



Marketing Channel Efficiency of Almond Products: Evidence from Samangan and Balkh-Afghanistan

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Authors' contributions

This study was carried out with the collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The objectives of this study are to determine the most efficient marketing channels for almond producers. The marketing of almond products plays a significant role for small-scale farmers that provide income and towards sustainable rural livelihoods. The sample size of the producers included 125 farmers who were taken by the stratified sampling method. In addition, 15 contractors/middlemen, 12 retailers, 8 wholesalers, 8 support service providers, and 7 exporters have been surveyed, and the total number of participants reached 175 respondents. Descriptive statistics, marketing efficiency analysis methods were used to analyses data of this research. According to the results of Acharya and Aggarwal methods, the marketing efficiency analysis, the marketing channels were ranked according to their efficiency levels, which were found 11.17 for Channel 2 (wholesalers), 6.53 for Channel 1 (middlemen or agents), 3.36 for Channel 4 (exporters) and 1.88 for Channel 3 (retailers). Afghanistan almonds are large potential for the development and efficiency of almonds marketing in the study area as almond production is one of the major cash products in the Samangan and Balkh that has positively increased the welfare of the producers and intermediaries.

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1. INTRODUCTION

Agriculture is the most important sector in Afghanistan; it makes up about one-third of GDP, which accounts for an estimated 18.6 percent of total agricultural GDP, 45.8 percent of export value and the agriculture employment an estimated more than 60 percent of Afghans population [1,2]. Afghanistan has a unique climate that provides perfect agro-climatic and bio-diversity which is ideal for growing a variety of agricultural crops, which includes a large number of horticulture crops especially almond. Horticulture in Afghanistan has gained its credibility for providing sustainable income, food security and providing employment opportunities, both in rural and urban areas. Almond is one of the widest cultivation fruit crops of the world in varying climatic zones extending from the temperate to the tropics in Samangan and Balkh region of Northern Afghanistan [3]. Due to the excellent climate for almonds, the yields are good, increasing yields are also due to new scientific methods and technologies introduced. The Afghan almonds command strong market demand for both domestic and export. As a result of Afghanistan now is focusing on increasing almond production in terms of quantity and quality [4]. Afghanistan is one of the most important export markets for almond products in the Asian continent. During the last decade, it has produced an average of 45180.6 tons of almonds annually and 1.5% of the world's almonds. Although the market has been partly supplied by increasing domestic production, it exports most of its production to abroad. In fact, Afghanistan receives about 0.32% of the world's exportable surplus of almond. Almonds are sold both shelled and unshelled. The trade-in unshelled almonds are considerably large, especially during the traditional day, festivals, and family parties. However, there is a greater increasing demand for shelled almonds. This increase is largely the result of their use on a more comprehensive scale [5]. The Afghanistan market accepts unshelled nuts in large quantities about five months in the year, while the markets for shelled almond extend over the whole year. Some varieties of almonds are not suitable for the unshelled nuts trade, perhaps because of their less attractive appearance, and more difficult to shell than others. However, they are quite satisfactory for use in a variety of almond products. Through improved means of refrigeration kernels, almonds can now be stored

in appropriate warehouses where they will keep satisfactorily for a year or more while awaiting collection or sale, and thus be available to the year-round demand in the trades of bakery and confectionery. The production of Afghanistan almond is ranked by FAO as 11th in the list of almond producing countries of the world. However, its domestic production is limited to 2% of world production [6]. Within the country, the South-Western and northern regions have the maximum area under cultivation with Zabul and Samangan provinces, accounting for much of its production, followed by the provinces of Urozgan, Ghor, Balkh, Kunduz, and Baghlan. The key locations for the production of almonds are in Samangan and Balkh provinces, including Aybak, Hazrat-e-Sultan, Feroz Nakhchir, Khulm, Balkh, Dehdadi, Nahri Shahi, and Dowlat Abad. In these areas, the almond season stretches from July until the end of September. As the year of 2017-2018, the cultivated area of almonds was 19,793 ha, and the yield rate of 1686 hectograms (one hectogram = 100 grams) per ha, recording a total yield of 27,291 tonnes, with conducive climatic conditions for growing variety of almond landraces of a hard shell and soft shell varieties. The preferred markets for the export of Afghan almonds are India and Pakistan, with the former preferred because of better profitability [7]. Usually, a range of companies from producer to final user performs marketing functions in order to fit market supply to the needs and wants of prospects. The increasing use of marketing contracts in many agricultural commodities and almonds distribution channels has increased interest in empirical and theoretical studies of agricultural marketing channels [8].

2. MATERIALS AND METHODS

2.1 Population and Sampling

This study was to determine efficiency of marketing channels for almonds products in Samangan and Balkh provinces of Afghanistan, as shown in Fig. 1. The primary data of this research were obtained from questionnaires conducted by face to face interviews, and the secondary data of study collected from various sources, (CSO, FAO reports, government publications, USAID reports, NGOs reports, journals, and websites). The target population to which the results of this study generally apply is all almond smallholder farmers and

intermediaries operated in two provinces. Initially, the intermediaries and smallholder almond producers' lists and the sizes of their almond orchards were obtained from the Almond Orchard Association, Nursery Association, and Dried Fruit Seller Association. The lists covered the 2018 data and made the accessible population of this study. Using the size of almond orchards operated by each farmer as the sample size determination criterion, the accessible population was divided in three strata as small, medium, and large farmers. Then using Yamane's [9,10] stratified sample size determination formula with 0.05 mean errors, and 95% confidence interval, a stratified sample of 125 smallholder almond producers, 15 contractor/middleman, 8 wholesalers, 12 retailers, 7 exporters, and 8 support services were determined. This number was proportionally divided into three strata, and respondents from each stratum were randomly selected. Each respondent had an equal and independent chance of being included in the sample. The sample size determination formula was used as in Eq. 2.1.

$$n = \frac{N \sum N_h S_h^2}{N^2 D^2 + \sum N_h S_h^2}, D^2 = \frac{e^2}{t^2} \quad (2.1)$$

Where:

- n = Sample size of almonds farmers.
- N = Population of almonds farmers in the main strata
- N_h = Number of almonds farmers in each stratum

- Sh= Standard deviation in each stratum
- D2= Expected variance
- e = Accepted error from mean
- t = value of corresponding the accepted confidence interval

2.2 Data Collection

The data collection instrument of this study was developed using an extensive review of the related literature as well as socioeconomic characteristics and agricultural infrastructure of the region. Particularly the studies by [11] were explicitly utilized in preparing the questionnaire of this study. It was included questions about socioeconomic characteristics of farmers and intermediaries including their province, age, education, average land used under the horticulture crops, type of business, number of the employees in the business, business experiences. In addition, questions related to almond cultivation and productivity was also included in the questionnaire. Technically the questions were both open-ended and closed-ended. Validity for the data collection instrument was assessed using a panel of experts including the researchers and experts from the Almond Orchard Association, Nursery Association, and Dried Fruit Seller Association. Reliability was established by using a pre-test at the end of which slight changes were made in the questions which were misunderstood by the respondents. Data were collected in (November, 2018). It took approximately half an hour to complete one questionnaire.



Fig. 1. Map of Afghanistan, almonds production by provinces, 2008

2.3 Data Analyses

Descriptive statistics including frequencies, percentages, means and standard deviations were used to analyses socioeconomic characteristics of farmers and intermediaries. The remaining analyses were based on the following statistical procedures:

2.3.1 Marketing efficiency analysis

Marketing efficiency is a measure of market performance. The movement of goods from producers to the ultimate consumers at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing. The mathematical formulation to measure the cost-benefit efficiency of marketing channels is described below in 2.2 [12,13,14].

$$Ps1 = \frac{pp}{cp} \times 100 \quad (2.2)$$

Where,

Ps1= producers' share in consumer price,
pp = producer price
Cp = consumer price

2.3.2 Price spread

A price spread is defined as the difference between the received price and paid price by producers and intermediaries for an equivalent quantity and includes marketing costs and margins of intermediaries involved. It is expressed as a percentage of consumer's price and one of the significant measures of marketing efficiency. The mathematical formulation to gauge the price spread is described below in Eq. 2.3.

$$Ps2=Cp - Pp \quad (2.3)$$

Where,

Ps2 = price spread between consumer and producer prices
Pp= producer price
Cp= consumer price

2.3.3 Acharya and Agawam's approach

According to Acharya and Agawam's Method, an ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate markets channels should take

into account is described below in Eq. 2.4 [12,13,14].

$$ME1 = \frac{Np}{\sum_{i=0}^n MC + \sum_{k=0}^n MG} \quad (2.4)$$

Where,

ME₁ = Marketing efficiency
Np = net price (price received by farmers– farmers marketing costs) received by farmers
MC = the total marketing costs,
MG = the total marketing margins

2.3.4 Shepherd's formula

The efficiency of the marketing channel was calculated with the help of the following formula. The higher this ratio, the higher would be the efficiency and vice versa. This can be expressed in the following Eq. 2.5 [12,13,14].

$$ME2 = \frac{CP}{\sum_{i=0}^n MC} - 1 \quad (2.5)$$

Where,

ME₂ = marketing efficiency
Cp = consumer price
MC = the total marketing costs

3. RESULTS AND DISCUSSION

3.1 Socio-demographic and Economic Characteristics

The cross-sectional study was conducted on 125 producers, and 42 market intermediaries in Samangan (Aybak, Hazrat-e-Sultan, and Feroz Nakhchir districts) and Balkh (Mazar-e-Sharif, Balkh, Dahdadi, Khulum, and Dewlat Abad districts) provinces, which are located in the northern region of Afghanistan. Each district of these two provinces includes many villages. As a result, 67.2% of producers and 61.9% of intermediaries were selected in Samangan, and 32.8% of producers and 38.1% of intermediaries were from Balkh province, as shown in Table 1.

In the country like Afghanistan, where the family structure is very strong and based on strong family relationships, respects, values and community norms behaviour; the household head is always the decision-maker of the family; therefore, age is very important social variable because as people get older they learn different things and try to survive in their hometown and

making better household and socio-economic decisions [15]. Age is a significant factor that affects many personality traits of the producers. The age group of farmers mainly divided into three groups; young (≤ 35), medium (36-50), and old (≥ 51) years. The percentage of the first age group producers is 26.4%, the second age group 41.6%, and the third age group 32.0%. The average age of the producers, who participated in the survey, was 45.13 years old. Also, the intermediaries were divided into the same three age groups whose percentages were 31%, 50%, 19%, respectively. The average ages of intermediaries were 41.44 years old. According to the results, people of all age groups were engaged in agricultural activities and continued from father to son (family farming) and it is continues, as shown in Table 1. Similarly, a study about the analysis of wheat value chain: the case of Sinana district, Ethiopia, the average age of farmers was found to be 46.2 years old [16].

Education plays a vital role by influencing producers and intermediaries in their approach and attitude towards agricultural activities. The distribution of education levels of sample producers and intermediaries were classified into six categories based on educational status such as illiterate (no schooling), Islamic school, primary school, secondary school, high secondary school, higher education (university). The results indicate that 36.0% of producers were illiterate, 12.8% attended Islamic school, 20.0% held a primary school degree, and 10.4% continued their education to receive a secondary school degree. Those who graduated from high school were 8.0%, while 12.8% graduated from university. It can be observed that the percentage of illiterates was higher than the other levels indicating that the country suffers from offering necessary educational opportunities for its citizens. The average schooling year for the farmer participants of this study was calculated as 5.40 years. The study areas have a large workforce and large land for agriculture, but there is a lack of technology and education. Currently, many farmers are illiterate and do not know modern farming methods. It should improve the quality of higher agricultural education and develop modern farming methods through talent and skills to overcome new and complex challenges. Similarly, A study conducted in the Bijapur district of Karnataka about the value chain analysis of raisin, the most level of education the farmers were illiterate (40%), and only 13.33% were graduated from university [17]. The percentage of university

graduates in the study areas was lower than the rate of university graduates in Karnataka. The education levels of the intermediaries included the following: Illiterate (7.1%), Islamic school (14.3%), primary school (16.7%), secondary school (4.6%), high school (35.7%), and university (21.4%). The average schooling year for intermediaries is 9.43 years. It can be observed from this finding that intermediaries have a higher level of education than the farmers' community in the region. This partly represents the general farming characteristics in developing countries where farmers operate in a more traditional manner and low-level education. Since being an intermediary requires some specialized knowledge, talents, and skills, these are only possible with further education. Therefore, intermediaries in the region have a higher level of education than farmers, as shown in Table 1.

Similarly, studies conducted in Hyderabad of India about the supply chain analysis for mangoes, the educational status of the intermediaries were as following: illiterate (7.50%), primary school (10%), secondary school (29.17%), high school (29.17%), and university graduates (24.17%), respectively [18]. The percentage of high school in the study areas was higher than the rate of high school in Hyderabad.

3.2 Average Land Used under the Horticulture Crops

Land is the main resource for agricultural production. The size of land use has a significantly affects on the economic returns of farmers. The extensive and varied nature of the horticulture sector covering fruits and vegetable crops provides better yields per unit of the study area besides diversification opportunities in agriculture. Most agricultural households in remote areas are small landowners with an average land size of 0.5 hectares. A small number of farmers have large areas of irrigated land, and land farms on the deserted strip of land on the river cover 10 hectares or more. The perennial of horticulture and nuts/almonds are rehabilitating in irrigated lands with deep pipe wells and drip irrigation systems. The average land farmers using for horticulture crops in the study area are; 0.982 hectare is almonds, 0.360 grapes, 0.327 pomegranates, 0.284 plums, 0.230 figs, 0.215 apples, 0.214 peaches, 0.181 apricots, 0.167 walnuts, 0.151 cherries, and 0.133 hectares is covering pear, as shown in Table 2. Similarly, a survey conducted on value

Table 1. Socio-demographic characteristics

Variables	Producers		Intermediaries	
	Fre.	(%)	Fre.	(%)
	N=125		N=42	
Province				
Samangan	84	67.2	26	61.9
Balkh	41	32.8	16	38.1
Age				
Young (≤ 35)	33	26.4	13	31
Medium (36-50)	52	41.6	21	50
Old (≥ 51)	40	32.0	8	19
Mean \pm SD	45.13 \pm 12.06		41.44 \pm 9.76	
Education				
Illiterate (no schooling)	45	36.0	3	7.1
Islamic School	16	12.8	6	14.3
Primary school	25	20.0	7	16.7
Secondary school	13	10.4	2	4.8
High school	10	8.0	15	35.7
University	16	12.8	9	21.4
Mean \pm SD	5.40 \pm 5.61		9.43 \pm 5.34	

Table 2. Average land used under the horticulture crops (hectare)

Variety	Average	%	SD
Almond	0.982	30.271	0.778
Grapes	0.360	11.097	0.507
Pomegranate	0.327	10.080	0.255
Plum	0.284	8.755	0.263
Fig	0.23	7.090	0.184
Apple	0.215	6.628	0.16
Peach	0.214	6.597	0.183
Apricot	0.181	5.580	0.186
Walnut	0.167	5.148	0.058
Cherry	0.151	4.655	0.082
Pear	0.133	4.099	0.052
Total	3.244	100.000	0.239

chain analysis of vegetables, the average area allocated for onion was 0.42 hectares, and potato 0.3 hectares in the Oromia of Ethiopia [19].

3.3 Type of Business of the Intermediaries

The chains of intermediaries through which almond products pass from producers to final consumers comprise their marketing chain. These are alternative ways of product flows from producers to end-user, and the supply chain is the path by which specific almond products are passed from producer to final consumer, including post-harvest functions such as processing storage, and value addition [18]. The network of contractor/middleman, wholesalers,

retailers, exporter, and support services participate in the disposal of almonds supply chains operating in the study area. Hence details of the type of business were examined, and the results showed that 30% of intermediaries are contractor/middleman, 24% retailers, 16% wholesalers, and 14% exporters.

3.4 Number of the Employees in the Business

The number of employees working for intermediaries was classified into three groups as (less than or 2), (3 to 4), and (5 or above). Half of the intermediaries surveyed (50%) employed two or fewer workers, while 33.3% employed (3-4 workers) and 16.7% employed more than five workers. The average number of workers

employed by the intermediaries was calculated as 3.52, as shown in Table 3.

3.5 Business Experiences of the Intermediaries

The number of years engaging in almond trade activities would probably provide the intermediaries with better experiences and *operating knowledge about the business* they carry out. The more experiences they gain, the more knowledge they learn about the operation and opportunities for their business activities. Therefore the experiences of intermediaries regarding their duration in the business were classified into three groups. The first group included the intermediaries who had less than ten years of business experience, and they consisted of 50% of intermediaries surveyed. The second group included those intermediaries who had 11-20 years of experience, and their share was 21.4%. Finally, the last group had the highest experience with more than 20 years, and their ratio was 28.6%. The average experience with almond business activities of the traders, who participated in the survey, was 14.6 years. As can be seen from this finding, the intermediaries have quite well experience with their business. Since half of them have less than ten years of experience, it can be said that this business may attract more individuals in the future, as shown in Table 3.

3.6 Marketing Efficiency

The marketing cost-benefit efficiency is directly relating to the costs and margins for the intermediaries involved in the sector of almond distribution. If the costs and margins covered by the participation of intermediaries are lower, this marketing channel is considered as more efficient in terms of sustainable producers' livelihoods. Different methods are used to estimation of almond marketing cost-benefit efficiency channels as follows.

3.7 Price Spread

A price spread is defined as the difference between the received price and paid price by producers and intermediaries for an equivalent quantity and includes marketing costs and margins of intermediaries involved. It is expressed as the percentage of consumer's price and one of the significant measures of marketing efficiency. The price spread assumption

recommends that the lower the price spread of a marketing channel, the more efficient for farmers [13]. Table 5, showed the price spreads of different marketing channels with their prices. The price spread of channel 3 was the highest among the commercially important marketing channels with the price spread of (198.16 Afs/kg). Channel 4 was the second with the price spread of (111.00 Afs/kg), channel 1 was the third with the price spread of (40.83 Afs/kg), and channel 2 was less than those of the other three marketing channels, and the price spread of (28.73 Afs/kg).

3.8 Producers' Share in Consumer's Price

The almond producers share in consumer prices refers to the actual share or percentage of the producer in the final price paid by the consumer. As the percentage of producers share in consumer prices increases, the almond farmer would receive more percentage of consumers' price. The efficiency of marketing gives an idea about the total marketing costs and marketing margins added by the various market intermediaries of almond supply chains during the process of almond marketing. As marketing costs and margins increase, marketing efficiency will decrease, and vice versa, it means that there is an inverse relationship *between* the marketing efficiency and marketing costs and marketing margins. The almond producers and consumers are more advantages with higher marketing efficiency. Table 5, shows the producers' shares in the consumer's prices, total marketing costs, and margins accruing to the four almond marketing channels. The producers share in consumer prices is one of the significant measures of marketing efficiency, which reveals that the greater share is the higher efficiency of the channel from the farmer's point of view. The results indicate that the producers' share in channel 2 was calculated as (92.30%), channel 3 (87.24%), channel 4 (79.32%), and channel 3 (66.97%).

3.9 Marketing Cost

The cost of marketing is one of the significant indicators to determine of cost-benefit efficiency. When a marketing cost is greater than a marketing channel benefit, it is considered as inefficient. Table 4 shows that the costs incurred by different intermediaries for performing marketing tasks. The average costs incurred for

the marketing of products includes labor charges, transportation, packing material, packing and weighing, loading/unloading, telecommunication, and taxes, etc. The main average marketing costs of producers consist of labor charges (2.8 Afs), transportation (1.0 Afs/kg), packing material (0.2 Afs/kg), packing and weighing (1.7 Afs/kg), loading and unloading (0.8 Afs/kg), telecommunication (1.5 Afs/kg), and taxes (2.5 Afs/kg) respectively. The total average marketing costs incurred by the producers were (10.7 Afs/kg). The marketing cost for middleman and local traders were calculated as labor charges 3.3 Afs/kg, transportation 2.1 Afs/kg, packing material 0.3 Afs/kg, packing and weighing 1.4 Afs/kg, loading and unloading 0.9 Afs/kg, telecommunication 2.0 Afs/kg, and in taxes 2.5 Afs/kg respectively. The total average marketing

costs incurred in this channel were 12.5 Afs/kg. In the case of wholesaler marketing costs constituted the labor charges (6.2 Afs), transportation (4.6 Afs/kg), packing material (0.7 Afs/kg), packing and weighing (2.7 Afs/kg), loading and unloading (1.9 Afs/kg), telecommunication (6.0 Afs/kg), and taxes (2.5 Afs/kg) respectively. The total average marketing costs in the wholesaler channel were 24.6 Afs/kg. Regarding the retailer (Mandvi and Shops), channel marketing costs consisted of the labor charges (6.1 Afs/kg), transportation (11.5 Afs/kg), packing material (1.3 Afs/kg), packing and weighing (5.9 Afs/kg), loading and unloading (6.5 Afs/kg), telecommunication (8.0 Afs/kg), and in taxes (6.8 Afs/kg) respectively. The total average marketing costs in the exporter channel were 52.3 Afs/kg (Table 4)

Table 3. Socio-economic characteristics of intermediaries

Variables	Frequency	(%)
	N=42	
Type of business		
Contractor/middleman	15	30.0
Retailer	12	24.0
Wholesaler	8	16.0
Exporter	7	14.0
Number of the employees in the business		
≤2	21	50.0
3-4	14	33.3
≥5	7	16.7
Mean ± SD	3.52 ± 3.19	
Experiences in the business (Years)		
≤10	21	50.0
11-20	9	21.4
≥21	12	28.6
Mean ± SD	14.59 ± 9.74	

Table 4. Intermediaries marketing in different channels (Afs/Kg)

Variables	Particulars				
	Producer	Middlemen (village traders, agents)	Wholesaler	Retailer (Mandvi and Shops)	Exporter
Labor charges	2.8	3.3	6.2	6.1	12.3
Transportation	1.0	2.1	4.6	5.2	11.5
Packing material	0.2	0.3	0.7	0.9	1.3
Packing and weighing	1.7	1.4	2.7	3.7	5.9
Loading/unloading	0.8	0.9	1.9	2.9	6.5
Telecommunication	1.5	2.0	6.0	6.1	8.0
Taxes etc.	2.5	2.5	2.5	3.6	6.8
Total	10.7	12.5	24.6	28.5	52.3

3.10 Marketing Margin

The term of marketing margin refers to the income earned by marketing agencies and market intermediaries involved in marketing a product. In this study, the marketing margin is the profit accrues to the supply chain trader in the process almond supply, and it is the difference between the prices of two successive supply chain intermediaries in the market [12]. It is one of the significant measures of marketing efficiency. Almonds are move from the farm gate to the consumption through four main channels. The margins of intermediaries are used as an indicator to measure marketing efficiency. A higher margin indicates a lower channel of marketing efficiency and vice versa. The results reveal that the total marketing margin of channel 3 was higher than other channels with the margin of (169.65 Afs/kg), channel 4 with the margin of (58.65 Afs/kg), channel 1 with the margin of (28.33 Afs/kg), and channel 2 with the margin of (4.13 Afs/kg), as shown in Table 5.

The cost-benefit of marketing efficiency on the four channels was estimated via the Acharya and Aggarwal approach. The approach reveals that are, the higher the resulting ratio, the higher and the efficiency of the marketing channel in terms of cost benefits. The results show that the efficiency of the channel 2 was higher than the

other three channels with the efficiency of (11.17), channel 1 (6.53), channel 4 (3.36), and channel 3 with the efficiency of (1.88). Also, the net price received by farmers on channel 3 and channel 4 is greater than the other two channels (373.33 Afs/kg). Similarly, [13] found that the marketing efficiency of channel 2 is greater than the other channels where the traders purchased their products at the orchard gate. The greater efficiency of channel 2 may be mainly due to the higher prices received by middleman and local traders in that channel, unlike the cases of wholesaler market, retailer (Mandvi and shops), and exporter channels. By the way, the differences in the marketing efficiency among channels are very high, as shown in Table 6.

The cost-benefit marketing efficiency of various channels was estimated via the Shepherd approach. This approach indicates that the higher resulting ratio is the higher efficiency of the marketing channel in terms of cost benefits. Table 7, showed that the marketing efficiency of channel 1 middleman and local traders are very higher than the other three channels (24.60), channel 3 (20.05), channel 2 (14.18), and channel 4 (9.25). The result can be related not only to the high prices paid by middleman and local traders but also to the less number of intermediaries involved in channel 1.

Table 5. Producer shares, price spreads, total marketing cost and total marketing margins (Afs/kg)

Particulars	(Middlemen) village	Wholesaler	Retailer (Mandvi	Exporter
	traders, agents)	Market	and Shops)	
	Channel 1	Channel 2	Channel 3	Channel 4
Producer price	279.17	344.6	401.84	425.67
Consumers price	320.00	373.33	600.00	536.67
Price spread	40.83	28.73	198.16	111.00
Total marketing cost	12.5	24.6	28.51	52.34
Total marketing margin	28.33	4.13	169.65	58.65
Producers share	87.24	92.30	66.97	79.32

Table 6. Marketing efficiency under Acharya and Agawam's method

Particulars	Marketing Channels			
	Channel 1	Channel 2	Channel 3	Channel 4
Total marketing cost	12.50	24.60	28.51	52.34
Total marketing margin	28.33	4.133	169.65	58.65
Net price received by farmers	266.66	320.00	373.33	373.33
Marketing efficiency	6.53	11.17	1.88	3.36
Marketing efficiency index	653	1117	188	336

Note: (1) Average prices, costs, and margins were calculated in Afs/kg. (2) Net price = the price received by farmers' - farmers' marketing costs

Table 7. Marketing efficiency under Shepherd's method

Particulars	Marketing Channels			
	Channel 1	Channel 2	Channel 3	Channel 4
Total marketing cost	12.50	24.60	28.51	52.34
Consumers price	320.00	373.33	600.00	536.67
Marketing efficiency	24.60	14.18	20.05	9.25

4. CONCLUSIONS AND RECOMMENDATION

Afghanistan almonds are large potential for the development and efficiency of almond marketing in the study area. Almond producers derive the least benefit from their products due to the unavailability of direct selling options on the markets by limiting the involvement of the contractors/middlemen due to the lack of access to financial resources. Therefore, innovation does not have a chance to increase the efficiency of the business. The production process has remained the same for centuries in these regions without using technology, modern machinery, and irrigation systems, and techniques to make better use of cultivation areas. Poor infrastructure in these areas, such as lack of electricity, paved roads for careless access to quality pesticides, and education related to agriculture, remain the main challenge of almonds production in the study areas. The intermediaries markets in major cities are the essential links in the almonds channels, which is characterized by a diversity of relatively smooth and non-specialist actors. It is the part where all of these intermediaries receive a large portion of the profit from the almonds business in the study areas. The market provides the physical space where farmers, traders, and retailers come together in the largest volumes. Although some players are bypassing the intermediaries market, it is clear that the main tendencies of the Kabul and Mazar-e-sharif almonds market are determined within the boundaries of the wholesale markets. The intermediaries should be effectively linked to the existing financial institutions in the study area and the whole state for providing of lending facilities to these stakeholders in terms of loans and microcredit as well as technical support such as business plan development, financial management, project management, bank credit regulation, credit repayment, and record-keeping for stakeholders to enhance their business performance.

The recommendations for farmer to grading and quality control activities should be carried out, which should include establishing a quality

specification for almonds and implementation of grading programs and operating inspection systems. And the Afghanistan almond industry should create a brand name for the almond varieties in order to differentiate from other almonds in the market and make investments in promoting to the other countries.

CONSENT

As per international standard or university standard guideline participant consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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