

An Integrated Investigation into the Socioeconomic Factors Threatening Crop Marketing: A Comparative Study on Faryab Province of Afghanistan and the Sistan Region of Iran

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Abstract

The income and livelihood of most rural families in Iran and Afghanistan depend on the agricultural sector. This sector is the most significant source of employment in these countries. However, crop marketing is in inferior condition in these countries. The present research's primary goal is to explore and identify the most important barriers and problems of crop marketing in Iran and Afghanistan. The research is an applied study in goal and uses a mixed-method (qualitative and quantitative). The data collection instrument was a questionnaire filled by experts in Faryab province Afghanistan and experts in Iran's Sistan region. So, a total of 40 Afghan and Iranian experts were asked to fill out the questionnaire. The Afghan experts included academic teachers and the senior employees of agriculture, irrigation, and finance and the Iranian experts included academic teachers and the employees of the Agriculture Jihad Organization. The fuzzy SAW technique was used in MCDMsolver 2018 for modeling. The results are presented with reasoning from the perspectives of the Iranian and Afghan experts. The results as to the opinions of 20 Iranian experts and 20 Afghan experts about eight criteria and 40 sub-criteria were divided into different steps and were analyzed with tables and graphs. From the viewpoint of the Iranian experts, the sub-criteria of 'insufficient infrastructure facilities' with a weight of 2.574, 'abuse of brokers and intermediaries in reducing crop prices' with a weight of 2.508, 'lack of supporting financial institutions with a weight of 2.444, 'lack of capital and credit' with a weight of 2.409, and 'the difference between on-farm crop prices and market prices' with a weight of 2.371 were the first to fifth most important challenge, respectively and the sub-criterion of 'mass media coverage with a weight of 0.066 was ranked the last. Nevertheless, the Afghan experts ranked 'lack of capital and credit' with a weight of 2.574, 'lack of supporting financial institutions with a weight of 2.508, 'the difference between on-farm crop prices and market prices' with a weight of 2.443, 'abuse of brokers and intermediaries in reducing crop prices' with a weight of 2.409, and 'insufficient infrastructure facilities' with a weight of 2.376 from the first to the fifth, respectively. They put 'failure to pre-purchase crops by the government' in the last rank.

Keywords: Afghanistan, Crop Marketing, Iran, Socioeconomic Factors

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Introduction

In the present world, the production of commodities/services aims to sell them in the market. As long as a commodity is not sold, its production will not be economical. On the other hand, given the globalization of the economy and the growing orientation of the economy towards integration and competitiveness, and in practice, the expansion of markets, commodity suppliers, including the suppliers of agricultural products, have no way but to know the science of marketing management fully. So, experts should know and understand crop management since they can perform the tasks they are responsible for in the best possible way so that they can win a better position in the supply of agricultural products and sustain it considering that there are, presently, robust competitors for the supply of these products in the domestic and international markets (Karbasi, 2008; Pakrooh et al., 2021).

An essential need of farmers is to understand and develop marketing programs for their products and services. The concept of marketing has been looked upon as a business activity, a thinking paradigm, a commercial target, an economic process, a transaction process, a demand and supply modulation process, and so on (Sanaei, 2007; Nabi Bidhendi et al., 2021). So, the fast growth of crop production and marketing requires the use of the achievements of agriculture science and technology to expand the production and commercial capacity of the countries (Fazl, 2015).

Since agricultural products are perishable and cannot be kept in the marketing channel for a long time, it is necessary to process them and supply them for consumers' consumption as soon as possible (Taleghani, 1991). Some main problems of crop production and marketing in developing countries are the low literacy and skill level and crop perishability (Amini and Ramazani, 2001; Kiani et al., 2019). The incorrect communication network has caused main items to be possessed by mediators and brokers so that producers incur serious social, economic, and local injuries (Tavasoli et al., 2007). The significant difference between on-farm crop prices and the consumers' prices is a source of dissatisfaction of both producers and consumers (Mortazavi and Fallahi, 2008). Rural people have long been suffering from marketing problems and the involvement of mediators, local profiteers, and middlemen (Khalilian, 2010). The various problems and challenges in the markets reveal a series of turmoil and disorders in agricultural and livestock products (Firouzabadi & Hosseini, 2011). On the one hand, the decline of agricultural production and the population growth and growing demand for these products have caused the failure to respond to the demands. Agricultural production is declining in inattention to crop marketing (Karani et al., 2014; Sardar Shahraki et al., 2018).

The critical political, economic, and technology barriers are recognized as the main marketing threats of agricultural entrepreneurs. Examples include weak pricing system, unorganized markets, the lack of access to markets and information, the shortage of local infrastructures, crop perishability, the lack of adequate capital for activities, low quality of agricultural products, the lack of recognition of customer and consumer demands, and the lack of expertise and skill in marketing (Ghambarali et al., 2015; Sardar Shahraki et al., 2019).

Marketing refers to a set of human activities aimed at satisfying people's requirements through the trade of commodities (Gaedeke and Tootelian, 1983). Unfortunately, most entrepreneurs do not place adequate importance on the marketing activities and instead focus on production, supply, and services, ignoring marketing activities (Laluran, 1991). After production, the main issue is the transfer of the commodity to the market and consumers to meet the demands of the growing population of urban communities (Dixie, 1991). Crops usually lose their quality due to non-technical and unscientific storage, which brings about problems for marketing activities (Meidani, 1994). Establishing a correct communication system or channel between producers and consumers will contribute to the success of the marketing of agricultural products, which is impossible without an efficient and all-inclusive system

(Crowfora, 1997). A reason for entrepreneurs' failure is the lack of marketing knowledge, which challenges crop marketing and causes crop quality loss, which threatens the effectiveness of marketing (Longenecker et al., 1999).

Crop quality is an index of marketability, so that low quality causes marketing problems (Katler and Armestrang, 2000). After harvesting, a part of the crop is perished in the marketing channel due to mismanagement, and the crop loses its quality. The first step in market identification and marketing development is gaining knowledge about customers and competitors in the market so that the producer can estimate its capability based on the customers' intentions and demands (Westerlund and Leminen, 2011). The lack of infrastructure impairs crop marketing, resulting in crop quality loss (White, 2012). A reason for the low quality of crops, which reduces their prices, is inattention to their marketing (Atelaet et al., 2016). Post-harvest wastage of crops and foodstuffs is common in developed and developing countries (Ali and Kumar, 2011). To reduce post-harvest wastage and increase crop collection from the farm, farmers need knowledge on crop storage, transport, and processing on the one hand and crop marketing (Schroeder et al., 1998). Farmers' decision on on-farm crop sale or their transport to the market depends on various factors, e.g., farm size, capital size, transport facilities, and knowledge of the market. Since the main activity in the rural areas of developing countries is often farming, agriculture is of vital significance due to its impact on employment, poverty alleviation, income generation, and food security of rural households (Fafchamps and Hill, 2005).

Regarding the importance of crop marketing in developing countries, it can be said that knowledge and awareness provided by marketing can significantly contribute to predicting crop sales, selecting an appropriate market for the crop, and pricing the crop properly (Thackeray and Brown, 2010). Accordingly, the present paper aims to

- Identify the most important factors threatening crop marketing in Afghanistan and Iran,
- Prioritize the challenges of crop marketing in Afghanistan and Iran,
- Compare crop marketing activities between Iran and Afghanistan and inform their strengths to one another, and
- Resolve the barriers and challenges to help the prosperity of crop marketing activities in these two countries.

Iran and Afghanistan are two developing countries struggling with many problems in crop marketing. Some of these challenges can be enumerated as the lack of local infrastructure, the lack of knowledge as to the market, the lack of crop processing industries, the lack of appropriate storage, the low on-farm price of crops, the dispersion of crops, and the lack of transportation roads. This research tries to identify the challenges of crop marketing in developing countries, focusing on the selected site (Faryab province in Afghanistan and the Sistan region in Iran) and propose some constructive recommendations to solve them.

Kabiri and Bazandeh (2010) investigated the status and bottlenecks of crop marketing in Iran. They conclude that increasing crop production and expanding markets, mainly supply surplus to demand, are significant issues in developing countries' economic management, especially at the level of rural communities. According to Fazeli and Moghadasi (2007), crop producers need production factors, technology, and others to perform better in their activities. Piri et al. (2007) argue that population growth, urbanization, an increase in marketing services, the emergence of industries, and an increase in the demand for raw agricultural material are factors that increase the importance of crop marketing over time. Najafi and Farajzadeh (2010) report that producers and consumers are faced with marketing problems and the involvement of brokers and middlemen in the market. Firouzabadi and Hosseini (2011) conducted a study on identifying the factors influencing crop marketing success. They conclude that various economic, structural, cultural, and social factors are influential in this process's success. According to Ghambarali et al. (2015), agricultural entrepreneurs suffer from many

economic, political, and technical obstacles and problems when they come to crop marketing. Anabestani and Tolabi (2019) investigated the challenges of crop marketing in Pol Dokhtar County, Iran using the fuzzy analytic network process and found that among the five challenges of crop marketing, the lack of physical infrastructure (0.316), cultural barriers (0.217), and market structure (0.174) were the most significant obstacles, respectively. Sharifi and Mehdizadeh Raini (2019) conducted a research study to identify and analyze agricultural cooperatives concerning crop marketing and revealed that political, economic, sociocultural, and technological factors influenced crop cooperatives' success in crop marketing in Jiroft County, Iran positively and significantly.

Deshpande and Zaltman (1982) report that four factors are influential on the use of market research information. They include organizational structure, technical quality, ability to act, and manager interaction. Longenecker et al. (1999) state that the lack of market knowledge and information on how to price crops in the market and consumer demands is the major challenge of crop marketing for entrepreneurs. Skuse (2001) argues that information and communication technology (ICT) is significant in empowering rural people, boosting businesses, and alleviating poverty in rural communities. In a similar study in Bangladesh, Heeks (2002) explored the effect of using and expanding information technology among agrarian rural communities. They found that information technology was influential on rural farmers' economic status and contributed to their welfare. Westlake (2002) attributed the low growth rate, productivity, and income of the agricultural sector in African countries to the lack of new inputs. Besides, Jayne et al. (2003) state that the use of new production factors, particularly chemical fertilizers, was dramatically increased in post-1980s Ethiopia. Kelly et al. (2003) analyzed the effect of production factor market development in Sub-Saharan countries. They found that if adequate investment were not made in infrastructure reinforcement, the development of input use policies, including input subsidization, credit distribution, and the implementation of input redistribution programs, would not be useful enough.

According to Rahman (2003), crop suppliers in Bangladesh have a wrong perception of their crop prices due to remoteness from the crop market and the lack of access to market information. Rana and Astuti (2003) researched the crop marketing system in Indonesia. They concluded that due to the lack of a marketing information system, the producers could not get market information on prices, supply, and demand. Musa et al. (2013) addressed the main barriers to crop production in Nigeria and reported that the unavailability of credits and infrastructure was the main reason for the crop marketing challenges in this country. Ness et al. (2010) state that the factors underpinning consumer requirements include satisfaction with crop quality, proper marketing, and compliance with organic crop production principles and practices. Based on Sexton (2011), most agricultural cooperatives focus on one or some crops in the agricultural market. Alibaygi et al. (2011) argue that ICT centers have a significant and positive effect on increasing rural people's revenues, employment percentage, agricultural information dissemination among farmers, and e-commerce. As well, Overa (2006) reports that farmers' use of mobile/smartphones can improve crop marketing activities, reduce food wastage, and decrease crop price fluctuations. According to White (2012), the removal of the barriers and challenges of crop marketing can enhance rural families' income and their capacities, comfort, welfare, and life quality.

Khodakarami and Chan (2013) studied the factors influencing the use of marketing information systems. They revealed that system integration, flexibility, and ease of learning were the most critical attributes for the system's quality. Marmullaku and Ahmeti (2015) investigated the factors affecting marketing strategies in a company. They found that pricing strategies, marketing path structure, and advertisement were the practical tools for access to customers and developing a strategy for a sustainable company. Kumar (2015) studied the role of marketing in agricultural production in India and concluded that the lack of physical facilities

and infrastructure, the loss of farmers' belief in financial and loan-giving institutes, the long path of marketing, and the lack of information and modern technology were the main challenges of crop marketing in India. Elias (2015) examined the communication tools for the preservation of farmers' cooperation. He found that various communication tools were necessary to maintain farmers' cooperation and satisfaction to influence the sustainability of promotion and development programs. Taleghani (2016) addressed the effect of farmers' participation in decision-making and reported that this participation could positively increase their cooperation and commitment, resulting in their satisfaction.

Research Innovation

Given the importance of crop marketing in Iran and Afghanistan, which can increase the income of rural families (crop producers), thereby contributing to the economic growth of these two countries, and the fact that previous research has emphasized the significance of crop marketing, this research investigates crop marketing in these two countries simultaneously for the first time. The study aims to identify and prioritize crop marketing factors in these two countries and propose some comprehensive solutions. So, it can be claimed that the research has the required contributions.

Material and Methods The variables used in the study include physical and infrastructure problems, financial and economic problems, pricing systems, market and information barriers, crop properties, cultural barriers, extension barriers, and production challenges, each with its sub-criteria. Table 1 present the criteria (O) and sub-criteria (C).

Data Collection Method and Instruments

Given the research goals and model, the data required were collected from Afghanistan and Iran experts using a questionnaire. The questionnaire was filled in two stages. At first, the questionnaires were administered to the experts to be filled out. Then, the items in higher ranks were identified to be included in the second stage questionnaire, which was administered online. To ensure the accuracy and comparability of the results, the experts were divided into Afghan experts and Iranian experts. Forty experts from Afghanistan and Iran completed the questionnaires.

The Afghan experts were selected from the academic teachers and the managers of the agricultural, financing, and irrigation, and the Iranian experts from the academic teachers and the Agriculture Jihad Organization employees. The fuzzy SAW technique was employed for modeling in the MCDM solver 2018 software package.

Materials and methods

This is one of the oldest methods used in MADM so that assuming the vector W (the important weights of attributes) for them, the best alternative is calculated as below (Asgharipour 2002):

$$A^* = \left\{ A_i \mid \max_i \frac{\sum_j w_j \cdot r_{ij}}{\sum_j w_j} \right\} \quad (1)$$

And if $\sum_j^n w_j = 1$, we have:

$$A^* = \left\{ A_i \mid \max_i \sum_j w_j \cdot r_{ij} \right\} \quad (2)$$

Table 1. Criterion and sub-criteria used in the study

Criteria	Sub-criteria	Code
Physical and infrastructure problems	1. Insufficient infrastructure facilities	C1
	2. Long marketing path	C2
	3. Lack of interest in innovation and new technologies	C3
	4. Lack of geographical access to the sales market	C4
	5. Inactivity of the National Office of Norms and Standards and Quality Control	C5
Financial and economic problems	6. Lack of capital and credit	C6
	7. Lack of access to banking facilities to purchase production factors	C7
	8. Inflation of crop prices	C8
	9. Lack of supporting financial institutions	C9
Pricing system	10. Abuse of brokers and intermediaries in reducing crop prices	C10
	11. Same price of organic crops with low-quality crops	C11
	12. Price fluctuations in the market	C12
	13. Failure to pre-purchase crops by the government	C13
	14. The difference between on-farm crop prices and market prices	C14
Market and information barriers	15. Lack of foreign markets	C15
	16. Existence of intermediaries and brokers	C16
	17. Improper distribution network	C17
	18. Lack of training and information on crop marketing	C18
	19. Lack of information and awareness of consumer status, crop prices, and supply market	C19
	20. Cultivation without considering market demands	C20
	21. Insufficient knowledge in market and crop marketing management	C21
Crop properties	22. Unawareness of the right time of crop harvesting	C22
	23. Low quality of agricultural products	C23
	24. Crop type (freshness, perishability, large volume, and thinness)	C24
	25. Seasonality of agricultural products	C25
Cultural barriers	26. Lack of awareness of farmers	C26
	27. Illiteracy of farmers	C27
	28. Lack of training of farmers	C28
	29. Lack of sufficient non-governmental organizations (NGOs)	C29
Extension barriers	30. Lack of training classes	C30
	31. Mass media coverage	C31
	32. Existence of marketing associations	C32
	33. Transferring marketing methods to the region and individuals	C33
Production challenges	34. Lack of recognition and analysis of consumer demands and behaviors	C34
	35. Lack of farmers' timely access to quality production factors	C35
	36. Small farm size and crop diversity	C36
	37. The dominance of traditional farming practices and limited production surplus	C37
	38. Subsistence farming	C38
	39. Farmers' non-compliance with production standards based on marketing criteria	C39
	40. Crop trade-in unsuitable routes to avoid customs tariffs	C40

This method needs similar scales and/or “dimensionless” measurements so that they can be compared to one another (Asgharipour. 2002). The ideal in the SAW method is that the weights w_j can be an estimate of final utility and also use a linear utility function in problem-solving given the summability conditions. The ISAW method introduced by Kornbluth uses the ranking of the alternative to estimate appropriate w_j 's provided there is a linear (but unknown) utility function. This estimation is based on the following premises (Asgharipour. 2002):

A. Assuming the linearity of the utility function, the alternative A_j is preferred to A_{i+1} if:

$$\sum_j w_j \cdot r'_{A_j} > \sum_j w_j \cdot r'_{A_{i+1}} \rightarrow \sum_j w_j \cdot r'_{ij} > \sum_j w_j \cdot r'_{(i+1)j} \tag{3}$$

And as a vector:

$$\begin{aligned} \underline{w}'(\underline{r}'_i - \underline{r}'_{i+1}) > \circ \\ \underline{w} \in W = \{ \underline{w} \mid \sum_j w_j = 1 \quad ; \quad w_j > \circ \} \end{aligned} \tag{4}$$

B. If α is a permutation of m existing alternatives $a=(A_1, A_2, \dots, A_i, A_{i+1}, \dots, A_m)$ that shows them in the order of preference and $\alpha(i)$ represents the alternative in the i th locus of the order presented in the permutation, then we will have for each consecutive pair of permutation with $(m-1)$ unequal relations for each pair of the alternatives:

$$\begin{cases} \underline{w}'(\underline{r}'_{\alpha(i)} - \underline{r}'_{\alpha(i+1)}) > \circ \quad ; \quad i = 1, 2, \dots, m-1 \\ \underline{w} \in W_a \quad ; \quad W_a = \{ \underline{w} \mid \underline{w} \in W \} \end{cases} \tag{5}$$

Any vector from $\underline{w} \in W_a$ that can satisfy the order existing in the permutation of α (i.e. hold true for the above $(m-1)$ inequalities) should be neutral to DM too provided the order of preferences in α is accepted by DM. So, if $\underline{w} \in W_a$ is accepted by DM, then the DM should accept the orders of α as a preferred order. The ISAW method is so that DM can change α to achieve the optimal order α^* and its corresponding \underline{w} (in which case the space $W_a \in W$ will be created too) (Asgharipour. 2002).

C. The preference order in the permutation of α should be practical. It will be impractical if one of the corresponding constraints as below is satisfied:

$$(\underline{r}'_{\alpha(i)} - \underline{r}'_{\alpha(i+1)}) < \circ \quad ; \quad i = 1, 2, \dots, m-1 \tag{6}$$

Even if a single element of the set of constraints corresponding to the inequalities is satisfied as described above, no \underline{w} vector can create the order of α because the dominated alternative cannot have a rank higher than the dominating alternative and only the alternatives for effective pairs can be ranked in order due to the presence of different \underline{w} . The set of the key of practical orders of α cause a partition of W as below:

$$W = \cup_a W_a \tag{7}$$

$$W_a \cap W_{a'} = \phi \quad ; \quad a \neq a' \tag{8}$$

In defining W_a , it is only necessary to consider the constraints formed by adjacent pairs of the elements existing in α . So, the set of W_a is specified by the set of corresponding linear constraints, and especially the requirements arising from the constraints (Asgharipour. 2002).

D. It is assumed that A_K and A_I are two adjacent alternatives of the existing order of α and that the constraint is satisfied obligatorily (equality):

$$\begin{cases} \underline{w}'(\underline{r}_k - \underline{r}'_1) \geq 0 \\ \underline{w} \in W_\infty \end{cases} \quad (9)$$

Then, the change in preference from $1 < K$ in α to $1 > K$ in $\acute{\alpha}$ is equivalent to the movement from the space W_a to the adjacent space $W\acute{a}$ over the borderline specified by the corresponding obligatory constraints, and if α is practice, $\acute{\alpha}$ will be practical too. Consequently, this allows DM to change the order of A_K and A_I in α and thereby improve the permutation order to prefer α . By correcting the order of alternative only related to the obligatory constraints, permutation will be feasible and the process will converge to the preferred answer (Asgharipour. 2002). Thereby, it considers the set W_a derived from the following system:

$$A_a \cdot W \geq 0 \quad (10)$$

$$\sum_{j=1}^n w_j = 1 \quad (11)$$

$$w_j \geq 0 \quad (12)$$

Then, the border W_a is specified by the obligatory rows for each value of \underline{w} and consequently, a subset $\{w\}$ is formed.

To reach the border W_a , the value of the objective function in the following linear programming should be set to zero (Asgharipour. 2002):

$$\begin{aligned} \text{Min} & : A_{a(i)} \cdot W \\ \text{S.t} & : A_a \cdot W \geq 0 \\ & \sum_{j=1}^n w_j = 1 : z \\ & w_j \geq 0 \quad ; \quad j = 1, 2, \dots, n \end{aligned} \quad (13)$$

F. Since we usually have $m > n$, the above linear programming dual is used to solve it i.e:

$$\begin{aligned} \text{Max} & \quad Z \\ \text{S.t:} & \quad A_a^t \cdot y + Z \cdot \underline{1} \leq A_{a(i)}^t \\ & \quad \underline{1} = \mathbf{1}_{n \times 1} \\ & \quad y \geq 0 \quad ; \\ & \quad y^t = \{y_1, \dots, y_{m-1}\} \end{aligned} \quad (14)$$

If this problem has a practical solution with $z=0$, then the row $A_{a(i)}$ will represent an obligatory constraint for W_a and its corresponding pair $\{a(i).a(i+1)\}$ will represent an obligatory pair (Asgharipour. 2002).

Results of Iranian Experts

Round 3: Weight assignment to dimensionless matrix from the perspective of Iranian experts

At this stage, the weight assignment model to the dimensionless matrix composed of 8 criteria and 40 sub-criteria was analyzed. The sub-criterion C1 from the criterion of physical

and infrastructure problems in the table of weight assignment to the dimensionless matrix (Table 2) had a low level of 0.297, a medium level of 0.33, and a high level of 0.33. Against the financial and economic criterion, this sub-criterion had a low level of 0.297, a medium level of 0.33, and a high level of 0.33. The same results were obtained for this sub-criterion concerning the criteria of pricing system, market and information barriers, crop properties, cultural barriers, extension barriers, and production challenges.

Based on the table of weight assignment to the dimensionless matrix (Table 2), the sub-criterion C2 against the criterion of physical and infrastructure problems had low, medium, and high levels of 0.168, 0.234, and 0.299, respectively. It is low, medium, and high levels against financial and economic problems were 0.165, 0.231, and 0.297, respectively. On the other hand, C2, against the pricing system, attained low, medium, and high levels of 0.231, 0.297, and 0.33, respectively. As is evident in table 2, these values for C2 against the criterion of market and information barriers were 0.106, 0.173, and 0.238, respectively. The sub-criterion of C39 against the physical and infrastructure problems had a low level of 0, a medium level of 0.033, and a high level of 0.099. Low, medium, and high levels of C40 against the physical and infrastructure problems were 0, 0.033, and 0.099, respectively.

Calculation of final scores

Table 3 presents the final scores assigned to the sub-criteria by the Iranian experts. According to this table, the sub-criterion of C1 (insufficient infrastructure facilities) was ranked first with a score of 2.574, and C10 (abuse of brokers and intermediaries in reducing crop prices) was ranked second with a score of 2.508. The third, fourth, and fifth ranks were assigned to C9 (lack of supporting financial institutions) that was scored 2.444, C6 (lack of capital and credit) that was scored 2.409, and C14 (the difference between on-farm crop prices and market prices) that was scored 2.371, respectively.

The sub-criterion of C25 (seasonality of agricultural products) was assigned with a score of 1.449 and was ranked 15th. It is seen that the 16th rank is for C29 (lack of sufficient non-governmental organizations (NGOs)) with a final score of 1.32. C20 (cultivation without considering market demands) was scored 0.99 and was ranked 20th.

At the bottom of the table, we observed C33 (transferring marketing methods to the region and individuals) with a score of 0.338, ranked 30th. At lower ranks, we have C23 (low quality of agricultural products) with a score of 0.167 at 35. The final ranks of 39 and 40 were assigned to C17 (improper distribution network) with a score of 0.099 and C31 (mass media coverage) with a score of 0.066, respectively.

Results of Afghan Experts

Round 3: Weight assignment to dimensionless matrix from the perspective of Afghan experts

At this phase, the weight assignment model to the dimensionless matrix composed of 8 criteria and 40 sub-criteria was analyzed. The results are presented in table 4. It is observed that the sub-criteria C1 in the criterion of physical and infrastructure problems had low, medium, and high levels of 0.297, 0.33, and 0.33, respectively. The same values were obtained for the low, medium, and high levels of this sub-criterion against financial and economic problems. The values calculated for the low, medium, and high levels of this sub-criterion against pricing system, market and information barriers, crop properties, cultural barriers, extension barriers, and production challenges were 0.231, 0.297, and 0.33, respectively.

Table 2. Weight assignment to dimensionless matrix

Weighted matrix	O1	O2	O3	O4	O5	O6	O7	O8
C1	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)
C2	(0.168,0.234,0.299)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.106,0.172,0.238)	(0.162,0.228,0.294)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C3	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.228,0.294,0.328)	(0.168,0.234,0.299)	(0.228,0.294,0.328)	(0.168,0.234,0.299)	(0.228,0.294,0.328)	(0.168,0.234,0.299)
C4	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.172,0.238,0.3)	(0.224,0.29,0.327)	(0.228,0.294,0.328)	(0.112,0.178,0.243)	(0.158,0.224,0.29)	(0.162,0.228,0.294)
C5	(0.231,0.297,0.33)	(0.102,0.168,0.234)	(0.115,0.182,0.248)	(0.162,0.228,0.294)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C6	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.294,0.328,0.33)	(0.234,0.299,0.33)	(0.234,0.299,0.33)	(0.231,0.297,0.33)	(0.234,0.299,0.33)	(0.29,0.327,0.33)
C7	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.224,0.29,0.327)	(0.172,0.238,0.3)
C8	(0.165,0.231,0.297)	(0.162,0.228,0.294)	(0.106,0.172,0.238)	(0.162,0.228,0.294)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C9	(0.297,0.33,0.33)	(0.294,0.328,0.33)	(0.254,0.309,0.33)	(0.28,0.322,0.33)	(0.234,0.299,0.33)	(0.277,0.32,0.33)	(0.238,0.3,0.33)	(0.241,0.302,0.33)
C10	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.29,0.327,0.33)	(0.267,0.315,0.33)	(0.254,0.309,0.33)	(0.257,0.31,0.33)	(0.284,0.323,0.33)
C11	(0.297,0.33,0.33)	(0.168,0.234,0.299)	(0.231,0.295,0.328)	(0.294,0.328,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)
C12	(0.165,0.231,0.297)	(0.162,0.228,0.294)	(0.102,0.168,0.234)	(0.165,0.231,0.297)	(0.106,0.172,0.238)	(0.158,0.224,0.29)	(0.102,0.168,0.234)	(0.162,0.228,0.294)
C13	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.102,0.168,0.234)	(0.099,0.165,0.231)	(0.109,0.175,0.241)	(0.158,0.224,0.29)	(0.162,0.228,0.294)
C14	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.294,0.328,0.33)	(0.231,0.297,0.33)	(0.228,0.294,0.328)	(0.231,0.297,0.33)
C15	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.036,0.102,0.168)	(0.086,0.152,0.218)	(0.043,0.109,0.175)	(0.033,0.099,0.165)	(0.046,0.112,0.178)	(0.036,0.102,0.168)
C16	(0.036,0.102,0.168)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.04,0.106,0.172)	(0.046,0.112,0.178)	(0.056,0.122,0.188)	(0.053,0.119,0.185)	(0.036,0.102,0.168)
C17	(0,0.031,0.096)	(0,0.002,0.036)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C18	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0,0.033,0.099)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)
C19	(0,0.033,0.099)	(0,0.012,0.056)	(0,0.007,0.046)	(0,0.007,0.046)	(0,0.007,0.046)	(0,0.002,0.036)	(0,0,0.033)	(0,0.002,0.036)
C20	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.036,0.102,0.168)	(0.04,0.106,0.172)	(0.086,0.152,0.218)	(0.036,0.102,0.168)
C21	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)

Table 2. Weight assignment to dimensionless matrix

Weighted matrix	O1	O2	O3	O4	O5	O6	O7	O8
C22	(0,0.033,0.099)	(0,0.01,0.053)	(0,0.015,0.063)	(0,0.012,0.056)	(0,0.012,0.056)	(0,0.01,0.053)	(0,0.003,0.04)	(0,0.005,0.043)
C23	(0,0.033,0.099)	(0,0.008,0.05)	(0,0.015,0.063)	(0,0.015,0.063)	(0,0.01,0.053)	(0,0.013,0.059)	(0,0.003,0.04)	(0,0.003,0.04)
C24	(0,0.033,0.099)	(0,0.01,0.053)	(0,0.012,0.056)	(0,0.003,0.04)	(0,0.025,0.082)	(0,0.02,0.073)	(0,0.026,0.086)	(0,0.003,0.04)
C25	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.102,0.168,0.234)	(0.099,0.165,0.231)	(0.152,0.218,0.284)	(0.102,0.168,0.234)	(0.102,0.168,0.234)
C26	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.096,0.162,0.228)	(0.04,0.106,0.172)	(0.102,0.168,0.234)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)
C27	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C28	(0.002,0.036,0.102)	(0,0.008,0.05)	(0.002,0.035,0.099)	(0,0.021,0.076)	(0,0.026,0.086)	(0,0.012,0.056)	(0,0.028,0.089)	(0,0.002,0.036)
C29	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C30	(0.003,0.04,0.106)	(0.002,0.036,0.102)	(0.023,0.079,0.145)	(0.002,0.035,0.099)	(0.002,0.033,0.096)	(0,0.028,0.089)	(0.002,0.015,0.059)	(0,0.031,0.096)
C31	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C32	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.03,0.092)	(0,0.023,0.079)	(0,0.016,0.066)	(0,0.02,0.073)	(0,0.021,0.076)	(0,0.021,0.076)
C33	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0.007,0.046,0.112)	(0.018,0.069,0.135)	(0.007,0.046,0.112)	(0.002,0.036,0.102)	(0,0.033,0.099)
C34	(0.028,0.089,0.155)	(0.028,0.086,0.149)	(0.028,0.087,0.152)	(0.028,0.086,0.149)	(0.028,0.087,0.152)	(0.028,0.086,0.149)	(0.028,0.087,0.152)	(0.028,0.084,0.145)
C35	(0.025,0.082,0.49)	(0.012,0.056,0.22)	(0.03,0.099,0.165)	(0.01,0.053,0.119)	(0.028,0.089,0.15)	(0.026,0.086,0.52)	(0.033,0.099,0.65)	(0.031,0.096,0.62)
C36	(0.028,0.089,0.155)	(0.007,0.046,0.112)	(0.03,0.092,0.158)	(0.03,0.092,0.158)	(0.028,0.089,0.155)	(0.01,0.053,0.119)	(0.025,0.082,0.149)	(0.012,0.056,0.122)
C37	(0,0.025,0.082)	(0,0.002,0.036)	(0,0,0.033)	(0,0.002,0.036)	(0,0.003,0.04)	(0,0.002,0.036)	(0,0,0.033)	(0,0,0.033)
C38	(0,0.033,0.099)	(0.031,0.096,0.162)	(0.002,0.036,0.102)	(0.031,0.096,0.162)	(0,0.033,0.099)	(0.031,0.096,0.162)	(0.002,0.036,0.102)	(0.002,0.036,0.102)
C39	(0,0.033,0.099)	(0,0.033,0.099)	(0.021,0.076,0.142)	(0.007,0.046,0.112)	(0.008,0.05,0.115)	(0.023,0.079,0.145)	(0.005,0.043,0.109)	(0.002,0.036,0.102)
C40	(0,0.033,0.099)	(0.026,0.086,0.52)	(0.021,0.076,0.42)	(0.015,0.063,0.29)	(0.026,0.086,0.52)	(0.031,0.096,0.62)	(0.003,0.04,0.106)	(0.008,0.05,0.115)

Table 3. The final score from the perspective of the Iranian experts

Code	Criteria or sub-criteria	Final score
C1	Insufficient infrastructure facilities	2.574
C10	Abuse of brokers and intermediaries in reducing crop prices	2.508
C9	Lack of supporting financial institutions	2.444
C6	Lack of capital and credit	2.409
C14	The difference between on-farm crop prices and market prices	2.371
C11	Same price of organic crops with low-quality crops	2.318
C7	Lack of access to banking facilities to purchase production factors	2.194
C3	Lack of interest in innovation and new technologies	2.079
C4	Lack of geographical access to the sales market	1.955
C2	Long marketing path	1.846
C5	Inactivity of the National Office of Norms and Standards and Quality Control	1.79
C8	Inflation of crop prices	1.782
C12	Price fluctuations in the market	1.65
C13	Failure to pre-purchase crops by the government	1.587
C25	Seasonality of agricultural products	1.449
C29	Lack of sufficient non-governmental organizations (NGOs)	1.32
C27	Illiteracy of farmers	1.254
C26	Lack of awareness of farmers	1.063
C21	Insufficient knowledge in market and crop marketing management	1.056
C20	Cultivation without considering market demands	0.99
C15	Lack of foreign markets	0.94
C18	Lack of training and information on crop marketing	0.866
C16	Existence of intermediaries and brokers	0.861
C34	Lack of recognition and analysis of consumer demands and behaviors	0.703
C35	Lack of farmers' timely access to quality production factors	0.676
C36	Small farm size and crop diversity	0.625
C40	Crop trade-in unsuitable routes to avoid customs tariffs	0.561
C38	Subsistence farming	0.503
C39	Farmers' non-compliance with production standards based on marketing criteria	0.445
C33	Transferring marketing methods to the region and individuals	0.388
C30	Lack of training classes	0.355
C32	Existence of marketing associations	0.264
C28	Lack of training of farmers	0.233
C24	Crop type (freshness, perishability, large volume, and thinness)	0.198
C23	Low quality of agricultural products	0.167
C22	Unawareness of the right time of crop harvesting	0.165
C19	Lack of information and awareness of consumer status, crop prices, and supply market	0.134
C37	The dominance of traditional farming practices and limited production surplus	0.099
C17	Improper distribution network	0.099
C31	Mass media coverage	0.066

According to table 4, the sub-criterion of C2 against the criterion of physical and infrastructure barriers had low, medium, and high levels of 0, 0.033, and 0.099, respectively. On the other hand, the sub-criterion of C2 against the financial and economic barriers, pricing, system, and production challenges had low, medium, and high levels of 0, 0, and 0.033, respectively. C40 against the criterion of financial and economic barriers had a low level of 0.165, a medium level of 0.231. A high level of 0.297 whereas low, medium and high levels were 0.099, 0.165, and 0.231 against the pricing system and 0.165, 0.231, and 0.297 against the criteria of market and information barriers and cultural and production barriers, respectively.

Table 4. Weight assignment to dimensionless matrix

Weighted matrix	O1	O2	O3	O4	O5	O6	O7	O8
C1	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)
C2	(0,0.033,0.099)	(0,0,0.033)	(0,0,0.033)	(0,0.02,0.073)	(0,0.01,0.053)	(0,0.002,0.036)	(0,0,0.033)	(0,0,0.033)
C3	(0,0.033,0.099)	(0,0.002,0.036)	(0,0.03,0.092)	(0,0.002,0.036)	(0,0.03,0.092)	(0,0.002,0.036)	(0,0.002,0.036)	(0,0,0.033)
C4	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.102,0.168,0.234)	(0.162,0.228,0.294)	(0.165,0.231,0.297)
C5	(0,0.033,0.099)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C6	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)
C7	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C8	(0,0.033,0.099)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0,0.033)
C9	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.234,0.299,0.33)	(0.231,0.297,0.33)	(0.294,0.328,0.33)
C10	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.297,0.33,0.33)
C11	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C12	(0,0.033,0.099)	(0,0,0.033)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0,0.033)	(0,0.031,0.096)	(0,0.002,0.036)
C13	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.03,0.092)	(0,0.003,0.04)	(0,0.03,0.092)	(0,0.003,0.04)	(0,0.033,0.099)
C14	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.294,0.328,0.33)	(0.234,0.299,0.33)
C15	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.036,0.102,0.168)	(0.092,0.158,0.224)	(0.036,0.102,0.168)	(0.033,0.099,0.165)
C16	(0.297,0.33,0.33)	(0.175,0.241,0.302)	(0.221,0.287,0.325)	(0.297,0.33,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)
C17	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)
C18	(0.036,0.102,0.168)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.092,0.158,0.224)	(0.04,0.106,0.172)	(0.033,0.099,0.165)	(0.033,0.099,0.165)
C19	(0.036,0.102,0.168)	(0.033,0.099,0.165)	(0.096,0.162,0.228)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)
C20	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.165,0.231,0.297)

Table 4. Weight assignment to dimensionless matrix

Weighted matrix	O1	O2	O3	O4	O5	O6	O7	O8
C21	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C22	(0.231,0.297,0.33)	(0.165,0.231,0.297)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.231,0.297,0.33)	(0.165,0.231,0.297)
C23	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C24	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)
C25	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C26	(0,0.033,0.099)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0,0.033)	(0,0.033,0.099)	(0,0.033,0.099)
C27	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)
C28	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.033,0.099,0.165)
C29	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0.003,0.04,0.106)
C30	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)	(0,0.033,0.099)
C31	(0.102,0.168,0.234)	(0.162,0.228,0.294)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C32	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.112,0.178,0.244)	(0.158,0.224,0.29)	(0.158,0.224,0.29)
C33	(0.099,0.165,0.231)	(0.033,0.099,0.165)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.099,0.165,0.231)
C34	(0.231,0.297,0.33)	(0.099,0.165,0.231)	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C35	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.224,0.29,0.325)	(0.106,0.172,0.236)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.165,0.231,0.297)
C36	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0,0.033,0.099)
C37	(0,0.033,0.099)	(0.033,0.099,0.165)	(0,0.033,0.099)	(0.033,0.099,0.165)	(0.002,0.036,0.102)	(0.031,0.096,0.162)	(0,0.033,0.099)	(0,0.033,0.099)
C38	(0,0.033,0.099)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)	(0,0,0.033)
C39	(0,0.033,0.099)	(0,0.033,0.099)	(0.033,0.09,0.5)	(0,0.033,0.099)	(0,0.033,0.099)	(0.033,0.099,0.)	(0,0.033,0.099)	(0,0.033,0.099)
C40	(0.165,0.231,0.297)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.165,0.231,0.297)	(0.099,0.165,0.231)	(0.165,0.231,0.297)

According to table 4, the sub-criterion of C2 against the criterion of physical and infrastructure barriers had low, medium, and high levels of 0, 0.033, and 0.099, respectively. On the other hand, the sub-criterion of C2 against the financial and economic barriers, pricing, system, and production challenges had low, medium, and high levels of 0, 0, and 0.033, respectively. C40 against the criterion of financial and economic barriers had a low level of 0.165, a medium level of 0.231. A high level of 0.297 whereas low, medium and high levels were 0.099, 0.165, and 0.231 against the pricing system and 0.165, 0.231, and 0.297 against the criteria of market and information barriers and cultural and production barriers, respectively.

Calculation of final scores

Table 5 presents the final scores assigned to the sub-criteria by the Afghan experts. According to this table, the sub-criterion of C6 (lack of capital and credit) was ranked the first with a score of 2.574, followed by the sub-criterion of C9 (lack of supporting financial institutions) in the second rank with a score of 2.508. C14 (the difference between on-farm crop prices and market prices) was assigned with a score of 2.442 and was ranked third, whereas the fourth rank was assigned to C10 (abuse of brokers and intermediaries in reducing crop prices) with a score of 2.409.

Based on table 5, C1 (insufficient infrastructure facilities) was assigned with a score of 2.376 and was ranked fifth. C31 (mass media coverage) with a score of 1.425 was placed in rank 15, while rank 16 was assigned to C33 (transferring marketing methods to the region and individuals) with a score of 1.32. The table shows that C19 (lack of information and awareness of consumer status, crop prices, and supply market) gained a score of 0.99 and was ranked 20th, and C28 (lack of training of farmers) with a score of 0.676 was ranked 25th.

Rank 30 was assigned to C30 (lack of training classes) with a score of 0.388 and rank 35 to C7 (lack of access to banking facilities to purchase production factors) with a score of 0.165. As we go down in the ranking, we see C5 (inactivity of the National Office of Norms and Standards and Quality Control) in rank 39 with a score of 0.099 and finally, C13 (failure to pre-purchase crops by the government) with a score of 0.066 in the lowest rank.

Summary

This section discusses the results obtained from the perspectives of the Iranian and Afghan experts. We discuss the indices' findings in the research in which 20 Iranian and 20 Afghan experts ranked eight criteria and 40 sub-criteria below.

According to tables 3 and 5, the sub-criterion of C1 (insufficient infrastructure facilities) is a significant challenge of crop production and marketing in Iran, so that most farmers earn a lower income from their crops because they lose some part of their crops or the quality of their crops is reduced due to the inadequacy of facilities and infrastructure (e.g., storage, processing industries, and transportation system). This sub-criterion was scored 2.574 and ranked first. The second rank was assigned to C10 (abuse of brokers and intermediaries in reducing crop prices) with a score of 2.508. The third and fourth ranks were also assigned to C9 (lack of supporting financial institutions) with a score of 2.444 and C6 (lack of capital and credit) with a score of 2.409, respectively.

According to the Iranian experts, the sub-criterion of C14 (the difference between on-farm crop prices and market prices) was ranked fifth with a score of 2.371 in this table, followed by the sub-criterion of C11 (the same price of organic crops with low-quality crops) with a score of 2.318 and the sub-criterion of C7 (lack of access to banking facilities to purchase production factors) with a score of 2.194 in the sixth and seventh ranks, respectively. Ranks 9 and 10 were

also assigned to C4 (lack of geographical access to the sales market) with a score of 1.955 and C2 (long marketing path) with a score of 1.846, respectively.

Table 5. The final score from the perspective of the Afghan experts

Code	Criteria or sub-criteria	Final score
C6	Lack of capital and credit	2.574
C9	Lack of supporting financial institutions	2.508
C14	The difference between on-farm crop prices and market prices	2.442
C10	Abuse of brokers and intermediaries in reducing crop prices	2.409
C1	Insufficient infrastructure facilities	2.376
C16	Existence of intermediaries and brokers	2.318
C22	Unawareness of the right time of crop harvesting	2.194
C20	Cultivation without considering market demands	2.079
C4	Lack of geographical access to the sales market	1.955
C35	Lack of farmers' timely access to quality production factors	1.84
C11	Same price of organic crops with low-quality crops	1.782
C34	Lack of recognition and analysis of consumer demands and behaviors	1.774
C40	Crop trade-in unsuitable routes to avoid customs tariffs	1.65
C32	Existence of marketing associations	1.584
C31	Mass media coverage	1.452
C33	Transferring marketing methods to the region and individuals	1.32
C25	Seasonality of agricultural products	1.254
C24	Crop type (freshness, perishability, large volume, and thinness)	1.056
C23	Low quality of agricultural products	1.056
C19	Lack of information and awareness of consumer status, crop prices, and supply market	0.99
C17	Improper distribution network	0.924
C18	Lack of training and information on crop marketing	0.87
C15	Lack of foreign markets	0.858
C27	Illiteracy of farmers	0.792
C28	Lack of training of farmers	0.676
C29	Lack of sufficient non-governmental organizations (NGOs)	0.625
C36	Small farm size and crop diversity	0.561
C37	The dominance of traditional farming practices and limited production surplus	0.503
C39	Farmers' non-compliance with production standards based on marketing criteria	0.446
C30	Lack of training classes	0.388
C26	Lack of awareness of farmers	0.355
C21	Insufficient knowledge in market and crop marketing management	0.264
C12	Price fluctuations in the market	0.231
C8	Inflation of crop prices	0.198
C7	Lack of access to banking facilities to purchase production factors	0.165
C3	Lack of interest in innovation and new technologies	0.165
C2	Long marketing path	0.13
C38	Subsistence farming	0.099
C5	Inactivity of the National Office of Norms and Standards and Quality Control	0.099
C13	Failure to pre-purchase crops by the government	0.066

The Iranian experts believe that C37 (the dominance of traditional farming practices and limited production surplus) with a score of 0.099 is in the 38th rank, followed by C17 (improper distribution network) with a score of 0.099 in rank 39 and C31 (mass media coverage) with a score of 0.066 in the final rank.

As is evident in table 5, the Afghan experts assigned a score of 2.574 to C6 (lack of capital and credit), ranking it in the first place. It is inferred from this finding that most Afghanistan

farmers are smallholders and poor and suffer from a lack of capital. Due to the inadequate capital, some farmers cannot grow plants since they do not have enough money, and others cannot market their crops properly. On the other hand, C9 (lack of supporting financial institutions) was ranked second with a score of 2.508, and C14 (the difference between on-farm crop prices and market prices) was ranked third with a score of 2.442, followed by C10 (abuse of brokers and intermediaries in reducing crop prices) with a score of 2.409 in the fourth rank. The next rank was assigned to C1 (insufficient infrastructure facilities) with a score of 2.376 and the sixth rank to C16 (existence of intermediaries and brokers) with a score of 2.318. On the other hand, rank seven was assigned to C22 (unawareness of the right time of crop harvesting) with a score of 2.194.

When looking at the last ranks in table 5, we see that C2 (long marketing path) with a score of 0.13 was placed in the 37th rank, followed by C38 (subsistence farming) in the 38th rank with a score of 0.099. The following two ranks, i.e., 39th and 40th, were assigned to C5 (inactivity of the National Office of Norms and Standards and Quality Control) with a score of 0.099 and C21 (failure to pre-purchase crops by the government) with a score of 0.066, respectively.

Recommendations

According to the results as to the factors threatening crop marketing in Afghanistan and Iran, using the opinions of 20 Iranian experts and 20 Afghan experts about eight criteria and 40 sub-criteria, it is found that crop production and marketing in these two developing countries are suffering from several challenges and problems. Some crops are partially wasted from farm to fork so that they are removed from the marketing system. The following recommendations can be made to settle crop marketing challenges partially:

- Given the most crucial sub-criterion, i.e., ‘insufficient infrastructure facilities, from the Iranian experts' viewpoint, the public and private sectors should take actions to rehabilitate infrastructure (cold storage, warehouses, roads, and Etc) to help improve production and marketing activities. On the other hand, since the Afghan experts prioritized the sub-criterion of ‘lack of capital and credit,’ i.e., the lack of financial resources, the public and private sectors are recommended to establish financial institutions (banks to provide peasants with loans, agriculture cooperatives, and agribanks) to facilitate farmers' production and marketing activities so that these activities can be performed better with more reliable finance.
- From the Iranian experts' perspective, ‘abuse of brokers and intermediaries in reducing crop prices’ is the second most crucial challenge. It is recommended to cut the hands of middlemen, brokers, and profit-seeking people who abuse actual producers by purchasing their crops at unreasonably low prices so that farmers perform their production and marketing activities themselves and share in the value-added chain of their crops. Nevertheless, the Afghan experts ranked ‘lack of supporting financial institutions’ the second. It is proposed to establish supportive state-run or privately-run financial institutions to facilitate crop production and marketing activities for the farmers, thereby helping boost these activities by financially supporting them.
- In traditional farming, the goal is to meet the needs of the farmer's family. In this system, farmers use traditional production factors. The agricultural sector's productivity is very low, surplus production is small, and farmers have a weak connection with the market of production factors and crops. It is recommended to convert traditional agriculture to modern agriculture, thereby enhancing crop production quantity and quality.
- Most farmers and people engaged in production and marketing activities in developing countries lack the required knowledge and skills, so crop production and marketing activities

are not performed correctly. Thus, it is recommended to enhance the knowledge, skills, and awareness of farmers and marketers by holding educational courses and seminars and sending them to different countries to increase their knowledge and awareness.

- Countries like Iran and Afghanistan are suffering from a lack of processing industry. Most highly perishable crops are consumed in the fresh form, some of which are wasted due to the processing industry's lack of processing. So, it is recommended to develop processing industries in different parts of these two countries to process crops, thereby increasing their value, extending crop shelf life, and stabilizing their prices.
- Most farmers have no timely access to production factors and crop sale markets. Therefore, it is recommended to reinforce the link between the farmers and production factors market and provide them with easy and timely access to the production factors to help their production and marketing activities.
- In developed countries like Iran and Afghanistan, crops do not have as much quality as the crops producing in other countries. So, it is gravely necessary to enhance the quality of crops by using high-quality production factors in order to be able to offer them in domestic and international markets. The government and farmers should also pay more attention to the nationally and internationally accepted standards.
- Most farmers and market middlemen have no access to marketing information. When there is a lack of correct and timely information on, say, prices, supply, and demand, marketing activities cannot be performed soundly. Therefore, it is recommended to establish state-run or private information institutions to facilitate farmers' access to market and marketing data and enhance their awareness of crop supply, demand, and prices to market their crops in appropriate markets at reasonable prices.
- Most crops in developing countries like Iran and Afghanistan are transferred to the sale market with no grading or packaging, which impairs their prices and renders them unmarketable. Crops are recommended to be packaged in delicate designs to avoid wastage, increase their added value, and improve their penetrability into the international markets.
- Most farmers in developing countries like Iran and Afghanistan are smallholders and poor, so they cannot do production and marketing activities alone. Indeed, no single farmer can affect crop prices in the market alone. It is thus recommended to establish farmer cooperatives and associations to help farmers do crop production and marketing activities better by cooperating with the farmers themselves. As such, they can gain a competitive advantage.

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