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Identification of Appropriate Strategies to Improve and Develop Private Agricultural Extension System: A Study in Mazandaran Province, Iran

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Abstract

In many countries, private sector provision of agricultural extension services is recognized as a key factor in the process of agricultural development. Insufficient attention to the private agricultural extension system in Iran, despite its relative success, has made it imperative to explore and identify appropriate strategies to improve and develop its activities. The statistical population of the present study consisted of 40 knowledgeable and experienced experts of agricultural consultation and technical service firms as a sample of private extension systems in Iran. The research used the SWOT and TOWS methods as the basis for the AHP technique known as the hybrid A'WOT method. In the first step of the research, the strengths, weaknesses, opportunities, and threats of these firms were evaluated. The results of the first step were used to extract 11 strategies by the TOWS diagram. In the second step, to identify the most appropriate strategies to improve the performance of private extension firms, 12 experienced experts were sampled from the research population by the snowball technique. The research instrument was two questionnaires whose validity were determined by face and content validation methods and whose reliability were estimated by Cronbach's alpha and inconsistency ratio strengths, weaknesses, opportunities, and threats were assessed in the first step. Then, TOWS was employed to develop 11 strategies. In the second step of the research, the AHP technique was used to identify the most appropriate strategies. The ranking of the strategies revealed that the strategies "financial support of firms and farmers in order to lay the ground for the privatization of agricultural activities" and "orienting the attitudes of the policymakers and managers of the public sector towards the role of private extension activities" were the most important strategies to improve and develop these firms in Mazandaran province, so they should be considered by the officials.

Keywords:
Agricultural consultation and technical service firms; agricultural extension privatization; analytic hierarchy process (AHP); SWOT

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INTRODUCTION

The growing development of human knowledge and the accomplishment to novel techniques in different sectors have made the use of the current knowledge and its integration with local conditions and facilities a necessary part of the agricultural sector so that farmers, especially smallholders, have used this knowledge in recent years to make a big difference in their performance and productivity. Experts of agriculture suggest that the main reason why farmers do not welcome the new sciences is that they lack adequate connection with information sources, so they are not adequately informed about their benefits (Rahimi et al., 2014). Major farmers receive the information they need from agricultural extension services, which is mainly managed and provided by the Ministry of Agriculture.

In many developing countries, ministries of agriculture hold a large administration with heavy and multiple tasks like vocational training and extension work. They have many problems with staff and budget and role conflict on a large scale. Public extension organizations are common in these counties, their effectiveness is limited by many deficiencies and challenges (Eicher, 2007; Yazdanpanah & Rahimifayzabad, 2019). In addition of these problems, weak performance of the public extension system and the current financial crisis showed that the extension organization has not succeeded and the current extension model needs to be reformed (Yazdanpanah & Rahimifayzabad, 2019). In this regard, there is a global tendency to withdraw governmental structures from these areas of activity and move toward privatization (Hoffmann, 2009; Mousavi & Moghaddasi, 2017). It seems that lack of private extension leads to increasing problems of rural development.

Studies show that the agricultural extension in Iran, like many other countries, is in an unfavorable situation and has not yet been able to develop promotional practices, formulate goals and objectives, organize structures and organizations (Alizadeh et al, 2019; Karimi-Gougheri et al, 2018), technology transfer, food security, poverty alleviation, social justice and environmental protection, as it should (Karimi-Gougheri et al, 2018). Iran's agricultural extension system needs to change in order to achieve agricultural and rural development (Rezaei-Moghaddam & Fatemi, 2019). In this regard, an effective and efficient agricultural extension system needs to develop its capabilities to change the environment and overcome these internal and external changes. (Sharma, 2003). Therefore, the agricultural extension system must meet its strategies in order to respond to redirect these new and changing needs (Feali et al, 2015).

In recent years, in order to overcome the challenges facing the agricultural extension system, different approaches such as decentralization and privatization have been proposed in different countries (Alizadeh et al, 2019). The private agricultural extension are perceived to be more efficient in extension service delivery (Ali, 2013; Muyanga & Jayne, 2008; Rana et al., 2013; Sylla et al., 2019; Naeem & Hassan, 2014) and a key factor in the development of agriculture (Ahmadpour & Soltani, 2014; Anderson & Feder, 2007).

In this case, governments should create the environment for private sector activity, For example, provides and maintains the necessary infrastructure, support for knowledge systems and the establishment and maintenance of political stability and continuity and physical security (Hoffmann, 2009)

The privatization of agricultural extension commenced in Iran in 2002 (Rahimi et al., 2014) mainly triggered by the inefficiency and poor quality of the public extension services (Alizadeh et al, 2019; Karimi-Gougheri et al, 2018) and the financial constraints of the public extension services (Asadi et al., 2008). It was also the result of the government's general policy of emphasizing privatization (Rahimi et al., 2014). As such, the process of using the experts of the private sector for agricultural extension in Iran was triggered by Wheat Consultant Engineers Project

(WCEP) in 2002. WCEP aimed to motivate the recruitment of experts by producers and the expansion of training and extension by using the technical services of the private sector and cooperatives in order to enhance the production of strategic crops. WCEP, which is considered to be the first step of privatization of agricultural extension in Iran, was initiated by taking advantage of the services of agricultural graduates on wheat farms and was extended to other staple crops including rice and oilseeds. Following the evolution of WCEP, the Agricultural and Natural Resources Engineering Organization (ANREO) became more active. ANREO had been established in 2001 to organize agriculture graduates who were participating in the project of farm consultants, as well as other agriculture graduates. ANREO organized those graduates who cooperated with the project of farm consultants within firms, came to be known as *Agricultural Consultation and Technical Service Firms* (ACTSF), in order to legalize their activity in the form of private agricultural extension and to give them more freedom of operation in all agricultural fields in the context of these firms.

A review of the literature shows that PAES has been relatively successful over the years. In this respect, Rahimi et al. (2016) assessed the establishment and exploitation of this system to be positive. In their research, they underlined the beneficial effects of the establishment of these firms on four dimensions – the development of agriculture, the development of extension training activities, the development of sustainable agriculture practices, and the interaction with scientific centers. In an assessment of the effectiveness and productivity of private agricultural extension activities, Bijani et al. (2009) reported that wheat farmers provided by the extension training courses of these firms had higher yields and income than non-provided farmers. Ghiasvand Ghiasi et al. (2008) addressed the determinants of the effective performance of PAES experts in Qazvin province and found it to be positive and successful. Ahmadpour et al. (2011) revealed that the presence of the experts of PAES at the farm level had increased crop yields. In an investigation into the effectiveness of the consulting services provided by the experts of the wheat project to farmers in Tehran province, Feli et al. (2007) reported that these services were a factor responsible for the increase in technical knowledge and professional skills of farmers and the improvement in their attitude. Similarly, Ahmadpour and Moumenihelali (2011) and Ghorbani (2008) have found the experts of PAES and their consulting to be effective in motivating farmers to use technical agricultural guidelines. Along with all the advantages, there is a concern that should not be neglected. It has been observed that these companies provide most of their services to large-scale farmers due to their better financial ability (Shekara, 2001), while they have to serve the whole farmers, both large and small scales the same.

In spite of the positive achievements of these firms, they have their own drawbacks and constraints, too. For example, Shaviklo et al. (2015), who explored the problems of these firms from the viewpoint of their CEOs, enumerated them as to be inadequate income, lack of institutionalization of the private-sector activities, and job instability and insecurity. Akbari et al. (2009) assessed the attitude of experts to be positive towards the activity of these firms and argued that the low literacy level, smallholding, and farmers' financial inability were the main problems that the firms faced. In another research, the challenges of the planning and management of these firms were categorized in seven classes – implementation, designing and planning, policy-making, coordination, supervision and appraisal, communication, and budget (Akbari et al., 2010). In an attempt for the pathology of private agricultural services, Naderi Mahdei et al. (2017) enumerated the external challenges to include policy-making, lack of information coordination and lack of financial supports, challenges related to the audience, structural dependence, communi-

cational challenges, and financial vulnerability of the audience. They also categorized the internal challenges into the managerial-skill, personal, professional, financial-marketing and lack of creativity categories.

In spite of evidence on the positive impact of PAES, they have unfortunately been developing at a very slow pace and even their development has halted in some cases. Following the legislation of the Code of the Recruitment of Experts in the Private-Sector Agricultural Extension System in 2010 and its implementation since late-2014, most experts were integrated into the governmental structure. As such, most service and educational activities delegated to this system by the public sector were virtually abandoned so that this system lost its usefulness, the private firms came into stagnation, and they became ineffective and inefficient.

As mentioned above, a brief overview of the state of agricultural extension over the past two decades shows the complex challenges and weaknesses in the Iran's public extension system (Asadi et al., 2009). Because of inability of the public-sector extension system to provide efficient and adequate services, the private agricultural extension is perceived to be a key factor in this situation. PAES in Iran, have a great potential to provide extension and technical consulting services to farmers and accelerate the agricultural development although it is faced with numerous problems and challenges.

Despite many studies on advantages and efficiency of private extension in Iran, no studies specifically addressed the ways and strategies for improving and developing these firms. Thus, it is essential to unlock this potential by identifying and adopting appropriate strategies. In this regard, the present paper was carried out to explore, develop, and identify strategies to improve and develope the activity of PAES in Mazandaran Province.

METHODOLOGY

The present research is an applied study that is quantitative in paradigm and descriptive in methodology. The statistical population was composed of 40 experts and experienced practitioners in the field of ACTSF. In the first phase, all of them, were asked to participate. After the data of the first phase were analyzed and the strategies were developed, to identify the most appropriate strategy (in the second phase), 12 experts and decision-makers were taken from the participants of the first phase by the snowball technique.

The research instrument was composed of two questionnaires. The first questionnaire assessed the strengths, weaknesses, opportunities, and threats of PAES. The data of this questionnaire contributed to develope strategies to improve PAES by using a TOWS matrix. In the second questionnaire (that was developed and administered in the second phase), the strategies derived from the TOWS matrix were subjected to the analytic hierarchy process (AHP) to find out the most appropriate strategies for improving PAES (Figure 1). The face and content validity of the questionnaires were checked by faculty members and experts who were informed about PAES. The reliability of the first-phase questionnaire was checked by estimating Cronbach's alpha for different sections and the whole questionnaire in a pilot study in which 30 questionnaires were completed. Cronbach's alpha for different sections (0.85 for strengths, 0.81 for weaknesses, 0.88 for opportunities, and 0.76 for threats) proved the reliability of the questionnaire. The reliability of the second-phase questionnaire (strategy assessment) was checked by the inconsistency ratio (IR). An IR of <0.1 shows the consistency of the comparisons (Ghodsipour, 2012).

As already mentioned, the study was composed of two phases in which the SWOT and AHP techniques were employed. AHP is applied in the context of SWOT to systematically assess the SWOT factors (Kurttila et al., 2000). The added value of SWOT is related to the pairwise comparison of the factors and

their analysis and this is accomplished by the eigenvalue technique used in AHP (Choobchian et al., 2015; Kangas et al., 2001). In other words, SWOT provides the basic framework for the analysis of a decision situation and AHP helps the analysis of the SWOT results. This hybrid method is called A'WOT (Khazaei Poi et al., 2014). In the first phase, the SWOT technique was used to enumerate the strengths, weaknesses, opportunities, and threats and to develop appropriate strategies. In this phase, the MS-Excel software package was used for data analysis and strategy development. The second phase used AHP in the Expert Choice software package to identify the most suitable strategy. The procedure and techniques used here are described below.

After the research objective was specified, a literature review was undertaken and some relevant experts were interviewed in order to develop a SWOT-based questionnaire as per the research objective. The respondents were asked to assign a score from 1 (= very low priority) to 5 (= very high priority) to each item of the strengths, weaknesses, opportunities, and threats. At this step, the items were ranked in terms of the assigned relative weight.

SWOT stands for the internal strengths and weaknesses of a firm and the environmental opportunities and threats that a firm or organization is exposed to. So, SWOT is a formal analysis of a firm's internal strengths and weaknesses and external opportunities and threats. SWOT is a popular technique by which managers can skim through the strategic position of their respective firms. In SWOT, it is posited that an effective strategy yields from reasonable adaptation between a firm's internal resources (strengths and weaknesses) and its environment (opportunities and threats).

After the strengths, weaknesses, threats, and opportunities were identified, the TOWS matrix was used to derive the appropriate strategies in four zones (Figure 1).

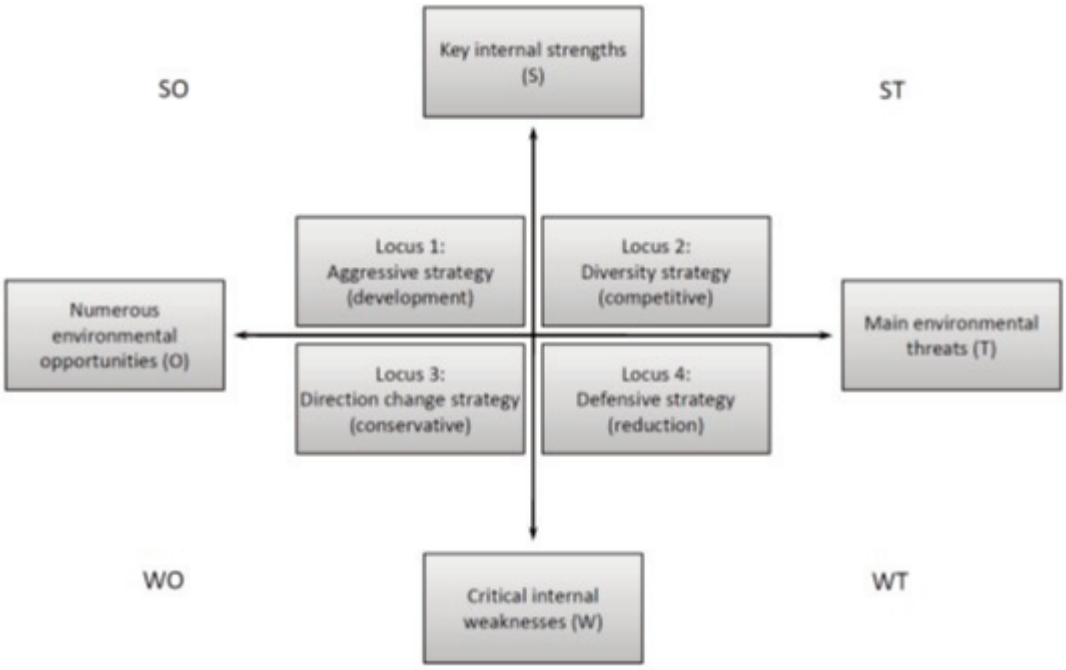

Figure 1. An overview of the strategic deployment zones in the SWOT model (Choobchian & Moumenihelali, 2017)

The TOWS matrix shows how external opportunities and threats of an organization can be matched with its internal strengths and weaknesses. So, it creates four categories of possible strategies. As is evident in Figure 1, these four approaches yield from the intersection of the external factors (opportunities and threats) and internal factors (strengths and weaknesses) (Weihrich, 1982) including:

Maximum-maximum strategies (SO): they are based on the development approach according to which more attention should be paid to the strengths and opportunities. Any system is wishing to be in this position. The strategy is to use resources and strengths and to take advantage of them to develop the opportunities of the system.

Maximum-minimum strategies (ST): they are based on the strengths of the system and they aim to mitigate the threats. Here, the goal is to improve the strengths by alleviating the threats.

Minimum-maximum strategies (WO): they belong to the direction-change approach, reflecting that a shift should be made in activities with respect to the weaknesses and opportunities.

Minimum-minimum strategies (WT): the approach is retreating or reduction. Overall, the goal is to mitigate both weaknesses and threats. Development in these conditions is highly risky. So, the strategies should be based on the battle for survival and/or a change to other management states.

Finally, the AHP technique was employed to specify the most appropriate strategies. The process is composed of four levels. The first level includes the research objective, i.e. identifying the proper strategies to improve the activity of PAES. The next level includes four points for the factor constituting SWOT and the third level is related to the factors of strength, weakness, opportunity, and threat. The last level is related to the strategies derived from TOWS. In the AHP process, we first made a pairwise comparison between the factors based on the research goal in order to assign scores to them. Then, the alternatives (strategies) were compared two by two based on the relevant factors so that they were assigned with a score based on each factor. Eventually, the scores obtained in the two steps were aggregated to yield the most appropriate strategies, i.e. those with the highest score. Figure 2 shows the theoretical model of the research for identifying the appropriate strategy by the AHP process.

In Figure 2, the lines show the relationship between the levels and some symbols have been used to show the relative weight of these relationships and the efficiency of each strategy as to each factor enumerated in the previous level of the AHP. These symbols are described below:

(W_S, W_W, W_O, W_T) show the importance of the individual strengths, weaknesses, opportunities, and threats in accomplishing the specified goals.

(W_{S1}, W_{S2}, …, W_{Sms}) indicate the relative significance of the strengths (S1, S2,…,Sms) in the specified group of strengths. Similarly, (W_{W1}, W_{W2},…, W_{Wmw}), (W_{T1}, W_{T2}, …, W_{Tmt}), and (W_{O1}, W_{O2}, … W_{Omo}) express the relative importance of each group in comparison with its counterpart factors (weaknesses, threats, and opportunities).

For each strategy j (j = 1,2,…,n), we have:

$U_{Si,j}$: the efficiency of the strategy *j* in using a certain strength for Si (i = 1,2,…,ms).

$U_{Wi,j}$: the efficiency of the strategy *j* in alleviating the impacts of the weakness Wi (i = 1,2,…mw).

$U_{Oi,j}$: the efficiency of the strategy *j* in taking advantage of the upcoming opportunities Oi (i = 1,2,…,mo).

$U_{Ti,j}$: the efficiency of the strategy *j* in coping with threats Ti (i = 1,2,…,mt).

If V_j is assumed to be the overall value of the strategy j (j = 1,2,…,n), then we will have:

$$V_j = w_s \sum_{i=1}^{i=ms} w_{Si} U_{Si,j} + w_W \sum_{i=1}^{i=mw} w_{Wi} U_{Wi,j} + w_O \sum_{i=1}^{i=mo} w_{Oi} U_{Oi,j} + w_T \sum_{i=1}^{i=mt} w_{Ti} U_{Ti,j}$$

Finally, the strategies with the highest V_j will be ranked as the best strategies (Elías & Aranda, 2007).

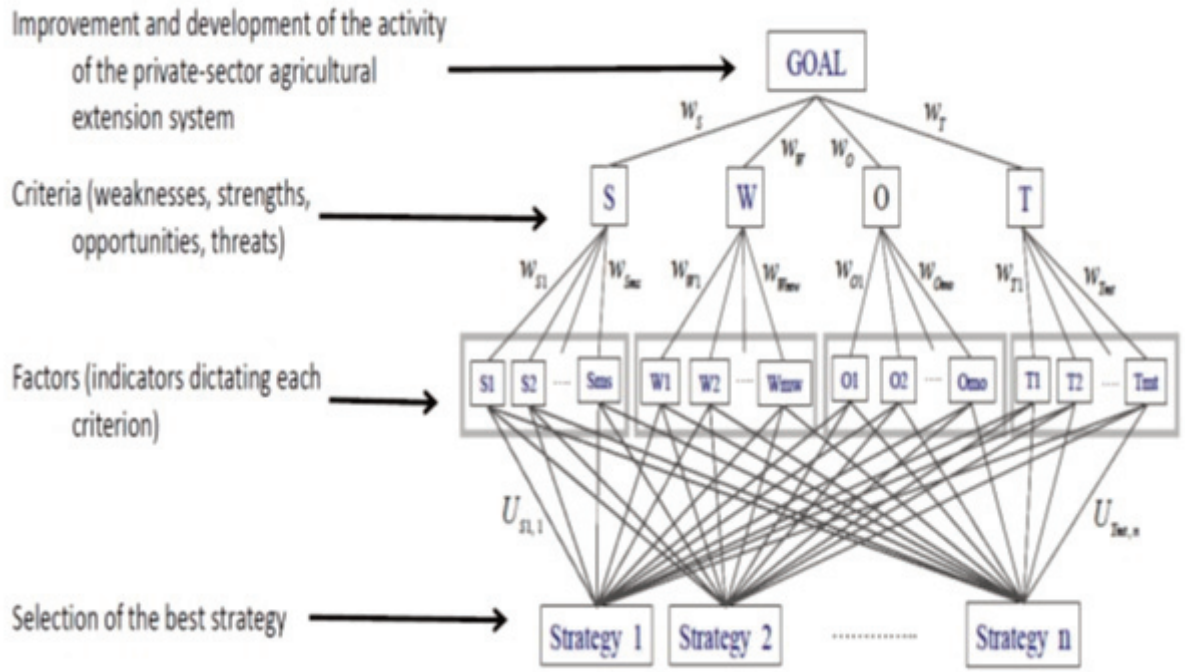

Figure 2. The theoretical model of the research in the context of the AHP process

Table 1

The Demographic and Professional Characteristics of the Respondents

Variable	Levels	Frequency	Percent	Mean/mode/median	SD	Min	Max
Age (year)	≤35	8	20	41.13	7.02	31	63
	36-50	28	70				
	≥51	4	10				
Work experience(year)	≤10	21	52.5	12.98	7.34	6	31
	11-20	12	30				
	≥21	7	17.5				
Gender	Male	23	57.5	Male	-	-	-
	Female	17	42.5				
Education level	B.Sc.	12	30	M.Sc.	-	-	-
	M.Sc.	28	70				
Organizational position	Manager (or CEO)	13	32.5	expert	-	-	-
	expert	27	67.5				

RESULTS

Participants' demographic and professional characteristics

According to Table 1, the respondents were in the age range of 31-63 years with an average of 41.13 years. Most of respondents were male and had master degree. Their average work experience was 13 years.

Assessment of SWOT for the activity of private-sector agricultural extension system

Based on Table 2 and the ranking of the strengths of the private agricultural extension firms, "recruitment of energetic experts who are educated in different agricultural

disciplines" is the main advantage of these firms. "Experts' strong sense of responsibility towards farmers" and "their good command of the issues" are in the next ranks. "The lack of proper insurance system for the members of the firms", "the lack of a proper financial and tariff system for technical agricultural services", and "the lack of commitment of some public-sector managers to relegate activities to private-sector agricultural service firms" were selected as the most important weaknesses. The ranking of the opportunities revealed that "motivating the youth to participate in the agricultural sector", "helping the empowerment of the private sector and making their activities competitive", "helping the deployment and development of processing industries", and "developing agricultural entrepreneurship" were ranked as the top opportunities for the extension activity of the private sector. Finally, the ranking of the threats to the development of these firms indicated that "the lack of transparency in the policies of the Ministry of Agriculture as to the activity of the private agricultural service firms", "the lack of a proper long-term and strategic plan for the development of the firms and the suspense of the private-sector investors", "the lack of governmental support of these firms (especially the newcomers to help their establishment)", and "the absence or non-adoption of privatization to pay for the services" were ranked from the first to the fourth.

Possible strategies to improve and develop private agricultural extensions system (PAES)

After identifying the strengths, weaknesses, opportunities, and threats of PAES and ranking the SWOT factors, four main factors in each component (based on the results in Table 2) were used in the TOWS matrix to derive the strategies. Finally, 11 strategies were derived in four zones (SO, WO, ST, and WT). Figure 3 presents that, among these 11 strategies, two strategies are in the SO zone, two are in the WO zone, three are in the ST zone, and four are in the WT zone.

The strategies derived are listed below:

Development strategies (SO)

S1: Granting privilege to the graduates of agriculture disciplines, especially rural youth, and adopting incentives and support policies (financial, technical, etc.) as to them to motivate the establishment and management of these firms

S2: Developing the scope of the firms via marketing their products and services in the field of the agricultural crop production and distribution and the related industries

Direction-change strategies (WO)

S3: Presenting the achievements and capabilities of the firms in different activity fields through exhibitions, gatherings, and local and national media

S4: Developing and adopting support and motivating policies, especially for the activities of the agricultural sector (as hard jobs) to recruit or encourage people to work in these firms (e.g. tax discounts or exempts and early retirement for the firms working on agricultural entrepreneurship and regulating financial facilities granted by financial institutions and banks)

Diversity or competition strategies (ST)

S5: Transparency in medium- and long-term policy-making and planning of institutions that support or are responsible for agricultural and rural activities (including the Ministry of Agricultural Jihad) towards firms and their experts

S6: Financial support (in the form of subsidy) of service providers (firms) and service receivers (farmers) in order to lay the ground for the privatization of agricultural activities

S7: Laying the ground for and expanding client loyalty through satisfying and fostering trust of farmers to the efficiency and effectiveness of private agricultural extension activities

Defensive strategies (WT)

S8: Orienting the attitudes of public-sector policymakers and managers towards private extension activities by explaining the role of these firms in rural and agricultural development process

Table 2

Ranking, Mean, and Standard Deviation of the Strengths, Weaknesses, Opportunities, and Threats of the Private Agricultural Extension System (PAES)

Factors	Items	Totalwt*	Meanwt**	Relativewt	Rank	Strength symbol
Strength	Recruitment of energetic experts who are educated in different agricultural disciplines	160	4.000	0.400	1	St2
	Experts' strong sense of responsibility towards farmers	155	3.875	0.387	2	St7
	Experts' good command of technical issues of agriculture	154	3.850	0.385	3	St5
	Experts' familiarity with local culture and values of farmers (accent and dialect)	150	3.750	0.375	4	St3
	Provision of all agricultural services based on technical principles (the supply of chemical pesticides and fertilizers, mapping, etc.)	145	3.625	0.363	5	St8
	Experts' use of local knowledge of people along with the technical knowledge	141	3.525	0.353	6	St4
	Enhancement of agriculture efficiency and productivity by the transfer of modern knowledge and technology	138	3.450	0.345	7	St9
	More cooperation of farmers with different agricultural activities	135	3.375	0.338	8	St10
	Enjoyment of a lot of farmers from the consulting services in the context of the agricultural extension system	130	3.250	0.325	9	St6
	The transfer of the latest research findings to the user in the shortest possible time	124	3.100	0.310	10	St1
	Total	1432	35.800	3.580		
	Aggregate mean	143.2	3.580	0.358		
Weakness	The lack of proper insurance system for the members of the firms	165	4.125	0.317	1	W4
	The lack of a proper financial and tariff system for technical agricultural services	163	4.075	0.313	2	W5
	The lack of commitment of some public-sector managers to relegate activities to private agricultural service firms	163	4.075	0.313	3	W13
	The lack of a proper tax system for the activity of the firms (engaging firms with tax laws and causing many problems for them)	161	4.025	0.310	4	W3
	Insufficient authority of firms to perform certain tasks, such as the distribution of agricultural inputs (government inputs)	161	4.025	0.310	5	W10
	Lack of adequate facilities and equipment (e.g. vehicles, office, water, electricity, gas, etc.) in firms	150	3.750	0.288	6	W7
	Firms' being non-profit and their negative annual financial balance (insufficient corporate income despite overwork)	149	3.725	0.287	7	W2
	The lack of a specific plan for the activity of the firms	149	3.725	0.287	8	W8
	Over-reliance of the firms on public sector financial support	149	3.725	0.287	9	W9
	Absence of a union or concentrated center at the county or province level for inter-network coordination and the establishment of a coordinated system of agricultural technical engineering services	144	3.600	0.277	10	W6
	Absence of full-time experts of the firms at the office and in the area	133	3.325	0.256	11	W11
	Farmers' insufficient trust in experts' advice and training	127	3.175	0.244	12	W12
	Lack of proper coordination and collaboration between the members and experts of the firms	118	2.950	0.227	13	W1
	Total	1932	48.300	3.715		
	Aggregate mean	148.62	3.715	0.286		

**: Likert scale from 1 to 5.

Table 2
Continued

Factors	Items	Totalwt*	Meanwt**	Relativewt	Rank	Strength symbol
Opportunity	Motivating the youth to participate in the agricultural sector	160	4.000	0.400	1	O7
	Helping the empowerment of the private sector and making their activities competitive	157	3.925	0.393	2	O3
	Helping the deployment and development of processing industries	154	3.850	0.385	3	O5
	Developing agricultural entrepreneurship	154	3.850	0.385	4	O10
	Helping the government reduce its costs and financial burden	151	3.775	0.378	5	O6
	Recruitment of university graduates in the firms	150	3.750	0.375	6	O9
	Creating and providing the opportunity to work in the field of sales and marketing of agricultural crops	149	3.725	0.373	7	O8
	Creating and developing a sustainable agricultural system through optimal use of agricultural inputs and safe crop production	148	3.700	0.370	8	O4
	Using banking facilities to invest and develop agricultural activities	145	3.625	0.363	9	O2
	Assisting in the establishment of risk management activities in agricultural fields such as tenure of crop insurance and its distribution	143	3.575	0.358	10	O1
	Total	1511	37.775	3.788		
	Aggregate mean	151.1	3.788	0.378		
Threat	The lack of transparency in the policies of the Ministry of Agriculture as to the activity of the private agricultural service firms	174	4.350	0.311	1	T13
	The lack of a proper long-term and strategic plant for the development of the firms and the suspense of the private investors	168	4.200	0.300	2	T12
	The lack of governmental support of these firms (especially the newcomers to help their establishment)	166	4.150	0.296	3	T11
	The absence or non-adoption of privatization (paying for the consulting services)	164	4.100	0.293	4	T6
	Failure to pay firm experts for services and advice	162	4.050	0.289	5	T2
	Lack of long-term support of firm activities in regions by local leaders and people	154	3.850	0.275	6	T14
	The financial inability of farmers to implement and apply the recommendations of experts of private agricultural firms	147	3.675	0.263	7	T7
	The deprivation of farmers from the consulting services of firms due to financial problems	145	3.625	0.259	8	T1
	Absence or inadequate access to the required inputs in accordance with the recommendations of experts	137	3.425	0.245	9	T8
	Lack of specific and appropriate programs for training and retraining of firm experts	137	3.425	0.245	10	T9
	The fact that farmers covered by firm services are smallholders	136	3.400	0.243	11	T5
	Unbalanced development of firms	134	3.350	0.239	12	T10
	Non-adoption of the recommendations of female experts due to cultural issues	125	3.125	0.223	13	T3
	The unfamiliarity of firm experts with the services required by local farmers and their lack of appropriate skills	109	2.725	0.195	14	T4
	Total	2058	51.450	3.675		
	Aggregate mean	147	3.675	0.263		

**: Likert scale from 1 to 5.

		Strengths	Weaknesses
		S_{12}	W_4
		S_{17}	W_8
		S_{18}	W_{13}
		S_{19}	W_9
Opportunities	O_7	Max-Max strategies (SO)	Min-Max strategies (WO)
	O_9	S1	S3
	O_8	S2	S4
	O_{10}		S5
Threats	T_{13}	Max-Min strategies (ST)	Min-Min strategies (WT)
	T_{12}	S5	S8
	T_{11}	S6	S9
	T_6	S7	S10
			S11

Figure 3. The TOWS Matrix

S9: Revising laws and regulations regarding how firms operate and the issues faced by the experts

S10: Identifying and distinguishing extension duties of the public and private sectors (the firms working in the agriculture) by the relevant bodies and agencies

S11: Forming a union to support and organize the activities of the firms, transfer their experiences, and so on

The best strategies to improve and develop the private-sector agricultural extension system

As already mentioned, the strategies derived from the TOWS matrix were based on the main factors among the four components of strengths, weaknesses, opportunities, and threats to the activity of the private agricultural service firms in Mazandaran province, which were listed with the participation of experienced experts of the private extension sector. To find out the best strategies, the SWOT factors were first compared on a pairwise basis and they were assigned with a score. Then, the 11 strategies of the TOWS matrix were compared two-by-two by the AHP technique based on the components of strengths, weaknesses, opportunities, and threats and their constituent factors. Finally, the strategies were ranked by score.

According to Table 3, the best strategy to improve and develop the activities of the private sector is to adopt a competitive strategy. As such, the strategy "financial support of service providers and service receivers in order to lay the ground for the privatization of agricultural activities" (S6) was selected as to the best strategy. The next ranks were assigned to "orienting the attitudes of public policymakers and managers towards private extension activities by explaining the role of these firms in rural and agricultural development process" (S8) and "granting privilege to the graduates of agriculture disciplines, especially rural youth to motivate the establishment and management of these firms" (S1).

According to the sensitivity analysis diagram (Figure 2), strategy S6 was ranked highest with the least variations versus the other strategies based on strengths, opportunities, and threats and was ranked the second based on weaknesses. Also, the strategy S8 was ranked the second after S6 based on strengths and opportunities. But, it was ranked the fourth among the 11 strategies based on threats. It is evident in the sensitivity analysis graph (Figure 4) that S11 and S3 were ranked the lowest with the least variations in four components.

DISCUSSION AND CONCLUSIONS

Given the problems and challenges facing farmers today, structural change of agricultural extension systems is inevitable. Many countries are pursuing more private sector participation as a tool to improve the effectiveness and sustainability of agricultural development systems. Various studies have

Table 3

Ranking of the 11 Strategies With Respect to Improving Private Agricultural Extension System

Symbol	Strategy	Percentage	Rank	IR*
S6	Financial support (in the form of subsidy) of service providers (firms) and service receivers (farmers) in order to lay the ground for the privatization of agricultural activities	12.7	1	
S8	Orienting the attitudes of public-sector policymakers and managers towards private extension activities by explaining the role of these firms in rural and agricultural development process	11.3	2	
S1	Granting privilege to the graduates of agriculture disciplines, especially rural youth, and adopting incentives and support policies (financial, technical, etc.) as to them to motivate the establishment and management of these firms	10.6	3	
S5	Transparency in medium- and long-term policy-making and planning of institutions that support or are responsible for agricultural and rural activities (including the Ministry of Agricultural Jihad) towards firms and their experts	10.4	4	
S9	Revising laws and regulations regarding how firms operate and the issues faced by the experts	10.4	5	
S10	Identifying and distinguishing extension duties of the public and private sectors (the firms working in the agriculture) by the relevant bodies and agencies	9.4	6	0.03
S2	Developing the scope of the firms via marketing their products and services in the field of the agricultural crop production and distribution and the related industries	8.9	7	
S4	Developing and adopting support and motivating policies, especially for the activities of the agricultural sector (as hard jobs) to recruit or encourage people to work in these firms (e.g. tax discounts or exempts and early retirement for the firms working on agricultural entrepreneurship and regulating financial facilities granted by financial institutions and banks)	8.5	8	
S7	Laying the ground for and expanding client loyalty through satisfying and fostering trust of farmers to the efficiency and effectiveness of private agricultural extension activities	8.0	9	
S11	Forming a union to support and organize the activities of the firms, transfer their experiences, and so on	4.9	10	
S3	Presenting the achievements and capabilities of the firms in different activity fields through exhibitions, gatherings, and local and national media	4.9	11	

* IR = Inconsistency Ratio

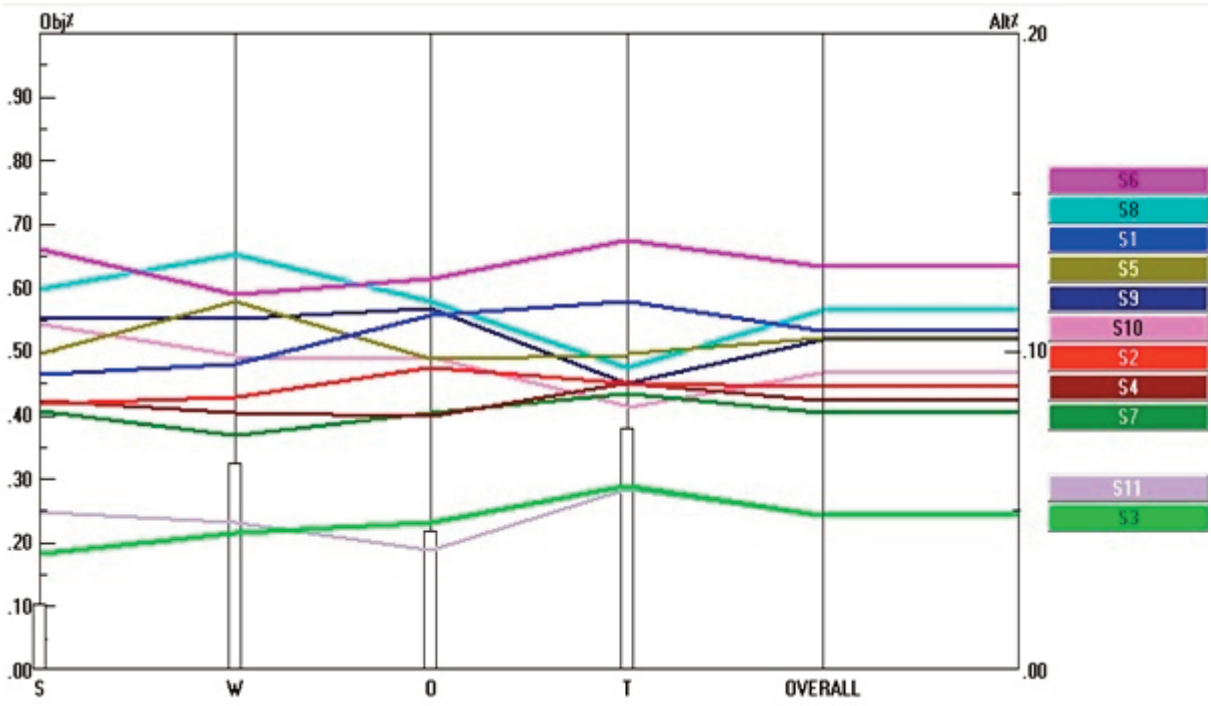

Figure 4. Sensitivity analysis of the 11 strategies to improve the activity of the private agricultural extension system

shown that privatization, leads to competition of product and service providers to supply better quality products and services at more competitive prices in the market place. On the other hand, it reduces the burden of government responsibility and tenure.

One of the most important limitations and problems is the lack of attention and focus on the dimensions that help the growth and expansion of this sector. In this respect, as the first step, it is important to explore and adopt appropriate strategies to achieve this. Accordingly, the present study was conducted to identify appropriate strategies to improve and develop the activities of private agricultural firms in Mazandaran Province.

Based on the results, "financial support of service providers and service receivers in order to lay the ground for the privatization of agricultural activities" was identified as the most important strategy in this regard. The government should support and encourage extension services provider. Governments should create the environment for private sector activity, including provides and maintains the necessary infrastructure and physical security (Ahmadvand & Mahdian Boroujeni, 2012; Hoffmann, 2009; Mahboubi & Najd Abbasi, 2012). At this stage, financial support is very important and vital. This support can be provided through low-interest loans and credits, give concession in sales tax on services or their income(Hansra et al., 2008) or/and Giving subsidies to farmers and private sector (Mahmoudi Karam Javan & Mirdamadi, 2005). In some cases, the public sector may need to provide some regulatory oversight of private-sector extension activities, especially when the public budget is involved (Feder et al., 2011).

"Orienting the attitudes of public-sector policymakers and managers towards private-sector extension activities" were identified as the second most important strategy. To be more relevant to the needs of farmers and rural clientele, policymakers attitude should be changed. In this regard, Assessing the effectiveness and quality of extension services can inform policy makers whether farmers are satisfied with the extension services and

therefore informs them about what to improve and promote as extension services (Sylla et al., 2019). in the other words, attitude of policymakers can be improved by introducing the positive activity and functions of the private agricultural extension firms and explaining their role in the process of agricultural and rural development. Better service delivery of Iran's agricultural extension system requires that the policies of this sector be tailored to future threats and opportunities (Rezaei-Moghaddam & Fatemi, 2019).

In the proccess of decentralization and developing the private agricultural extension activities, effective strategies should be considered. It requires a policy and strategies, which regulates the transfer of authority and financial resources, determines local responsibilities, and establishes the mechanisms for public participation and social monitoring (Hoffmann, 2009). Paying attention to and applying these strategies can pave the way for progress ,success and development of private agricultural extension.

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REFERENCES

Ahmadpour, A. and Moumenihelali, H. (2011). Factors Influencing the Effectiveness of Rice Supervisor's Technical Advice: The case of Mazandaran Province, Iran. *African Journal of Agricultural Research*, 6(22), 5168-5173.

Ahmadpour, A., & Soltani, Sh. (2014). The need for a strong public-private linkage in agricultural extension system (Case study: Sari Township, Iran). *International Journal of Agricultural Management and Development, 4*(1), 41-50.

Ahmadpour, A., Moumenihelali, H., & Izadi Amiri, H. (2011). Evaluating rice supervisor extensionists' performance: The case study of Mazandaran Province, Iran. *American-Eurasian Journal of Agricultural and Environmental Sciences, 11*(1), 38-44.

Ahmadvand, M., & Mahdian Boroujeni, M. (2012). Evaluate the performance of successful consulting, technical and engineering services companies in Borujen city. Proceedings of the 4th Iranian Congress on the Extension and Training of Agricultural Sciences and Natural Resources. September 18-19, University of Tehran, Iran.

Akbari, M., Asadi, A., Mosavi, S. S., & Sokhtanlo, M. (2009). Agricultural experts and administrators' attitude toward Wheat Advisor Engineers (WCEs) Project: Problems orientation of Zanjan Province. *Iran Agricultural Extension and Education Journal, 5*(1). 61-71

Akbari, M., Asadi, A., Shabanali Fami, H., & Skandari, J. (2010). Analyzing challenges of wheat counsultant engineers project from view point of wheat counsultant engineers: A Case study of Isfahan Province. *Iran Agricultural Extension and Education Journal, 5*(2). 71-78.

Ali, J. (2013). Farmers' perspectives on quality of agricultural information delivery: A comparison between public and private Sources. *Journal of Agricultural Science and Technology, 15* (4) ,685-696.

Alizadeh, N., Alipour, H., Nikooei, A., Hajimirrahimi, S., Bakhshi-Jahromi, A., & Hasanpour, B. (2019). Identification of challenges and requirements of the agricultural extension and pathology of the current status of the new agricultural extension system of Iran. *Iranian Agricultural Extension and Education Journal, 14*(2), 21-35.

Anderson, R. J., & Feder, G. (2007). Agricultural extension. In: *Handbook of Agricultural Economics*. Evenson, R.E. and P. Pingali (Eds.). Chapter 44, Volume 3 Agricultural Development: Farmers, Farm Production and Farm Markets, Elsevier, Amsterdam, 2343-2378.

Asadi, A., Akbari, M., Shabanali Fami, H., & Alambaigi, A. (2008). Improvement mech-

anisms of Wheat Consultant Engineers (WCES) Project in Iran. *American Journal of Agricultural and Biological Science*, *3* (4), 511-516.

Asadi, A., Sharifzadeh, A., Akbari, M., & Alam Beigi, A. (2009). *An income an overview on a systemic approach to agricultural extension and development with an emphasis on the agricultural knowledge and information system*. Tehran: Jihad Daneshgahi Publications, Tehran Branch.

Bijani, M., Malek Mohammadi, I., & Yazdani, S. (2009). Effectiveness evaluation and productivity of agricultural extension activities in wheat package project in Shiraz and Marvdasht counties of Fars Province. *Iran Agricultural Extension and Education Journal, 4*(2). 67-79.

Birkhaeuser, D., Evenson, R.E., & Feder, G. (1991). The economic impact of agricultural *extension*: A review. *Economic Development and Cultural Change*, *39*(3), 607-650.

Choobchian, S., & Moumenihelali, H. (2017). *Multi-criteria decision-making - ahp and swot analysis.* Tehran: Publications of University Jihad, Iran.

Choobchian, S., kalantari, K., Asadi, A., & Taghavi Motlagh, S. (2015). Determining of best strategy for improvement of sustainable coastal fishery in the Guilan Province using AHP technique. *Journal of Fisheries, 68*(1), 41-59. doi: 10.22059/jfisheries.2015.53870

Eicher, C. K. (2007). *Agricultural Extension in Africa and Asia*. World Ag Info project, Cornell University, New York, US.

Elías Osuna, E., & Aranda, A. (2007). Combining SWOT and AHP techniques for strategic planning. In Proceedings of the 9th International Symposium on the Analytic Hierarchy Process-ISAHP, August 2-7, Viña del Mar, Chile.

. In: Sharma, V. P. (2003). Enhancement of extension systems in agriculture: Country papers; Islamic Republic of Iran Hirakawacho, Chiyoda-Ku, Tokyo: Asian Productivity Organization: 116-126.

Feali, S., Pezeshki Rad, G., Sedighi, H., Shahbazi, E., & Ghoreish Abhari, S. (2015). External factors affecting the Iranian Agricultural Extension System (IAES) by 2025. *Iranian Journal of Agricultural Economics and Development Research, 46*(1), 157-166. doi: 10.22059/ijaedr.2015.54488

Feder, G., Birner, R., & Anderson, J.R. (2011). The private sector's role in agricultural extension systems: Potential and limitations. *Journal of Agribusiness in Developing and Emerging Economies, 1* (1), 31-54. https://doi.org/10.1108/20440831111131505

Feli, S., Pezeshki Rad, Gh., & Chizari1, M. (2007). Effectiveness of advisory services given to wheat producer farmers through wheat farms' advisors in Tehran Province. *Iran Agricultural Extension and Education Journal, 3*(1).73-81

Ghiasvand Ghiasi, F., Hosseini, F H., & Hosseini, M. (2008). Factors affecting the Performance of wheat agricultural advisers in Qazvin Province. *Iran Agricultural Extension and Education Journal, 3*(2),31-43

Ghodsipour, h. (2012). *Analytical Hierarchy Process (AHP).* Tehran: Amir Kabir University Press, Iran.

Ghorbani, M. (2008). Evaluation of agricultural advisory services effects on sugar beet in Razavi Khorasan Province. *Journal of Applied Sciences, 8*(20), 3733-3737.

Hansra, B.S., Suraj, P.T., Ananth, P. N. & Chandregowda, M.J. (2008). *Agricultural extension system: Issues and Approaches.* Concept Publishers, New Delhi, India.

Hoffmann, W. (2009). Governmental extension services, their generic problems and potential solutions. Linking Knowledge to Policy and Action: Innovations in Extension and Advisory Services for Food and Livelihoods, 15.-18. November in Nairobi, Kenya.

Kangas, J., Pesonen, M., Kurttila, M., & Kaganus, M., (2001). A'WOT: Integrating the AHP with SWOT Analysis. *Proceedings – 6th ISAHP Berne, Switzerland*, 189-198.

Karimi-Gougheri, H., Rezaei-Moghaddam, K., Zamani, G., Hayati, D., & Rezaei, A. (2018). Analysis of agricultural extension and education organizational network in Kerman Province: Social network analysis. *Iranian Agricultural Extension and Education Journal, 13*(2), 131-151.

Khazaie poi,. J., Jaberi, A., & Asadi, H. (2014). Developing a model for sports leisure strategies and measuring its effectiveness using SWOT integrated approaches and fuzzy hierarchy process analysis and structural equation modeling *Journal of Operational Research and Its Applications, 10*(4), 56-68.

Kurttila, M., Pesonen, M., Kangas, J., & Kajanus, M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis-a hybrid method and its application to a forest- certification case. *Forest Policy and Economics*, *1*(1), 41-52.

Mahboubi, M. R. & Najd Abbasi, M. (2012). Threatening factors for the establishment and operation of consulting, technical and engineering services companies Agriculture (Case study: Golestan province). Proceedings of the 4th Iranian Congress on the Extension and Training of Agricultural Sciences and Natural Resources. September 18-19, University of Tehran, Iran.

Mahmoudi Karam Javan, J., & Mirdamadi, S.M. (2005). Decentralization for agricultural extension development. *Jihad*, 269, 3-12.

Mousavi, N., & Moghaddasi, A. (2017). Farmers' perceptions and effective factors to accept privatization of livestock extension services. *Agricultural Extension and Education Research, 9*(3), 1-10.

Muyanga, M., & Jayne, T.S. (2008). Private agricultural extension system in Kenya: Practice and policy lessons. *Journal of Agricultural Education and Extension, 14*(2), 111-124, DOI: 10.1080/13892240802019063

Naderi mahdei, K., Zanganeh, A., & Pouya, M. (2017). Pathology of agricultural engineering, technical and consulting companies: The Case of Hamedan and Malayer Counties. *Iranian Agricultural Extension and Education Journal*, *12*(2), 137-149.

Naeem, M. R., & Hassan, M. Z. Y. (2014). Comparative analysis of public and NGO sector's role in improving rural livelihoods in the Punjab, Pakistan. *International Journal of Agricultural Extension, 02*(01), 01–04.

Rahimi M., K., Zarafshani K., & Rostami, F. (2016). The impacts of establishing agricultural consulting, technical and engineering services companies on rural development of Kermanshah and Zanjan Provinces. *Space Economy and Rural Development, 5*(17). 103-115.

Rahimi, M., Zarafshani, K., Rostami, F., & Nori, M. (2014). Evaluation of the performance of Agricultural Development Service Firms (ADSF) in Zanjan Province using AHP. *Iranian Agricultural Extension and Education Journal*, *10*(2), 153-163.

Rana, A., S., Reddy, G., . P., & Sontakki, B., . S. (2013). Perceived service quality of agricultural organizations comparative analysis of public & private sector. *International Journal of Advanced Research in Management and Social Sciences, 2*(1), 286–295.

Rezaei-Moghaddam, K., & Fatemi, M. (2019). Strategies for improvement of agricultural extension new approach of Iran. *Iranian Agricultural Extension and Education Journal, 15*(2), 223-251. doi: 10.22034/iaeej.2020.199832.1450

Shaviklo, N., Hosseini, S., & Pouratashi, M. (2015). Problems of agricultural engineering and technical advisory services companies, from viewpoints of companies administrators (Case study: Qazvin Province). *Iranian Journal of Agricultural Economics and Development Research*, *46*(1), 43-50. doi: 10.22059/ijaedr.2015.54478

Shekara, P. (2001). Private extension in India: Myth, realities, apprehension and approaches. Hyderabad (India): National Institute of Agricultural Extension Management (MANAGE), Hyderabad, India. Pp:81- 84. Retrieved from http://www.researchgate.net

Sylla, A. Y., Al-Hassan, R. M., Egyir. I. S., & Somuah, H. A. (2019). Perceptions about quality of public and private agricultural extension in Africa: Evidence from farmers in Burkina Faso. *Cogent Food & Agriculture*, 5(1), 1-14. DOI: 10.1080/23311932.2019.1685861

Toudeh-Rusta, M. (2004). Privatization in the country, problems and solutions. *Journal of Jihad,* 261,23-26.

Weihrich, H. (1982). The TOWS Matrix-A tool for situational analysis. *Long Range Planning, 15*(2), 54-66.

Yazdanpanah, M., & Rahimifayzabad, F. (2019). Reasons for the failure of agricultural extension using grounded theory (Case study: Lorestan Agricultural Jihad). *Iranian Journal of Agricultural Economics and Development Research, 50*(3), 549-575. doi: 10.22059/ijaedr.2019.269598.668674

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