi |
|---------------------|----------|-----------|---------|--------|---------|
| Auction price | 970 | 760 | 880 | 450 | 420 |
| Transportation cost | 3 | 3 | 3 | 3 | 3 |
| Packing cost | 5 | 5 | 5 | 5 | 5 |
| Storage cost | 1.33 | 1.33 | 1.33 | 1.33 | 1.33 |
| Selling price | 1070.666 | 820.642 | 970.466 | 484.25 | 440.5 |
| Profit/crate | 100.536 | 60.384 | 90.603 | 34.42 | 20.17 |
| Profit% | 10.309 | 7.945 | 10.295 | 7.6486 | 4.996 |

Table 5. Distribution of the respondents according to wholesaler margin in district Mastung.

| Mastung | Tor kulu | Shin kulu | Kaja | Amri | Mashadi |
|---------------------|----------|-----------|---------|--------|---------|
| Auction price | 900 | 720 | 840 | 410 | 390 |
| Transportation cost | 3 | 3 | 3 | 3 | 3 |
| Packing cost | 5 | 5 | 5 | 5 | 5 |
| Storage cost | 1.33 | 1.33 | 1.33 | 1.33 | 1.33 |
| Selling price | 970.536 | 760.642 | 900.466 | 430.25 | 410.5 |
| Profit/crate | 70.536 | 40.384 | 60.603 | 20.42 | 20.17 |
| Profit% | 7.77 | 5.55 | 7.14 | 4.87 | 5.12 |

Retailer's Margin**Retailer margin in district Kalat**

Table 6 shows the margins of retailers from apples produced in Kalat. The Tor Kulu was purchased at Rs. 1070.66/crate, the purchase price of the Shin Kulu was Rs. 820.64/ crate, the Kaja was purchased at Rs. 970.4/crate, the purchase price of Amri was Rs. 484.25/crate while the Mashadi was purchased on Rs. 440.5/crate. Per crate Transportation cost was Rs. 10, while Rs. 5/crate was the picking cost and Rs. 5/crate was the loading per unloading cost. The selling price of Tor kulu was Rs. 1150/crate, the Shin Kulu price was Rs. 860.214/crate, Kaja was sold out at Rs. 1030.33/crate, the selling price of Amri was Rs. 530.75/crate and the Mashadi was sold-out on Rs. 490.25/crate. The average estimated profit for Tor kulu was Rs. 93.33/crate, Shin kulu was Rs. 84.57 /crate, Kaja Rs. 85.86/crate, Amri profit was Rs. 78.5/crate, and Mashadi profit was Rs.70.75/crate. The profit share for the apple varieties was 7.502% Torkulu, 4.943% Shin kulu, 6.274% Kaja, 9.602% Amri, and 11.351% Mashadi.

Retailer margin in district Mastung

Tor Kulu was purchased at Rs. 970.534/crate, the purchase price of Shin Kulu was Rs. 760.642/crate, the Kaja was purchased at Rs. 900.466/crate, the purchase price of Amri was Rs. 430.25/crate while the Mashadi was purchased on Rs. 410.5/crate. The per crate transportation cost was Rs. 10, while Rs. 5/crate was the picking cost and Rs. 5/crate was the loading/unloading cost. The selling price of Tor kulu was Rs. 1050.534 /crate, Shin Kulu price was Rs. 810.241/crate, Kaja was sold-out on Rs. 960.33 crate, the selling price of Amri was Rs. 460.75/crate and the Mashadi was

sold-out on Rs. 440.25/crate. The average estimated profit for Tor kulu was Rs. 80.33/crate, Shin kulu was Rs. 50.57/crate, Kaja Rs. 60.86/crate, Amri profit was Rs. 30.5 / crate, and Mashadi profit was Rs. 30.75/crate. The profit share for the apple varieties was 8.240% Torkulu, 6.648% Shin Kulu, 6.759% Kaja, 7.088% Amri, and 7.491% Mashadi. The results are in agreement with Shah et al. (2011) who revealed that for all marketed apple varieties, the retailer earned an average profit of 14.12% paid by the consumer in which the maximum net margin from Kaja was Rs. 65 and the minimum net margin from Amri Rs. 47/crate as shown in Table 7.

Improvement in the Quality and Shelf Life of the Fruits

The wholesaler every time demands a good product from the farmers so that they can earn a maximum amount of profit and it can also prove helpful in increasing the credibility of their customers, in the following table few improvements carried out by the farmers in the fruit are mentioned. The shows that an overwhelming majority of the wholesalers claimed that their farmers brought improvement in the quality of apple, while only 20% of the respondents reported that they were claiming to bring improvement in the shelf life of the apples in Kalat and 73.3% of wholesaler claimed that their farmers brought improvement in the quality of apple, while only 6.7% of the respondents reported that they were claiming to bring improvement in the shelf life of the apple in Mastung district. Moreover, during the discussion wholesaler also stated that every farmer who visits the market to sell their product provides specific qualities of their product to motivate the wholesaler to purchase their item at a reasonable price (Coldevin 2001) as shown in Table 8.

Table 6. Distribution of the respondents according to retailer margin in district Kalat.

| Kalat | Tor kulu | Shin kulu | Kaja | Amri | Mashadi |
|------------------------|----------|-----------|----------|--------|---------|
| Purchasing price | 1070.666 | 820.642 | 970.466 | 484.25 | 440.5 |
| Transportation cost | 10 | 10 | 10 | 10 | 10 |
| Packing cost | 5 | 5 | 5 | 5 | 5 |
| Loading unloading cost | 5 | 5 | 5 | 5 | 5 |
| Selling price | 1150 | 860.214 | 1030.333 | 530.75 | 490.25 |
| Profit/crate | 80.333 | 40.571 | 60.866 | 46.5 | 50.75 |
| Profit% | 7.502 | 4.943 | 6.274 | 9.602 | 11.351 |

Table 7. Distribution of the respondents according to retailer margin in district Mastung.

| Mastung | Tor kulu | Shin kulu | Kaja | Amri | Mashadi |
|------------------------|----------|-----------|---------|--------|---------|
| Purchasing price | 970.536 | 760.642 | 900.466 | 430.25 | 410.5 |
| Transportation cost | 10 | 10 | 10 | 10 | 10 |
| Packing cost | 5 | 5 | 5 | 5 | 5 |
| Loading unloading cost | 5 | 5 | 5 | 5 | 5 |
| Selling price | 1050.534 | 810.214 | 960.333 | 460.75 | 440.25 |
| Profit/crate | 80.333 | 50.571 | 60.866 | 30.5 | 30.75 |
| Profit% | 8.240 | 6.648 | 6.759 | 7.088 | 7.491 |

Table 8. Distribution of the respondents according to improvement in the quality and shelf life of the fruit.

| District | Kalat | | Mastung | |
|-------------|-------|------|---------|------|
| | F | % | F | % |
| Improvement | | | | |
| Quality | 9 | 60.0 | 11 | 73.3 |
| Shelf life | 3 | 20.0 | 1 | 6.7 |
| Price | 3 | 20.0 | 3 | 20.0 |
| Total | 15 | 100 | 15 | 100 |

This is the fact in Balochistan 86.7% of respondents reported that they strongly agreed due to the lack of border management which affects their business from the Iran and Afghanistan border and only 13% agreed with border management which is similar in both districts of Balochistan.

CONCLUSIONS

During this study, the number of problems which were faced by farmers was observed. There was no appropriate market in Mastung and Kalat for apple because of this the producers, wholesalers, and retailers paid higher costs of transportation. On average 80% of the farmers sell their orchards to contractors which lemmatize their profit and the orchards are risked by insect pests and diseases. The unavailability of water was also one of the basic issues faced by producers. Due to the less availability of water and the unavailability of electricity, most of the farmers cut down their orchards in both districts. The smuggling of Afghanistan and Iran apples into the Pakistan market highly affects the demand and prices of Pakistan's apples and the weak market intelligence level as most of the growers sell their produce in Quetta, Karachi, and Lahore markets without knowing about the demand and prices in other terminal markets. On the basis of the findings of this study recommendations must be introduced for policymakers as well as researchers and apple growers should be provided training regarding modern techniques, cold storage of apple production for quality, and year-round production.

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