

Full Length Research Paper

Planning new management approach for milk production using the SWOT and the Fuzzy AHP model: A case study in the Sistan and Baloochestan province, Iran

Hamid Reza Mirzaei¹, Morteza Rojuee², and Amir Hossain Okhravi³

¹Department of Animal Science, University of Zabol, Iran.

²Department of Management, University of Imam Reza, Iran.

³MS industrial management, Ferdowsi University of Mashhad, Iran.

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This study is aimed at recognizing strengths (S), weaknesses (W), opportunities (O) and threats (T) of the milk producing assembly in the Sistan and Baloochestan province and planning a new approach for the efficient management of the animal husbandry industry of the province. Ten strong points, eighteen weak points, ten opportunities and thirteen threats were considered through a survey by means of a questionnaire based on existing conditions according to management and policy, financial performance, capital investment, efficiency, land and pasturages, animal hygiene, family, life style and region by 3 groups of officials in charge (20 persons), animal husbandry men (40 people) and graduates (40 people). The total of the weights, their medium, their relative weights, and the rank of each of the strong points, weak points, opportunities, and threats from the viewpoint of the 3 respondent groups was computed and the SWOT matrix was formed so as to ascertain the competing plans (SO), reviewing plans (WO), the variety plans (ST) and the defending plans (WT). Also for the purpose of final prioritizing, an importance coefficient between 0 and 1 was used in the form of %50 for the officials, 30% for the animal husbandries, and 20% for the graduates. The low death rate of animals is counted as the most important strong point and the level of capital investment rate was counted as the most important weak point for the expansion of the milk production plants. In addition to this, the demand for milk consumed by the families and the years of successive famine were recognized as the most important opportunity and threat for the expansion of these units. Then the Fuzzy AHP model was used -by designing the software- in order to prioritize the plans. On this basis, competing/invasive plans were prioritized in order to improve the conditions of the milk production plants in the Sistan region. Experimental analysis in the mentioned region shows that we can make use of the relative advantages of the region by offering suitable policies and increased capital investments.

Key words: SWOT model, Fuzzy AHP, managerial plan, milk production plants, sistan and Baloochestan Province, Iran.

INTRODUCTION

The province of Sistan and Baloochestan is one of the most expanded provinces of the country which is located

in the far end of the Southeast part of Iran and covers about 1100 km of the land border with Pakistan and

Afghanistan. Also it has about 300 km of water border with the Oman Sea. This province borders with Southern Khorasan province and Afghanistan on the North, Hormozgan and Kerman provinces from the West, Oman Sea from the South, and Afghanistan and Pakistan from the East.

It expands over an area of 187502 sq.km which is about 11.4% of the whole country with a relative population density of 7.7 persons per square kilometers. It has dry, desert type of weather with very minimal rain (the medium annual rain is about 100 millimeters). The province of Sistan and Baloochestan has 2963866 animal husbandry units (They possess about 23786000 cows, 1441566000 sheep and lamb, 1420613000 goats and about 77901000 camels). The province is considered to be one of the most important centers for animal husbandry in the southeast of the country as reported by the internet site of the Sistan and Baloochestan's governor. Considering the successive years of famine in recent years, the animal husbandry industry has suffered from a serious crisis. Therefore, proper planning and management of the animal husbandry sector can somewhat help solve existing problems. Management is defined as the process of guaranteeing the achievement of the benefits resulting from employing suitable approaches for a given system. According to this statement, a suitable approach is defined according to the needs of a given system for a definite period of time. Different models are available for the strategic planning of production units from profit-based business, non-profit and governmental units. One of the most used models in the management approaches is the Harvard model. The basic aim of this model is setting communications between the organization and its environment so as to achieve the best strategic choice. Measuring the strong points (S), the weak points (W), the opportunities (O), and the threats (T) which has become famous as SWOT, are the main point and the Harvard model. Emphasizing on the opportunities and the strong points as the most important factors for achieving effective approaches to solve the shortcomings and minimize the threats is the most positive facet of this model.

The management's has various roles such as stimulating production and service, planning and guidance, coordinating and overseeing, evaluating and innovating are issues that are closely considered in analyzing management approaches for planned expansion (Crittenden, 1997). These issues play an important role considering government's intervention in scheduling and management of production units. For this reason, it is attempted in this article to use the SWOT model in order to recognize the systematic conditions which govern the management system of animal husbandries units and milk production units in the Sistan and Baloochestan province and the compilation of the SWOT model. Then the strategic plans developed will be prioritized using the Fuzzy AHP model by using the opinion of industry experts.

LITERATURE REVIEW

The SWOT model

Previous studies have shown that performing SWOT analysis play a significant role in the success of the operations of the milk production units and creating new production capacities. In this model, two kinds of effective factors on the success will be investigated. One is the investigation of the inner factors which include the operational processes and the managerial decision makings made inside the animal husbandry unit which are under the control of the system's management to a great extent. The strong points and the weak points are a part of the inner factors. The strong points and the weak points may be determined by comparing past operation with the present operation and/or by comparing with the average expected operation of the industry in question (Bruynis and Zoller, 2007). The second kind of factors is the external factors that include opportunities and threats which affect the environment of the animal husbandry unit from the outside. The manager can have very little control over them and is not able to change them. These include competitors, financial intermediators, governmental institutions, unions and various organizations, share holders, finance providers, customers etc. (Alvani, 2008). On the whole, the inner and factors which are being investigated in this study are listed in Tables 2 and 3.

Until now, necessary and sufficient information about surveys which are related to the application of the SWOT model in animal husbandry and bird production units have not been reported in our country. However, these models have been extensively used in other countries in agriculture and animal husbandry units.

Some of the researchers Singh and Pundir (2003); Bandara (2002) have reported many of the approaches, the issues and the prospects for small milk producing units in south Asia and East Africa. Staal et al. (2008) have compared and surveyed the expansion policies for the milk production industry in south Asia and the East Africa. The strategic plan for milk production industry has been done in Pakistan under the title of "the white revolution" (Austin, 2006) especially in the small production units (Garcia et al., 2003; Hegdeh, 2006). Comprehensive strategic plans for milk production have been compiled and reported by the Baloochestan and Pakistan's provincial government (2005a, b). Strategic expansion plans for milk production units in the Asia Pacific (ESCAP, 2008), North Korea (FAO, 2004), India (FAO, 2007), Bangladesh (FAO, 2007), Mongolia/Japan (FAO, 2007), Myanmar (FAO, 2007), Nepal (FAO, 2004), Philippines (FAO, 2004) and Thailand (FAO, 2005) have also been reported.

Fuzzy AHP

In a situation in which the needed information is

Table 1. Triangular fuzzy conversion scale.

Linguistic scale	Triangular fuzzy scale	Triangular fuzzy reciprocal scale
Just equal	(1, 1, 1)	(1, 1, 1)
Equally important	(1/2, 1, 3/2)	(2/3, 1, 2)
Weakly more important	(1, 3/2, 2)	(1/2, 2/3, 1)
Strongly more important	(3/2, 2, 5/2)	(2/5, 1/2, 2/3)
Very strongly more important	(2, 5/2, 3)	(1/3, 2/5, 1/2)
Absolutely more important	(5/2, 3, 7/2)	(2/7, 1/3, 2/5)

quantified, they will be stated numerically. However, when the research to be done in terms of quality and there is some vagueness in related information, the information cannot be stated in exact numbers. In these conditions managers cannot offer an exact number for explaining their ideas either. This is the reason why they use verbal evaluation instead of using specific numerical values (Kacprzyk, 1986). Since verbal evaluation is done by people in an approximate way, use of triangular and trapezoidal membership functions are suitable means for overcoming the vagueness of such evaluations (Sabeti, 2009). In spite of the benefits which are usually claimed for hierarchical analysis, this method has been criticized for being unable to take uncertainties and the vagueness of information provided by some decision makers into account (Deng, 1999). However, as it was explained before, the use of FAHP for benefiting from the decision makers' vague and probabilistic opinions has been recommended (Shishe and Hejazi, 2010).

In 1983, two Polish researchers called Larhoon and Pedreek proposed a method for the hierarchical fuzzy analysis process which has been based on the least squares logarithmic approach. However, the complexity and the extent of calculations in this method have caused it not to be used much.

In 1996, another method called extent analysis was proposed by a Chinese researcher called Yung Chang. The numbers used in this method are triangular fuzzy numbers. Triangular fuzzy numbers are usually used in descriptive conditions and trapezoidal numbers are used for forecasting. Triangular numbers are used in this study since descriptive information has been used. The fuzzy hierarchical analysis approach is presented subsequently. Consider two triangular fuzzy numbers $M_1 = (L_1, m_1, u_1)$ and $M_2 = (L_2, m_2, u_2)$ as shown in Figure 1. Then:

$$M_1 + M_2 = (L_1 + L_2, m_1 + m_2, u_1 + u_2)$$

$$M_1 \times M_2 = (L_1 L_2, m_1 m_2, u_1 u_2)$$

$$M_1^{-1} = \left(\frac{1}{u_1}, \frac{1}{m_1}, \frac{1}{L_1} \right) \quad M_2^{-1} = \left(\frac{1}{u_2}, \frac{1}{m_2}, \frac{1}{L_2} \right)$$

It should be noted that the result of multiplying two fuzzy numbers or the inverse of a triangular fuzzy number is no more a triangular fuzzy number. These relations only

present an approximation for the product of the two triangular fuzzy numbers.

In the extent analysis method, the SK value which itself is a triangular fuzzy number is computed for each row of the comparison matrix as follows:

$$S_k = \sum_{j=1}^n M_{kj} \times \left[\sum_{i=1}^m \sum_{j=1}^n M_{ij} \right]^{-1}$$

Where "K" is the row number, and I and j are the indices.

In this method we must obtain the relative size of values obtained after calculating the various S_k . In general, if S1 and S2 are two triangular fuzzy numbers, the relative size of S1 as compared to S2 is defined as follows:

$$V(s_1 \geq s_2) = 1 \quad m_1 \geq m_2 \text{ If;}$$

$$V(s_1 \geq s_2) = \frac{u_1 - L_2}{(u_1 - L_2) + (m_2 - m_1)} \quad \text{other wise}$$

The relative size of a triangular fuzzy number compared with k other triangular fuzzy numbers is obtained from:

$$V(s_1 \geq s_2, \dots, s_k) = \min \{ V(s_1 \geq s_2), \dots, V(s_1 \geq s_k) \}$$

Also for calculating the indicators' weights in the pairwise comparison Matrix, we act as follows:

$$w'(x_i) = \min \{ V(S_i \geq S_k) \} \quad k = 1, 2, \dots, n, \quad k \neq i$$

So the indicators weight will be as follows:

$$w' = [w'(x_1), w'(x_2), \dots, w'(x_n)]^t$$

That is the same vector of unnormalized coefficients of the hierarchical fuzzy analysis. Then the normalized weights for the indices are calculated on the basis of the following relation (Azar and Faraji, 2002):

Table 2. The matrix of the inner factors on the Sistan and Baloochestan’s animal husbandries.

The Strong points (S)		The responsible ones				The domesticated animal keepers				The graduates			
		The weights' total	The weights' medium	The relative weight	The rank	The weights' total	The weights' medium	The relative weight	The rank	The weights' total	The weights' medium	The relative weight	The rank
S1	The lowness of the death rate of the domesticated	100	4	0.4	1	163	3.98	0.39	1	156	3.89	0.38	2
S2	The partnership of the family members and the task division	100	4	0.4	1	135	3.3	0.33	4	109	2.73	0.27	8
S3	The land sources with high fertility	100	4	0.4	1	144	3.52	0.35	3	141	3.53	0.35	3
S4	The greatness of the cows' milk production	88	3.52	0.35	2	159	3.89	0.38	2	160	4	0.4	1
S5	The likelihood of the future generation to continue the profession of nurturing cows	82	3.28	0.32	3	122	2.98	0.29	6	98	2.45	0.24	10
S6	The order of suitable record- taking	71	2.84	0.28	4	109	2.63	0.26	9	122	3.05	0.3	6
S7	The income’s currency outside the farm	69	2.76	0.27	5	104	2.58	0.25	10	129	3.23	0.32	4
S8	The program of making the cows' pairing at one time	68	2.72	0.27	6	128	3.15	0.31	5	126	3015	0.31	5
S9	The likelihood according to using new techniques	64	2.56	0.25	7	121	2.93	0.29	7	121	3	0.3	7
S10	The order of using high technology in food provision	63	2.25	0.22	8	119	2.9	0.29	8	108	2.7	0.27	9
The weak points (W)													
W1	A lot of investments in making place for the domesticated animals	97	3.88	0.21	1	122	2.98	0.16	11	138	3.45	0.19	8
W2	The dependence of milk productions on the fodder’s rate	96	3.84	0.21	2	145	3.56	0.19	5	154	3.85	0.21	2
W3	The insufficient available sources of water	96	3.84	0.21	2	151	3.68	0.2	2	149	3.73	0.2	5
W4	The low area of the fertile lands	92	3.68	0.2	4	144	3.55	0.19	6	145	3.62	0.2	6
W5	The decrease of the pregnancy rate in cows	92	3.68	0.2	5	142	3.48	0.19	7	154	3.53	0.19	2
W6	The investment shortage	91	3.64	0.2	6	150	3.68	0.2	3	152	3.8	0.21	3
W7	The insufficient saving of dry fodder	90	3.6	0.2	7	148	3.6	0.2	4	151	3.78	0.21	4
W8	The reduction of milk production	89	3.56	0.19	8	142	3.45	0.19	7	156	3.9	0.39	1
W9	The decrease in milk’s production	89	3.56	0.19	9	154	3.83	0.21	1	141	3.53	0.19	7
W10	The greatness of production expense	87	3.48	0.19	10	150	3.65	0.2	3	149	3.73	0.2	5
W11	The weakness of husbandry’s aids	84	3.36	0.18	11	129	3.18	0.17	10	121	3.02	0.17	12
W12	The foot problems	83	3.32	0.18	12	129	3.15	0.17	10	126	0.15	0.17	11
W13	The shortage of experienced and educated husbandry managers	78	3.12	0.17	13	136	3.3	0.18	9	135	3.38	0.18	9

W14	The shortness of the useful lifetime of the bearing cows	77	3.08	0.17	14	136	3.38	0.18	9	145	3.62	0.2	6
W15	The increase in the nipples' #	76	3.04	0.16	15	139	3.4	0.18	8	126	3.15	0.17	11
W16	The unsuitableness of replacement #	74	2.96	0.46	16	129	3.13	0.17	10	127	3.17	0.17	10
W17	The oldness of the equipment	66	2.64	0.14	17	116	2.8	0.15	12	138	3.45	0.19	8
W18	The problems in managing the workers	57	2.28	0.12	18	116	2.85	0.15	12	116	2.9	0.16	13

Table 3. The matrix of the outer factors on the Sistan and Baloochestan's animal husbandries

Opportunities (O)	The responsible ones				The domesticated animal keepers				The graduates				
	The weights' total	The weights' medium	The relative weight	The rank	The weights' total	The weights' medium	The relative weight	The rank	The weights' total	The weights' medium	The relative weight	The rank	
O1	The demand for using milk among the families	100	4	0.4	1	152	3.73	0.37	2	156	3.9	0.39	1
O2	The suitable supports over the agricultural section	100	4	0.4	1	155	3.78	0.37	1	147	3.68	0.36	3
O3	The availability of cheap man power	97	3.88	0.38	2	126	3.13	0.31	4	127	3.17	0.31	5
O4	The inclination to sell milk instead of house use	94	3.76	0.37	3	133	3.25	0.32	3	153	3.83	0.38	2
O5	The demand from the milk units	76	3.04	0.3	4	123	3.02	0.3	6	102	2.55	0.25	8
O6	The fact that the supportive groups in the industry section are a lot	69	2.76	0.17	5	125	3.05	0.3	5	107	2.68	0.26	7
O7	being next to the border areas	56	2.24	0.22	6	104	2.55	0.25	10	91	2.28	0.22	10
O8	The possibility of food import	56	2.24	0.22	6	108	2.68	0.26	8	120	3	0.3	6
O9	The availability of rental land	45	1.8	0.18	7	106	2.58	0.25	9	145	3.63	0.36	4
O10	Extensive import of livestock	43	1.72	0.17	8	115	2.78	0.27	7	101	2.52	0.25	9
The threats (T)													
T1	successive droughts	100	4	0.33	1	160	3.9	0.32	1	147	3.68	0.3	3
T2	The variations of price of milk	100	4	0.33	1	149	3.65	0.3	2	154	3.85	0.32	2
T3	shortage of financial resources in milk production section	99	3.96	0.33	2	144	3.53	0.29	3	160	4	0.33	1
T4	dangers of contagious disease through imports	94	3.76	0.31	3	133	3.3	0.27	8	117	2.93	0.24	9
T5	expansion of roads in the area	86	3.44	0.28	4	135	3.28	0.27	6	145	3.63	0.3	4
T6	The unacquaintance of the domesticated animal keepers with new management	84	3.36	0.28	5	124	3.07	0.25	9	133	3.33	0.27	7
T7	absence of supportive insurance system for the milk producers	83	3.32	0.27	6	142	3.5	0.29	4	114	2.85	0.23	10
T8	marketing problems	82	3.28	0.27	7	124	3	0.25	9	118	2.95	0.24	8
T9	lack of milk storage facilities	81	3.24	0.27	8	140	3.4	0.28	5	135	3.38	0.28	6

T10	Man decision makers and managers	79	3.16	0.26	9	134	3.33	0.27	7	144	36	0.3	5
T11	The existence of dust and storm in some days	76	3.04	0.25	10	118	2.85	0.23	11	112	2.8	0.23	11
T12	Worry about polluted milk	62	2.48	0.2	11	121	2.95	0.24	10	112	2.8	0.23	11

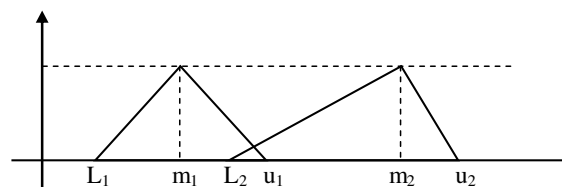


Figure 1. Addition, multiplication and inversion of triangular fuzzy numbers (Azar and Faraji, 2002).

$$w_i = \frac{w'_i}{\sum w'_i}$$

Using the fuzzy numbers in pairwise comparisons is based on Table 1. These numbers have been defined slightly differently in various sources. The triangular fuzzy numbers used by Bozbura and Beskese (2007) have been used in this study.

The goal of the research

The goal of this research is the use of the SWOT model and evaluating the management of small animal husbandry units especially in the provinces of Sistan and Baloochestan for the first time in Iran. Without doubt it is necessary to take a serious step to develop strategic management plans in such units in order to increase their efficiency and productivity. Therefore, the main goals of this research are defined as follows:

1. Recognizing the strong points, the weak points,

the opportunities and the threats of the management of milk production units in the Sistan and Baloochestan province

2. Developing strategic plans for efficient management of the animal husbandry industry for the future.

3. Prioritizing the developed plans.

The research questions

Besides the necessity of performing the complete strategic plan and the lack of sufficient research done on this topic, this research is important from another point of view. The mixing of the state government and the performance of the affairs by the private and the cooperative sections, a special form of management of the animal and the birds producing units in the province of Sistan and Baloochestan has been developed. So, both the chaos resulting from the actions and the lack of a complete strategic plan will cause the loss of the nation's resources. So, by performing this research we can survey and analyze two basic questions which are as follows:

1. How is the management of the milk producing units in the Province of Sistan and Baloochestan?
2. What ways and strategies are available in order to improve the management conditions in milk producing units?

The research methods

The stages of this research are as follows:

The 1st step: By using a questionnaire and asking the

opinion of the Sistan and Baloochestan's animal husbandry, the strong points, the weak points, the opportunities and the threats of this industry are extracted and then they are prioritized.

In this stage, we have benefitted from the opinions of 100 expert persons including 20 people from the government office of animal affairs, 40 persons working in animal husbandry from 3 different villages including Sistan and Khash, plus 40 graduates in the field of animal husbandry.

The 2nd step: Various competitive (SO), reconsideration (WO), Variety (ST), and defensive (WT) strategies were developed using the SWOT model.

The 3rd step: The weights for the two most important strong points, weak points, opportunities and threats were calculated using hierarchical fuzzy analysis based on extent analysis method and using the pair wise comparison matrix relying on the opinions of three experts in the animal husbandry industry in the Sistan and Baloochestan province (one of the officials, one industry worker and one graduate). And then the various strategies were evaluated based on these factors and were then prioritized.

In order to collect information from the two questionnaires, instruments for gathering the data and checking the list of (the real data) for data collection, library written sources and existing documents have been used. In order to collect information related to the milk producing units, a questionnaire about governing, policy, financial performance, investment, profitability, land and cultivation issues, animal hygiene, family and life style, and the regional characteristics were considered.

A pilot study was carried out by ten percent of the province units answering the research questionnaire. A review of the answers resulted in some corrections in the questionnaire. And finally a complete questionnaire was compiled which whose validity was certified by experts. The reliability of the questionnaires was computed by using Cronbach's Alpha via SPSS. The questionnaire's alpha

was 81% which indicates its stability and high degree of reliability.

The SWOT model compilation

The stages of compiling the SWOT model in this research are as follows: Recognizing the inner factors (the strong points and the weak points) and the external factors (the opportunities and the threats), prioritizing the inner and the outer factors, forming the SWOT matrix, entering the chosen factors by paying attention to prioritizing and comparing the inner and the outer factors with each other and determining the strategies for SO, WO, ST and WT, and determining the steps to be taken on the basis of the developed strategies.

On the basis of the available condition, the collection of the strong points, weak points, and also the available opportunities and the threats and their effectiveness on the animal husbandry units in the frameworks of (management and policies, financial performance, investment, efficiency, land and farm use, animal hygiene, family and life style, and the regions in question) were considered and studied. In this research, 10 inner strong points versus 18 inner weak points and 10 outer opportunities versus 13 outer threats were recognized and surveyed. A total of 20 strong points and opportunities were considered as the advantages and 38 weak points and threats were considered as the limits in order to expand the animal husbandry units. In Table 2, the inner evaluation matrixes factors are presented while in Table 3 the external matrix factors are presented.

The total of the given weights, the weight's medium and the relative weight of each of the strong points, weak points, opportunities and the threats from the viewpoint of the three respondent groups is counted as follows:

1. By paying attention to the ideas of the ones in charge, the domesticated animal keepers and the graduates, the strong points and the weak points were determined based on the amount and the priority of being effective and the importance for each one of the inner factors based on the present condition with four degrees of intensity as follows: (It is very important, It is important, It is less important and It is not important).
2. The given priority to each one of the strong points, the weak points, the opportunities and the threats was counted by paying attention to the ideas of the three respondent groups. For final prioritizing, an importance factor between zero to one was considered as follows: 50% for the ones in charge, 30% for the domesticated animal keepers and 20% for the graduates. In this order, the strong points, the weak points, the opportunities and the threats were prioritized as shown in Table 4.

Compilation of strategies (The SWOT Matrix)

The competitive/ invasive approach (SO)

In the frame of these approaches, the system tries to benefit from the outer opportunities by using the inner strong points and also tries to optimize the opportunities by benefitting from the strong points.

The reevaluation/adapting approach (WO)

The aim of these approaches is that the system be benefitting from the available opportunities in the inner environment try to improve the inner weak points.

The variety/ necessity approach (ST)

By performing these approaches, the systems tries to reduce or

destroy the effects resulting from the available threats by using their strong points.

The defensive approach (WT)

The organizations which use this approach adopt a defensive state for themselves. And the aim from this approach is reducing the inner weak points and preventing the effects of the threats from the outer environment. In fact, such an organization tries to reduce its activities for its own survival, it blends into other systems, and it declares bankruptcy or finally stops operation. With this explanation, all of the approaches and the strategies for the expansion of the milk husbandry units were derived as follows:

The competitive/ invasive approach (SO)

In the competitive approach where the concentration is on the inner strong points and the outer opportunities, the following strategies (Table 5) are offered for benefiting from the available superiorities meant for expanding the studied husbandries:

1. Emphasis put on expanding the industrial husbandries and the common husbandries under control for the purpose of the availability of relative advantages for expanding these kinds of husbandries in the studied areas.
2. Efficient use of the increased motivation for owning an animal husbandry unit for the purpose of increased products and employment for the inhabitants of the Sistan and Baloochestan province.
3. Recognizing and benefiting from the benefits, the products and the other relative advantages of these areas' animal husbandry for competing with other areas.
4. Using expert and experienced manpower for forming cooperatives. Also spreading and teaching animal husbandry by carrying on different sessions with the people.
5. Creating coordination between different related units and sections so as to unify the functions of the industrial and the common animal husbandry units by carrying out sessions and using coordinating management policies with the presence of government and nongovernment institutions and organizations, people and entrepreneurs.
6. Creating a basis for benefiting from the supports of the private section for investing on the domestic animal husbandry industry in this province by clarifying the institutional policies and the local programs, the tax laws, subsidies, bank loans, etc.
7. Concentration of the activities of animal husbandry units on profitable activities in order to make better use of available resources, earning more income and creating new jobs and further expansion.

The reevaluating/adapting approach (WO)

In the reevaluating approach, the main goal is to benefit from the outer opportunities, to alleviate the weak points while emphasizing on the inner weak points. For this reason, the following strategies are offered:

1. Logical use of supporting laws and regulations in order to expand and mobilize the underlying structures, different facilities and equipments in the studied area while reviewing the kind of programming and institutional support in these areas.
2. Reevaluating the way resources, services and facilities are allocated and prioritizing them.
3. Reevaluating land use laws and regulations and presenting the needed licenses.

Table 4. Final prioritizing of the strong points, the weak points, the opportunities and the threats.

The strong points (S)	Priority	The opportunities (O)	Priority
The lowness of the domesticated animal's death rate	1	The milk use demand	1
The greatness of the cow's milk production	2	Suitable support of the agriculture section	2
The high land sources and fertility	3	Existence of rental lands	3
The cows' pairing	4	The possibility of importing animal food through border markets	4
The partnership of the family members	5	Being side by side of border areas	5
Inclination to continue the profession of nurturing cows	6	Likelihood to sell milk	6
Proper record keeping system	7	The existence of cheap man power	7
Use of income outside the unit	8	Extensive import of domesticated animal	8
Inclination to use new technology	9	The supportive groups in the industry section	9
Use of high technology feeding	10	Demand for payoff of payments	10

The weak points (W)	Priority	threats (T)	Priority
The low level of investment	1	Droughts	1
The dependence of milk production upon fodder	2	Shortage of financial sources in the production section	2
The decrease in milk production	3	The variations of the price of milk	3
Investment shortage	4	The way expansions	4
The small amount of fertile lands	5	Existence of dust and vapor existence	5
Increased inflammation of breast	6	Unfamiliarity of domesticated animal keepers with the new management	6
Insufficient saving of dry fodder	7	Multiple management	7
The decrease in pregnancy rate	8	Lack of milk keeping system	8
The greatness of production expense	9	The market finding problems	9
The shortage of experienced managers	10	The dangers of the diseases' transport from the outside	10
The oldness of the equipment	11	Lack of insurance system	11
Foot problems	12	The concern for using polluted milk	12
The weakness of veterinarian help	13	The shortage of expert workers	13
Over investment	14		
Uncontrolled import of domesticated animals	15		
The effect of the calf's feeding on milk production	16		
The problems of the workers' management	17		
The shortness of the useful lifetime of the cows	18		

4. Reevaluating and expanding the associated offices in the relevant region in order to provide education for the people so as to make the best use of animal husbandry.

The variety/ necessity approach (ST)

In this approach the following strategies are proposed in

order to provide for some of the needs with an emphasis on the internal strengths and the external threats:

1. Providing variety to the animal husbandry facilities,

Table 5. The SWOT Matrix and how to determine strategies

SWOT	The strong points (S)	The weak points (W)
The opportunities (O)	The competitive approach (SO)	The reevaluating approach (WO)
The threats (T)	The variety approach (ST)	The defensive Approach (WT)

Table 6. The opinions of one of the experts about the comparison of the offered strategies for “the greatness of the milk production”.

Variable	SO	ST	WO	WT
SO	1	2	3	4
ST	1/2	1	2	2
WO	1/3	1/2	1	2
WT	1/4	1/2	1/2	1

Table 7. The equivalent matrix for counting the adaptation factors.

Variable	SO	ST	WO	WT
SO	1	1	1.5	2
ST	1	1	1	1
WO	0.67	1	1	1
WT	0.5	1	1	1
Total	3.17	4	4.5	5

activities and services in order to provide the satisfaction of the workers in the animal husbandry unit and consequently increasing the number of the animal husbandry units in the region.

2. Ascertaining the desirable density of population in the various fertile lands in different places in the province in order to reduce the pressure on these regions and not overburdening them to prevent their destruction.

3. Expanding farming in order for the animal raisers to benefit from them and make some money and prevent the destruction of farm land.

4. Expanding advertising programs for introducing the benefits of animal husbandry in solving the problems of unemployment and reducing crime rate.

The defensive approach (WT)

In this approach by emphasizing on the alleviation of the vulnerabilities of the studied area, the below strategies are offered:

1. Conducting seminars and meetings for the expansion of investment in the animal husbandry industry by the city council or the villages council with the help of other related organizations and associated officials and entrepreneurs; inviting the internal and foreign investors; providing special investment facilities and privileges in the field of building collection units for the villagers' milk and other milk products, and building milk processing factories.

2. Educating and informing the people about ways to increase production.

3. Planning and encouraging the people to cooperate in expanding the animal husbandry units and their facilities and earning more income as a result of this. Also benefiting from investment by the private sector in areas where the local people themselves cannot finance.

4. Encouraging the workers in animal husbandry units for expansion by using the research done in this field and in marketing in order to benefit from advertising in new markets.

Prioritizing planned strategies based on the fuzzy AHP model

Members of the decision making team have reported their opinion about each pairwise comparison in one of six levels as shown in Table 1.

Consistency rate

Although, the consistency rate has not been used in several cases for hierarchical fuzzy processing (Azar and Faraji, 2002; Noori et al., 2007; Sabeti, 2009; Najafi and Karimi, 2009; XU, 2006; Chan et al., 2008; Huang et al., 2009). It has been referred to in some research studies (Shishe and Hejazi, 2010; Lam et al., 2008, Lee, 2009; Ying and Chang, 2009). In other words, it is not approved of by all researchers. For more confidence in the results obtained we have used consistency rate as reported by Ying and Chang (2009). The consistency rate must not be more than 0.1. Otherwise, those matrixes are inconsistent (Ying and Chang, 2009). We report the procedure to calculate the consistency rate using one of the tables which has been filled by one of the experts. The remaining rates have been calculated in the same way. Table 6 shows some data recorded by one of the experts. For calculating the consistency rate, these numbers must be changed to the medium value by using Table 1. Now as it was stated, the equivalent of these numbers mean has been written in Table 7.

To continue, firstly the weight of each received factors and then the medium of the weights of each rows has been counted. After this operation, the received weights in the column have been multiplied in linear way with the numbers of the equivalent matrix. The medium of these numbers is equal to lambda. Then, the consistency factors have been determined by using these relations:

$$CI = (\lambda - n) \div (n - 1) , CR = CI \div RI$$

The value of n is equal to the number of the factors which are compared. Also the value of "RI" follows the value of "n". If n=4, then RI is equal to 0.90. The results are shown in Table 8.

$$* 1 \div 3.17 = 0.3155$$

$$** (0.3155 + 0.25 + 0.3333 + 0.4) \div 4 = 0.32$$

$$\# (0.32 \times 1) + (0.25 \times 1) + (0.22 \times 1.5) + (0.21 \times 2) = 1.32$$

$$@ 1.32 \div 0.32 = 4.059$$

$$CI = (\lambda - n) \div (n - 1) = (4.047 - 4) \div (4 - 1) = 0.0157$$

Table 8. Counting the consistency factors.

Variable	SO	ST	WO	WT	Weight	A*W	Lambda
SO	0.3155*	0.25	0.3333	0.4	0.32*	1.32#	4.059@
ST	0.3155	0.25	0.22222	0.2	0.25	1.00	4.050
WO	0.2114	0.25	0.22222	0.2	0.22	0.89	4.042
WT	0.1577	0.25	0.22222	0.2	0.21	0.84	4.037
Medium							4.047

$$CR = CI \div RI = 0.0157 \div 0.90 = 0.0174 < 0.1$$

So, the consistency rate for this matrix is 0.0174 which is less than 0.1. Thus the values are reliable. The consistency rates of the other matrices were also validated after calculating.

Final fuzzy matrices

In what follows we shall discuss the final fuzzy matrices which have been obtained from the geometric mean of the expert opinion as shown in Table 9 in the form of pairwise comparisons offered for demand for milk among the families which have been shown in fuzzy form.

In explanation of the presented numbers in the Table, a sample has been offered. As an example in the 1st row and the 2nd column of Table 9, these numbers have come: (0.85, 1.44, and 1.99). As it was stated, these numbers are inverted. Also by paying attention to the pairwise fuzzy comparisons' rules (Azar and Faraji, 2002) the reverse cell of this cell, that is, the 2nd row and the 1st column of Table 9: (0.5, 69, 1, 17) has been obtained in this way:

$$(0.85, 1.44, 1.99) \gg (1/1.99, 1/1.44, 1/0.85) \gg (0.5, 0.69, 1.17)$$

The other entries in the tables have also been obtained this way by the designed software. And after performing the fuzzy AHP calculations in the fuzzy expansion analysis the weights of each factor and strategy are determined as shown in Table 10. Then by paying attention to each one of the factors, the kinds of the strategies were evaluated and prioritized. The results of these accounts have been shown in table 11.

RESULTS AND DISCUSSION

By paying attention to the theoretical sources of the research and the field studies using the SWOT technique, the capacities and the limits of the husbandry in the studied area were distinguished. And practical answers and approaches were offered so as to manage milk production. Because of this, the received results can be offered in the two quantitative and qualitative aspects. The results of the qualitative aspects of each one of the effective inner and outer recognized factors are the following issues:

1. The vulnerability of most rural areas which have animal

husbandry is very high because of their expansion.

2. The superiorities and privileges of the village areas are mostly confined.

3. The needs of these areas are very high because of having husbandry considering the threats and the limitations of opportunities.

4. Redistribution of resources in the studied area is necessary considering the opportunities and the high amount of weak points.

Examining the results of the quantitative aspects of the strong points, the weak points, the opportunities and the strengths shows that: Among the strong points in the studied area, environmental factors, such as the lowness of the domestic animals' death and the highness of the cows' milk production are counted as the most important advantage for expanding the husbandries.

1. More to this, from amongst the external opportunities, the peoples' motivation for having animal husbandry in these areas especially in Sistan and Baloochestan is high. By paying attention to the offered approaches, the most use can be made from these cases so as to expand the animal husbandries.

2. From the external threats consecutive famines (Mirzaei, 2008) and the limitations of investment of financial resources in the milk production section is considered to be one of the most important external threats. Defensive strategies have been proposed to overcome these threats.

3. Considering what was said we can say that if the industrial and traditional animal husbandries units are to survive and become stabilized and play an effective role in the lives of the people, there is a need to define specific plans for local participation, simplified rules and regulations, good marketing and realistic planning. We recognize that the poor management, lack of evaluation and supervision system and also the dependence of animal husbandry units on other factors such as the dependence of the milk production on animal food products causes an increase in the vulnerability of these units.

4. To sum up, considering the gained results it seems that the competitive / offensive strategy has a higher priority amongst the strategies for the animal husbandry units in this region.

Table 9. The group-Fuzzy matrix of the offered pairwise comparisons for “Demand for milk among the families”.

Variable	SO	ST	WO	WT
SO	(1, 1, 1)	(1.99, 1.44, 0.85)	(2.36, 1.82, 1.23)	(3.13, 2.62, 2.11)
ST	(1.17, 0.69, 0.50)	(1, 1, 1)	(1.31, 1, 0.63)	(2.11, 1.59, 1.04)
WO	(0.81, 0.55, 0.42)	(1.59, 1, 0.76)	(1, 1, 1)	(1.50, 1, 0.50)
WT	(0.47, 0.38, 0.32)	(0.96, 0.63, 0.47)	(2, 1, 0.67)	(1, 1, 1)

Table 10. The weight of each one of the factors and the strategies.

Factors	S1	S2	W1	W2	O2	O2	T1	T2
The weight of the factors	0.20	0.04	0.11	0.08	0.14	0.07	0.21	0.15
SO	0.47	0.27	0.52	0.33	0.43	0.52	0.28	0.30
ST	0.32	0.25	0.27	0.28	0.24	0.28	0.40	0.27
WO	0.21	0.24	0.11	0.23	0.19	0.17	0.21	0.25
WT	0.00	0.24	0.10	0.16	0.14	0.03	0.11	0.18

Table 11. The normalized weight of the strategies and determining their priority.

Variable	S1	S2	W1	W2	O2	O2	T1	T2	Total of normalize weight	Strategy priorities
SO	0.094	0.0108	0.0572	0.0264	0.0602	0.0364	0.0588	0.045	0.3888	1
ST	0.064	0.01	0.0297	0.0224	0.0336	0.0196	0.084	0.0405	0.3038	2
WO	0.042	0.0096	0.0121	0.0184	0.0266	0.0119	0.0441	0.0375	0.2022	3
WT	0	0.0096	0.011	0.0128	0.0196	0.0021	0.0231	0.027	0.1052	4

SUGGESTIONS

1. Using skillful and experienced man power in order to expand the animal husbandry
2. Expansion of animal husbandry for increasing income and making employment in order to reduce unemployment and social problems by mechanizing the farming and animal husbandries.
3. Making a uniform management of resources, guidance, control, supervision and development of animal food products especially milk products.
4. Easing rules and regulations.
5. Increasing the participation of the people by expanding education.
6. Suitable and stable marketing.
7. Realistic planning.
8. Paying attention to insurance for the units and their employees
9. Benefiting from the expert opinion of the specialists.
10. Putting an exact surveying procedure into effect and recording their variations.

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