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Investment Priorities in the Livestock and Poultry Agribusinesses Value Chains

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ABSTRACT

Agricultural sector plays a fundamental role in development, especially in developing countries. Investment in targeted agribusinesses can develop and improve agricultural value chains. Because of capital shortages and different investment requirements of the sector, the capital allocation has become an important decision-making issue for managers and investors of the agricultural sector in recent years. Investors have many alternative investment options in the agriculture sector and factors such as return on investment, investor expertise and interest, government policies, and the comparative advantages of each region can affect the direction of the capital to different agricultural subsectors. The main objective of this study was to investigate investment priorities in the livestock and poultry value chains of Khorasan Razavi Province in Iran. This paper employs the Analytic Network Process (ANP) model for agribusiness investment decisions, which is one of the important Multi-Criteria Decision-Making (MCDM) methods. The contribution of this research is that it ranks agribusiness activities on the livestock and poultry value chains and determines the most important areas for investment direction. The results show that "government policies and laws" are the most important factor for business selection in the livestock and poultry subsectors. Furthermore, livestock and poultry feed businesses contribute the most to the progress of the value chains. Therefore, stability in policy-making and appropriate legislation to support agricultural businesses can be effective in this regard.

Keywords: Analytic Network Process, Livestock feed, Multi-criteria decision-making methods, Poultry feed.

INTRODUCTION

During the past decades, there has been a substantial change in agriculture and agribusiness, which has affected the investment decisions in this sector. In today's rapidly changing business, many developed and developing countries change their approach from traditional agriculture to agribusiness with a focus on the entire value chain instead of separate activities. Therefore, planning for agribusiness and its related industries is receiving increased attention from policymakers and strategists related to the agricultural sector. The Food and Agricultural Organization (FAO, 2017) defines agribusiness as comprising business activities performed from farm to fork, covering the entire value chain. Developing a competitive and sustainable agribusiness sector requires focusing on various components of the entire chain (European Union, 2013). Considering numerous barriers such as increasing production costs and high risk of agricultural production activities, prioritizing the investment and capital flows in the agricultural sector and directing it to the most efficient chains in the total value chain is important. (Clark *et al*., 2014).

The OECD-FAO report (2019) provides

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an overview of the latest set of quantitative medium-term projections for global and national agricultural markets. The projections cover consumption, production, stocks, trade, and prices for 25 agricultural products (including livestock and poultry products) for the period 2019 to 2028. Based on this survey, the East and Southeast Asia region is expected to see 60-100% growth in per capita income by 2028. These higher incomes will result in greater demand for meat and other products related to livestock and poultry. Therefore, with increasing demand for meat, the investment requirements in livestock and poultry subsectors would increase.

The main objective of this research was to investigate the investment priorities in agribusiness that contribute to the growth and strengthening of the value chains with a focus on the livestock and poultry subsectors. According to the data from the central bank of Iran, the livestock and poultry subsector provides about 29 percent of the total agricultural value added during 2015-2020 (Central Bank of Iran, 2018). Development of various components of the poultry and livestock value chains require raising levels of nutrition, improving agricultural productivity, and contributing to the growth of the world economy (FAO, 2012).

In the report of Iran Feed Industry Association (2019), the best opportunity to invest was referred to agriculture and animal husbandry, because about 120 million tons of crops and livestock exist by volume, in addition to quality, and unique diversity in the conversion and complementary industries.

Realizing the investment priorities could guide the managers to ensure their investments contribute to the highest positive impact on the sustainable economic growth of the entire value chain. Investment prioritization is important for identifying opportunities for private sector investment (Shvetsova *et al*., 2018).

The review of the literature (Porookani, 2010; Anaraki, 2013; Jahadgar, 2017) indicated that livestock and poultry businesses in Iran can be classified in 8 scopes as shown in Figure 1.

As mentioned, this research aimed to determine the best investment alternatives within the poultry and livestock chains to help the subsector managers recognize and choose the most appropriate businesses. In other words, the most important investment opportunities in the poultry and livestock subsectors that have the highest effect on the entire value chain are to be identified.

Although the investment priorities have been investigated in the agriculture sector in different countries, most studies have focused on comparison of the agricultural sector and its sub-sectors and ignored a specific value chain related to a specific subsector. The classification of the literature investigated in this study is shown in Table 1.

In the literature review, the ignored topic is determining the agribusiness value chains

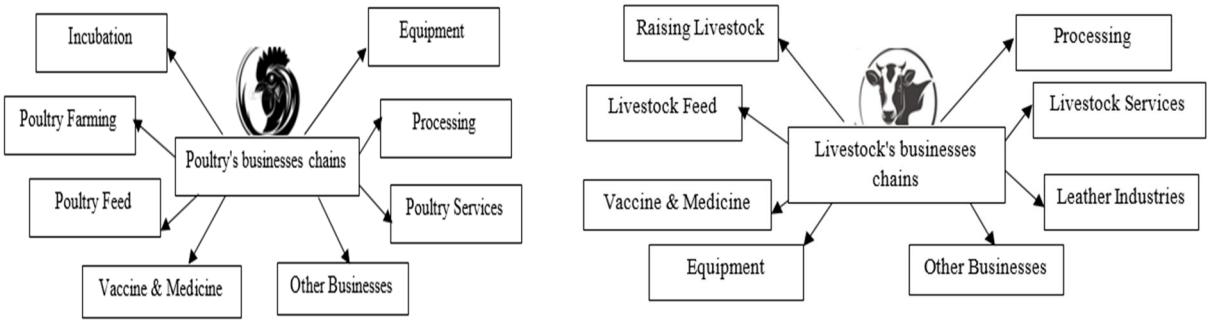

Figure 1. Livestock and poultry subsector businesses.

Table 1. Classification of literature based on the used methods.

Reference	Numerical taxonomy	Factor analysis	Topsis	Delphi	Engineering-Economic	Fuzzy	AHP	ANP	Other techniques
Bodin *et al*.(2005)							1		
Wey *et al*. (2007)								1	
Pakdin Amiri (2010)			1			1	1		
Vargas (2010)							1		
Tan *et al*.(2010)			1			1			
Nandi *et al*.(2011)							1		
Shahabi (2011)							1		
Wu *et al*. (2012)							1		
Golaghaie-Darzi (2013)	1	1	1						
Arabmazar and Khademian (2013)	1		1						
Mirzadeh *et al*. (2014)							1		
Ghazvineh (2014)				1	1				
Reed *et al*. (2014)							1		
Vahedi & Falah (2015)							1		
Wu & Kou(2016)							1		
Mombeini *et al*. (2016)						1	1		
Bai *et al*.(2016)						1			
Arsic *et al*. (2017)						1		1	
Soniwan *et al*. (2017)							1		
Tovar-Perilla *et al*. (2018)									1
Chatterjee *et al*. (2018)						1	1		
Lotfi *et al*.(2018)			1			1			
Balali *et al*. (2019)				1	1				
Fernandez Portillo *et al*. (2019)								1	
Mansouri Moayyed *et al*. (2019)			1						
Alary *et al*. (2020)									1
Shin *et al*. (2020)							1		
Siejka (2020)							1		
Lotfi *et al*. (2021)									1
Lotfi *et al*. (2021)									1
Farrokh tabar *et al*. (2021)						1	1		
Total (summary)	2	1	6	2	2	8	18	3	4
Present research								1	

in the poultry and livestock subsectors that need more investment requirements for increasing the total value of chains. In other words, the agribusinesses in the poultry and livestock value chains should be considered more than before. Therefore, this research identifies priorities of investment in poultry and livestock value chains as innovation in the scope of the agribusiness value chain.

Khorasan Razavi is a landlocked province in Iran that has 118,854 square kilometers, about 7 percent of Iran, and has a population of about 6.4 million (8 percent of the population of Iran), and 27 percent of its population live in rural areas.

Khorasan Razavi is active in livestock and poultry production and the mean gross value of livestock products from total agricultural products was 36.6 percent as shown in Table 2.

In addition, comparison of the value of livestock products in Khorasan Razavi Province with other provinces shows that this province has top rankings in various livestock products such as red meat, poultry, eggs, and milk in the country. According to Iranian Ministry of Agricultural Jihad reports, milk production of the province is 9.6 percent of the total milk production, the red meat production of the province is 8.6 percent of the total red meat production and the chicken production of the province is 6 percent of the country's total poultry production. Moreover, eggs production of the province is 11.3 percent of the total eggs production in Iran and the bulk of raw materials of the subsector is the backbone of industrial development production.

Despite the province's advantages in the production of livestock and poultry products, the number of livestock keepers of the province is decreasing, which shows the declining attractiveness of some livestock investment projects. Furthermore, reducing changes occur in livestock used for slaughtering. Also, despite the average annual production of more than 12,841 thousand tons of livestock products of the province that indicates a considerable amount of agricultural capital is embodied in the livestock subsector, the resulting value added is negligible (Iranian Ministry of Agricultural Jihad, 2012-2019) .

These problems have caused particular concerns for value chain actors in response to the problems of the industry. With the growing concerns, investment prioritization can encourage private sector investment in the poultry and livestock value chains that are more attractive and profitable. Therefore, this research uses an Analytic Network Process (ANP) model, multi-criteria basis, for evaluation of investment alternatives of livestock and poultry industry, which aims the followings:

- To rank agribusinesses on the livestock and poultry value chains.
- To develop and prioritize the specific criteria, both the effective quantitative and qualitative factors, for assessing and selecting an investment in the livestock and poultry industry.
- To consider the internal relations between criteria.
- To improve the selection of investment fields in the livestock and poultry industry

Table 2. The gross value of agricultural products in Khorasan Razavi Province (million Rials). [a]

Year	Horticultural products	Farming products	Livestock products	Fisheries products	Total agricultural products	Percentage of livestock products of total agricultural products
2019	99547909	55127768	82400769	2224117	239300558	34.43
2018	50183177	37201934	53502527	1003228	141890866	37.7
2017	49749928	37364094	44518975.1	1010924	132643921.1	33.56
2016	44959788	32766520	42460460.3	229218.9	120415987.2	35.26
2015	36874647	28296340	40751154.26	594950	106517091.3	38.26
2014	30704297	25635146	38944374.8	446606	95730423.8	40.68

[a] Source: Iranian Ministry of Agricultural Jihad.

Table 3. The share of livestock production [a] in Khorasan Razavi Province in the country (%).[b]

Year	Milk	Red meat	Chicken meat	Eggs
2019	9.6	8.6	6.3	11.36
2018	9.5	8.7	7.4	11.14
2017	9.7	8.9	7.3	9.9
2016	9.6	8.8	7.9	10.18
2015	9.6	9	6.9	8.5
2014	7	6	6.2	9.5
2013	6.9	6	6.2	9.1

[a] Value of honey and cocoon is removed. [b] Source: Iranian Ministry of Agricultural Jihad.

and direct it toward more productive fields.

MATERIALS AND METHODS

Different factors can affect the investment decisions of business actors. When a decision-maker has to consider different criteria to choose different alternatives, the problem becomes one of Multiple-Criteria Decision-Making (MCDM) to be solved by related tools. However, existing MCDM approaches have some limitations. First, some approaches [e.g. the Analytic Hierarchy Process (AHP)] do not consider the internal relations between criteria; these are addressed by other approaches, such as the Analytic Network Process (ANP) that Saaty (1996) proposed for multi-criteria. The aim of Saaty presentation is designing a model through which complex issue of multi decision is analyzed into smaller pieces, by reasonable value analyzes them into simpler components, and then integrates these values into a final decision. ANP is a developed form of AHP that can model the correlations and feedbacks among effective elements during a decision-making process. Also, ANP is helpful to deal with interdependent relationships within a multi-criteria decision-making model.

ANP Steps

According to related studies (Saaty and Vargas, 2013; Saaty, 2004) ANP is introduced in three basic steps:

1) Model Construction and Problem Structuring: This research shows a model to illustrate how empirically to prioritize a set of livestock and poultry businesses by using a 3-level selection model that is transformed into a network structure. The elements symbolize the fundamental building blocks of the network. They represent both criteria and alternatives. According to Figure 2, the businesses of the livestock subsector are divided into eight categories that are identified as alternatives and include: (1) Raising livestock, (2) Livestock feed, (3) Vaccine and medicine, (4) Equipment, (5) Processing, (6) Livestock services [Includes businesses related to marketing activities, insurance, technology development and education, and consulting services.], (7) Leather industries, and (8) Other businesses [Includes businesses related to the use of animal waste, carcasses, and livestock recording organs, etc.].

Figure 3 illustrates the proposed analytical model of poultry subsector businesses in which alternatives are divided into eight categories including: (1) Incubation, (2) Poultry farming, (3) Poultry feed, (4) Vaccine and medicine, (5) Equipment, (6) Processing, (7) Poultry services, and (8) Other businesses.

In both livestock and poultry business chains, there are different criteria to be applied in alternatives selection. A literature review was conducted to determine the main criteria for investment priorities selection, because these criteria vary according to the different concerns of managers, researchers, and investors. While most investment decisions are considered the trade-off

between risk and profit of a project, the investment decisions of agribusiness investors are based on other internal considerations, as well as external considerations. In this research, different criteria are surveyed and, eventually, 9 criteria are considered as priority for livestock and poultry subsector's businesses. These include: (1) Risk level of activity, (2) Profitability, (3) Place attractions, (4) Market situation and size, (5) Finance facilities, (6) Competitiveness, (7) Government policies and laws, (8) Probability of technical success, and (9) Inter-sectorial links. [Refers to direct or indirect interactions among of these sectors.] The elements are shown in the second level of Figures 3 and 4 illustrated a large number of different aspects of investment considerations of various stakeholders in the livestock and poultry subsector.

2) Pairwise Comparison Matrices: The determination of weights is based on node pairwise comparisons when one element depends on two or more different elements from one cluster, and cluster pairwise comparisons when elements (one or more) from one cluster depend on two or more elements from the other clusters. To determine the values of the pairwise judgments, Saaty's 1-9 scale is used. Pairwise comparisons are performed in the framework of node and cluster matrices, and local priority vectors are derived as estimates of the relative importance associated with the elements or clusters being compared. After doing pairwise judgments, the consistency ratio should be checked. To accept consistency, Consistency Ratio (CR) is expected to be less than 0.1 (Saaty, 1990; Kadoic, 2018).

3) Super-Matrix Construction: In the first step, the un-weighted super-matrix is created directly from all local priority vectors. In the second step, the weighted super-matrix is calculated by multiplying the values of the un-weighted super-matrix with their affiliated cluster weights. By normalizing the weighted super-matrix, it is made column-stochastic. In the third and final step, the limit super-matrix is processed by raising the entire super-matrix to power until it converges in terms of lines.

Limit priority values within this super-matrix indicate the flow of influence of an individual element towards the overall goal.

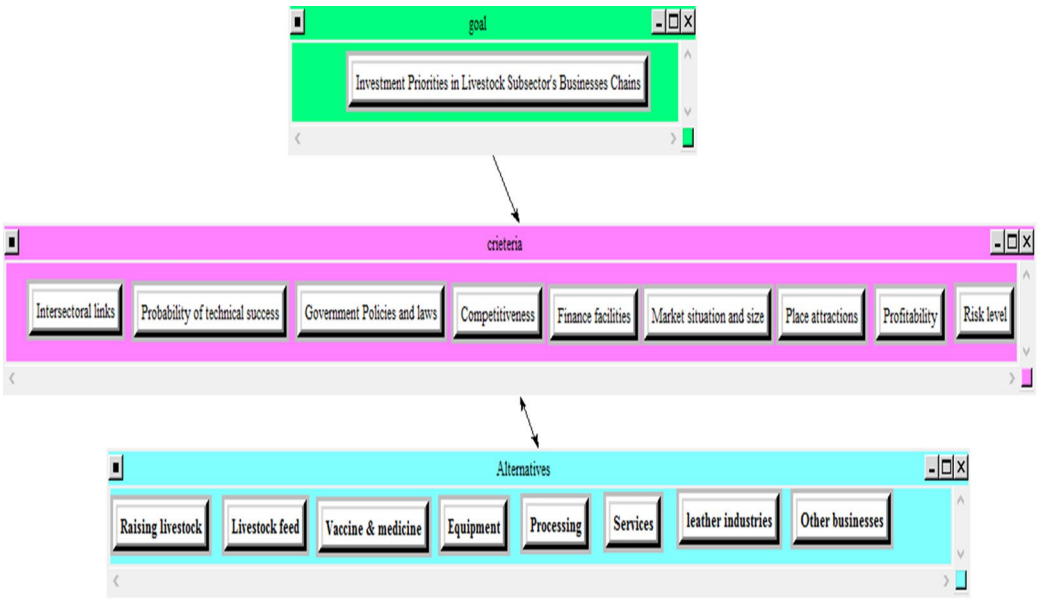

Figure 2. Three level model of investment priorities in livestock's businesses chains.

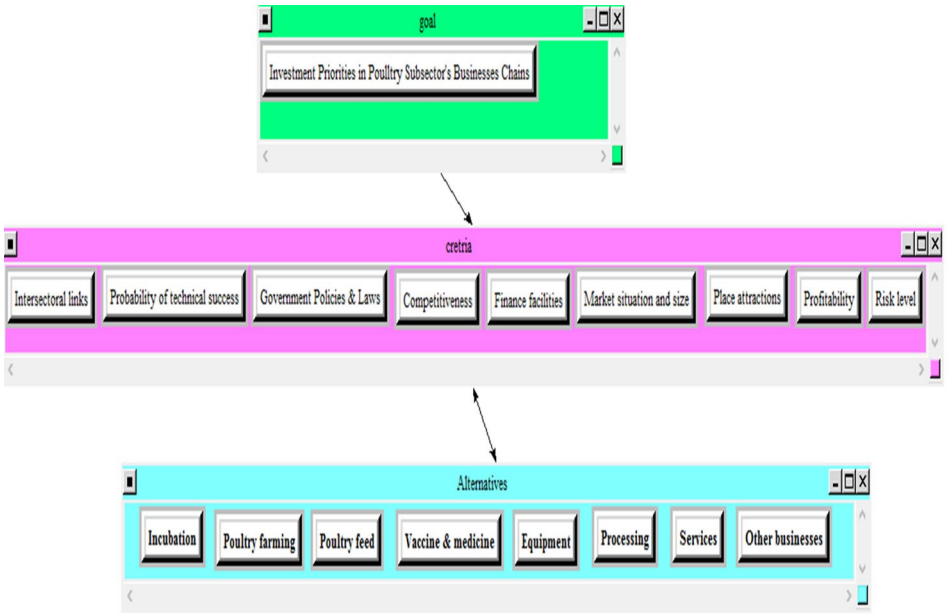

Figure 3. Three level model of investment priorities in poultry's businesses chains.

Since the decision alternatives are elements of an original cluster of the network, their limit priorities are synonymous with their contributions to the goal and are used for the ranking of alternatives, being normalized within the cluster (Wicher *et al*. 2016).

RESULTS AND DISCUSSION

In this study, primary data was collected in 2020 using a questionnaire that was filled by 14 industrial investors and producers with investment experience in the livestock and poultry industry, and scores were computed for prioritizing investment of the business chains. The questionnaires were collected in February 2020 to May 2020.

As step 1 mentioned, at first, a network model is structured that includes decision elements. After that, the importance of the variables is compared by questionnaire in this scale. After pairwise comparisons, the Consistency Ratio (CR) was determined to be less than 0.1. Then, an un-weighted super-matrix was formed by filling a super-matrix with the obtained relative importance weights (the priority vector). Table 4 presents an un-weighted super-matrix that is provided by super decisions software. A weighted super-matrix was produced by adjusting the un-weighted super-matrix to column stochastic such that the sum of the elements in each column is equal to one. The resulting limiting of the weighted super-matrix is called a limiting super-matrix. After that, the limit super-matrix was formed, which showed the effects of the variables in the long run.

The final step of ANP is to choose the best alternative. As shown in the Figure 4, investment final priorities in livestock businesses are as follows. Livestock feed with a final score of 0.31 is the first priority, while processing with final score of 0.19 and raising livestock with a final score of 0.15 are the second and third priorities. In addition, vaccine & medicine with a final score of 0.12, leather industries with a final score of 0.11, equipment with a final score of 0.06, livestock services with a final score of 0.03, and other businesses with a final score of 0.02 are the next priorities.

The final priorities and rankings of the type of business related to poultry sector, is shown in Figure 5. In the poultry subsector, poultry feed with a final score of 0.32, is the first priority, while poultry farming with a

Name	Graphic	Ideals	Normals
Equipment		0.197589	0.061560
leather industries		0.371433	0.115723
Livestock feed		1.000000	0.311557
Other businesses		0.076590	0.023862
Processing		0.607394	0.189238
Raising livestock		0.472302	0.147149
Services		0.086607	0.026983
Vaccine & medicine		0.397769	0.123928

Figure 4. Investment final priorities in livestock's businesses chains. (Source: Research findings).

Name	Graphic	Ideals	Normals
Equipment		0.118536	0.038106
Incubation		0.524426	0.168588
Other businesses		0.072617	0.023344
Poultry farming		0.700625	0.225231
Poultry feed		1.000000	0.321471
Processing		0.356324	0.114548
Services		0.087761	0.028212
Vaccine & medicine		0.250408	0.080499

Figure 5.. Investment final priorities in poultry's businesses chains. (Source: Research findings).

final score of 0.22 is the next investment priority. Moreover, incubation with a final score of 0.17, processing (0.11), vaccine and medicine (0.08), equipment (0.04), poultry services (0.03), and other businesses with a final score of 0.02 are the next investment priorities.

One of the most important features of the ANP model is that, in addition to showing how the criteria affect the alternatives at the same time, it shows which criteria are more important for each alternative. Table 5 shows which criteria is more important for each livestock business, respectively.

Table 6 provides the normalized weights for each livestock business that indicates which criteria is more important, respectively.

Findings in the criteria of livestock businesses demonstrate that: (i) Government policies and laws factor has the first rank with 37 percent, (ii) Profitability is in the second rank with 12.5 percent, (iii) Market situation and size stays in the third rank with 12.2 percent, and finance facilities factor has the weakest importance with 2 percent (Figure 6).

Prioritizing and assigning weights to each criterion concerning a set of available businesses in the poultry industry shows that government policies and laws influence investment decisions, with 34 percent. Market situation and size is in the second rank with 17.8 percent. Profitability stays in the third rank with 15 percent, and the finance facilities factor has the weakest importance with 2 percent (Figure 7).

CONCLUSIONS

The designed model of investment priorities in the livestock and poultry business consists of three levels and is designed to determine the investment attractions of businesses in the chains. While presently huge shortages are reported in feed chains, especially in the imported inputs, according to the results, Khorasan Razavi Province should increase efforts to support the businesses of feed chain to contribute and grow the entire value chain. Investors' tendencies show that they are willing to increase their investment in feed businesses, but paying more attention to the feed chains should not overlook the other chains.

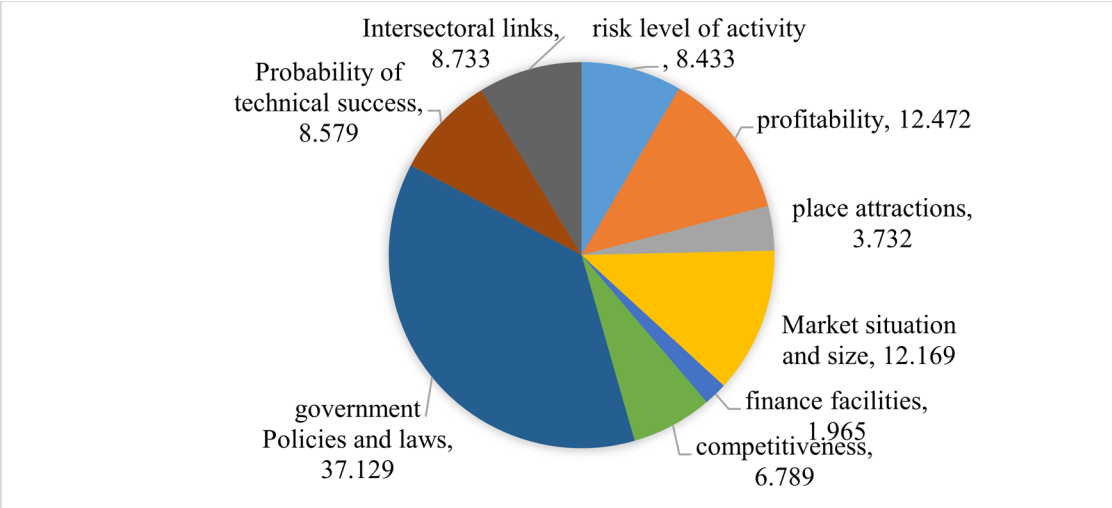

Figure 6. Relative share of decision criteria in livestock's businesses chains. (Source: Research findings).

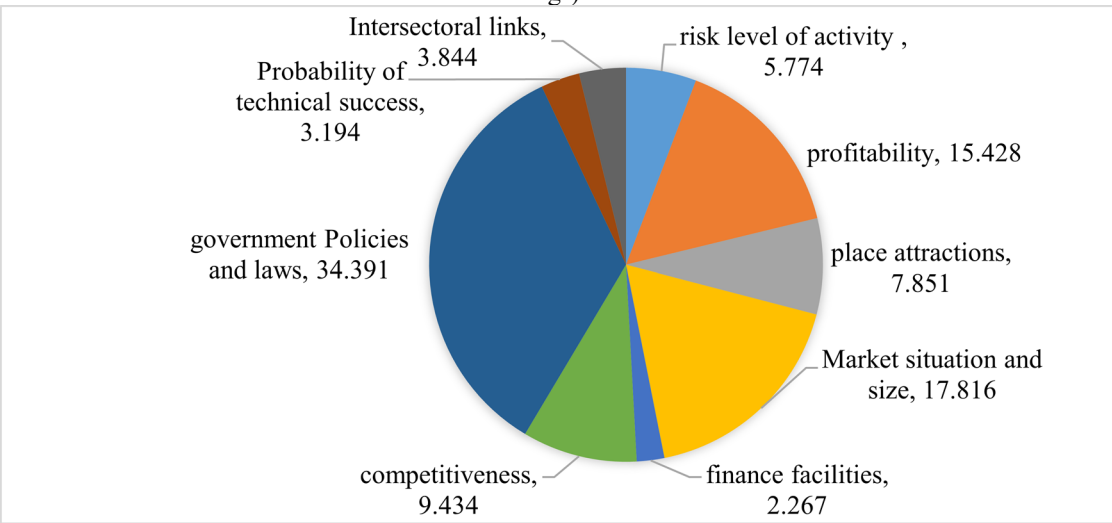

Figure 7. The relative share of decision criteria in poultry's businesses chains. (Source: Research findings).

By considering the influential factors in the poultry and livestock business chains, the constraints and opportunities for growth of the value chains are identified. The criteria of the model showed that factors related to external considerations, such as government policies and laws, have the most important role to encourage the investors and directing the capital toward shortages of the value chain. Changes are expected in the government policies and laws, because investors' attitudes to the policies were negative and they believed that the policies threatened investment opportunities in the subsector. Therefore, it is important to improve the policies and laws based on consultation with all stakeholders of the livestock and poultry value chains.

This case study provides insight into the expectations and priorities of investment businesses of livestock and poultry of Khorasan Razavi Province in Iran and shows that the method is effective in selecting the best investment alternatives in the value chains and can be used in other regions.

Table 4. Livestock un-weighted super-matrix. [a]

	Raising livestock	Livestock feed	Vaccine and medicine	Equipment	Processing	livestock services	Leather industries	Other businesses	Risk level	Profitability	Place attractions	Market situation and size	Finance facilities	Competitiveness	Government Policies and laws	Probability of technical success	Inter-sectorial links
Raising livestock	0	0	0	0	0	0	0	0	0.367	0.223	0.037	0.210	0.030	0.086	0.039	0.327	0.138
Livestock feed	0	0	0	0	0	0	0	0	0.099	0.325	0.354	0.361	0.398	0.385	0.327	0.219	0.358
Vaccine and medicine	0	0	0	0	0	0	0	0	0.049	0.166	0.089	0.157	0.149	0.073	0.144	0.119	0.058
Equipment	0	0	0	0	0	0	0	0	0.143	0.044	0.048	0.049	0.059	0.045	0.065	0.044	0.046
Processing	0	0	0	0	0	0	0	0	0.221	0.119	0.245	0.102	0.110	0.145	0.245	0.156	0.202
Livestock services	0	0	0	0	0	0	0	0	0.023	0.029	0.064	0.025	0.029	0.028	0.024	0.027	0.026
Leather industries	0	0	0	0	0	0	0	0	0.072	0.071	0.139	0.072	0.021	0.212	0.130	0.084	0.147
Other businesses	0	0	0	0	0	0	0	0	0.024	0.021	0.024	0.0232	0.025	0.025	0.025	0.023	0.024
Risk level	0.094	0.058	0.064	0.019	0.117	0.024	0.171	0.034	0	0	0	0	0	0	0	0	0
Profitability	0.226	0.104	0.237	0.043	0.076	0.058	0.066	0.149	0	0	0	0	0	0	0	0	0
Place Attractions	0.061	0.025	0.027	0.034	0.051	0.055	0.018	0.084	0	0	0	0	0	0	0	0	0
Market situation and size	0.128	0.202	0.052	0.098	0.089	0.047	0.036	0.212	0	0	0	0	0	0	0	0	0
Finance facilities	0.179	0.019	0.019	0.019	0.018	0.018	0.028	0.018	0	0	0	0	0	0	0	0	0
Competitiveness	0.047	0.080	0.126	0.099	0.026	0.099	0.047	0.058	0	0	0	0	0	0	0	0	0
Government policies and laws	0.369	0.338	0.351	0.444	0.406	0.3793	0.405	0.296	0	0	0	0	0	0	0	0	0
Probability of technical success	0.026	0.035	0.086	0.069	0.180	0.194	0.138	0.041	0	0	0	0	0	0	0	0	0
Intersectoral links	0.032	0.139	0.039	0.173	0.037	0.126	0.092	0.107	0	0	0	0	0	0	0	0	0

[a] Source: Research findings.

Table 5. Poultry un-weighted super-matrix. [a]

	Incubation	Poultry farming	Poultry feed	Vaccine and medicine	Equipment	Processing	Poultry services	Other businesses	Risk level	Profitability	Place attractions	Market situation and size	Finance facilities	Competitive ness	Government Policies and laws	Probability of technical success	Inter-sectorial links
Incubation	0	0	0	0	0	0	0	0	0.169	0.101	0.266	0.239	0.179	0.059	0.167	0.184	0.172
Poultry farming	0	0	0	0	0	0	0	0	0.324	0.248	0.143	0.261	0.189	0.219	0.169	0.377	0.401
Poultry feed	0	0	0	0	0	0	0	0	0.275	0.334	0.334	0.228	0.331	0.368	0.387	0.151	0.182
Vaccine and medicine	0	0	0	0	0	0	0	0	0.056	0.149	0.093	0.065	0.081	0.110	0.054	0.082	0.045
Equipment	0	0	0	0	0	0	0	0	0.041	0.027	0.056	0.035	0.057	0.065	0.026	0.068	0.057
Processing	0	0	0	0	0	0	0	0	0.074	0.084	0.052	0.121	0.113	0.139	0.146	0.085	0.077
Poultry services	0	0	0	0	0	0	0	0	0.031	0.028	0.029	0.029	0.027	0.021	0.026	0.032	0.046
Other businesses	0	0	0	0	0	0	0	0	0.030	0.027	0.027	0.020	0.023	0.017	0.023	0.019	0.021
Risk level	0.024	0.052	0.072	0.023	0.028	0.108	0.079	0.059	0	0	0	0	0	0	0	0	0
Profitability	0.163	0.175	0.179	0.065	0.100	0.133	0.065	0.166	0	0	0	0	0	0	0	0	0
Place attractions	0.089	0.0785	0.066	0.125	0.048	0.051	0.036	0.264	0	0	0	0	0	0	0	0	0
Market situation and size	0.197	0.124	0.196	0.188	0.164	0.191	0.214	0.200	0	0	0	0	0	0	0	0	0
Finance facilities	0.015	0.031	0.024	0.019	0.018	0.019	0.020	0.016	0	0	0	0	0	0	0	0	0
Competitiveness	0.039	0.085	0.108	0.141	0.152	0.089	0.123	0.121	0	0	0	0	0	0	0	0	0
Government policies and laws	0.376	0.399	0.298	0.357	0.389	0.343	0.353	0.088	0	0	0	0	0	0	0	0	0
Probability of technical success	0.035	0.037	0.015	0.047	0.072	0.029	0.072	0.031	0	0	0	0	0	0	0	0	0
intersectoral links	0.061	0.019	0.042	0.036	0.028	0.035	0.036	0.055	0	0	0	0	0	0	0	0	0

[a] Source: Research findings..

Table 6. Normalized weights criteria of livestock's businesses chains. [a]

Criteria	Normalized weights							
	Raising livestock	Livestock feed	Vaccine and medicine	Equipment	Processing	Livestock services	Leather industries	Other businesses
Risk level	0.094	0.579	0.642	0.019	0.117	0.024	0.017	0.034
Profitability	0.226	0.104	0.237	0.043	0.076	0.058	0.066	0.149
Place attractions	0.061	0.025	0.027	0.034	0.051	0.055	0.018	0.084
Market situation and size	0.128	0.202	0.052	0.098	0.089	0.047	0.036	0.212
Finance facilities	0.0179	0.187	0.019	0.019	0.018	0.018	0.028	0.019
Competitiveness	0.047	0.080	0.126	0.099	0.026	0.099	0.047	0.058
Government policies and laws	0.369	0.338	0.351	0.444	0.406	0.379	0.405	0.296
Probability of technical success	0.026	0.035	0.086	0.069	0.180	0.194	0.138	0.041
Inter-sectorial links	0.032	0.139	0.039	0.173	0.037	0.126	0.092	0.107

[a] Source: Research findings.

Table 7. Normalized weights criteria of poultry's businesses chains. [a]

Criteria	Normalized weights							
	Incubation	Poultry farming	Poultry feed	Vaccine and medicine	Equipment	Processing	Poultry services	Other businesses
Risk level	0.0241	0.052	0.072	0.023	0.028	0.108	0.079	0.059
Profitability	0.163	0.175	0.179	0.065	0.100	0.133	0.064	0.166
Place attractions	0.089	0.078	0.066	0.125	0.048	0.051	0.036	0.264
Market situation and size	0.197	0.124	0.196	0.188	0.164	0.191	0.214	0.200
Finance facilities	0.150	0.031	0.024	0.019	0.018	0.019	0.020	0.016
Competitiveness	0.039	0.085	0.108	0.141	0.152	0.089	0.123	0.121
Government policies and laws	0.376	0.399	0.298	0.357	0.389	0.343	0.353	0.088
Probability of technical success	0.035	0.037	0.015	0.047	0.072	0.029	0.072	0.031
Inter-sectorial links	0.061	0.0188	0.042	0.036	0.028	0.035	0.036	0.055

[a] Source: Research findings.

In future studies, fuzzy logic can be combined with the existing methodology to select the priorities and address uncertainty concerns in investment decision making.

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اولویت‌بندی سرمایه‌گذاری در زنجیره کسب و کارهای زیربخش دام و طیور

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چکیده

بخش کشاورزی نقش اساسی در توسعه، بویژه در کشورهای درحال توسعه ایفا می‌کند. سرمایه‌گذاری در کسب و کارهای کشاورزی مورد هدف می‌تواند زنجیره‌های ارزش کشاورزی را توسعه دهد. به دلیل کمبودهای سرمایه و نیازهای مختلف سرمایه‌گذاری این بخش، تخصیص سرمایه به یکی از موضوعات مهم تصمیم‌گیری برای مدیران و سرمایه‌گذاران بخش کشاورزی تبدیل شده است. سرمایه‌گذاران گزینه‌های سرمایه‌گذاری زیادی در بخش کشاورزی دارند و عواملی مانند بازدهی سرمایه‌گذاری، تخصص و علاقه سرمایه‌گذار، سیاست‌های دولت و مزیت‌های نسبی هر منطقه می‌تواند هدایت سرمایه به بخش‌های مختلف را تحت‌تأثیر قرار دهد. هدف اصلی این مطالعه بررسی اولویت‌های سرمایه‌گذاری در زنجیره‌های ارزش دام و طیورِ استان خراسان رضوی در ایران، برای بهبود انتخاب زمینه‌های سرمایه‌گذاری در صنعت دام و طیور و هدایت آن به سمت زمینه‌های مولد اقتصادی است. بنابراین نوآوری این پژوهش رتبه‌بندی چرخه‌های کسب و کار کل زنجیره‌های ارزش دام و طیور است. این مقاله مدل فرایند تحلیل شبکه‌ای (ANP) را برای تصمیمات سرمایه‌گذاری زنجیره کسب و کارهای کشاورزی که یکی از روش‌های تصمیم‌گیری چندمعیاره است مورد استفاده قرار داده است. نوآوری این پژوهش در آن است که فعالیت های کسب و کار کشاورزی در حوزه

زنجیره ارزش دام و طیور را رتبه بندی کرده و مهمترین حوزه ها برای سرمایه گذاری را مشخص می کند. نتایج نشان می‌دهد که "سیاست‌ها و قوانین دولت" مهمترین عامل برای انتخاب کسب و کار در زیربخش‌های دام و طیور است. همچنین کسب و کارهای خوراک دام و طیور بیشترین سهم را در پیشرفت زنجیره‌های ارزش دارند. بنابراین ثبات در سیاست‌گذاری و قوانین مناسب برای حمایت از مشاغل کشاورزی می‌تواند در این زمینه موثر باشد.