

Status-assessment of the functions of agricultural extension system in accomplishing food security (A case of Jihad-e Agriculture Organization in Kohgiluyeh and Boyerahmad province)

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ABSTRACT: The functions of the agricultural extension system and their components towards food security were surveyed on a statistical population composed of the experts of Jihad-e agricultural organization in Kohgiluyeh and Boyerahmad province, Iran. The sample size was determined to be 89 individuals by Krejcie and Morgan (1970)'s table who were selected by simple randomization method with proportional allocation. Data collection instrument was a questionnaire whose validity was confirmed by a panel of academic and executive experts and whose reliability was assessed to be 0.78-0.90 by Cronbach's alpha. The results showed that the status quo and the optimal status of the agriculture extension system functions and their components differed significantly. Accordingly, it is recommended to strengthen the functions of this system to attain food security by revising skill-vocational training system, empowering the extension agents, and training human resource of the extension network.

Keywords: food security, agricultural development, food poverty, extension function, agricultural extension system

INTRODUCTION

The annual food consumption has been increased by about 20 percent over the past three decades owing to the ever-increasing global population and significant progress. Predictions show that food production should be boosted by at least 50 percent so as to meet the food demand of 9-billion world population by 2050 (Graham et al., 2012). Post-revolutionary Iran has always emphasized on the issue of self-sufficiency in the production of basic agricultural crops and enhancing food security. But, in spite of this emphasis and sensitivities to accomplish it, food security has been reduced in recent years (Gharib, 2013). The correct counteraction with the barriers and challenges of the agricultural sector to accomplish the goals of food security depends on reviewing the past experiences, laying out the future perspective, and assessing the feasibility to transit away from the status quo. In this respect, the agricultural extension system has a vital role to play as a facilitator of the agricultural development. Hence, it is imperative to look for an approach whereby the ground can be laid to realize the new goals (Farrokhi & Sedighi, 2005). Accordingly, the prerequisite for moving towards food security is to invest in different functions of

the extension service with an emphasis on food security. But, it seems impossible to realize food security without identifying and formulating the functions of the extension service under the status quo and desirable status. So, the present study pursues the following objectives:

1. Reviewing the present status of the extension system functions to accomplish food security
2. Examining the optimal status of the extension system functions to accomplish food security
3. Exploring the gap between the status quo and the optimal condition for each component of the extension system functions to accomplish food security

Review of Literature

A review of the literature implies that the educational-promotional courses have played a remarkable role in improving farmers' knowledge and attitudes in particular and the development of safe and sustainable agriculture in general (Nazarzadeh Zareh et al., 2011). Nonetheless, the general models of the agriculture extension have been criticized in many countries for failure in accomplishing the basic goals, such as increasing production and ensuring food security and sustainability (World Bank, 2009). Similarly, the agricultural extension system in Iran has some problems, drawbacks, and limitations despite its 70-year background (Allahyari, 2009). This has motivated various studies on assessing the status and performance of the extension system in realizing its goals – e.g. food security. In a comparative study on the characteristics of extension agents in the former ministries of Jihad-e Sazandegi and agriculture in Iran, Heidary et al. (2006) prioritized the desirable characteristics of the extension service of the Ministry of Jihad-e Agriculture. They found that there has always been a gap between the optimum performance and the performance of the agricultural extension system in human resource aspect in terms of the adequacy of the educated extension agents, educational level, abilities, skills, and so on. This has directly influenced the success of the system.

Saadi et al. (2008) argue that the agricultural extension system is predominantly governmental in most countries, particularly in developing countries, whereas the governmental extension is fiercely criticized for its high costs, limitations of extension resources in driving extension activities, inadequacy of technical conditions and efficient people, and the lack of opportunity for contact with farmers due to constraints of human resource. In a study on the attitudes of agricultural extension agents towards poverty-oriented extension system in Fars province of Iran, Kianmehr and Hayati (2013) concluded that although the agricultural extension is used as an important tool to counteract the poverty, its performance so far shows that the agencies in charge of the agricultural extension have concentrated their activities on more developed and affluent people and have overlooked caring for poor rural people, contributing to the deterioration of poverty and injustice.

Allahyari (2008) reported that the barriers like the concentration of decision-making authority at the central levels and the weakness in the appropriate delegation of this authority to national levels have impaired the performance of the extension system as a demand-driven system and have complicated its reform.

Mirzaei et al. (2016) suggest that the governmental extension system, which has an inflexible hierarchical structure and focuses on the linear approach of technology transfer, is no longer able to meet the diverse needs of different client groups and does not have cost-benefit justification. This explains why 32 percent of the extension experts negatively assessed the changes in the extension system and its performance over the past three decades and mentioned the successive change of the head of the Agriculture Extension Organization as an effective factor. Sharifzadeh (2014) stresses out that if the agricultural extension is to go beyond the concerns on production boosting towards more comprehensive topics like the sustainability of production systems, the actors of the agricultural extension systems, which are composed of interactive components, should understand the required changes and should purposefully focus on their implementation and institutionalization.

Sabouri (1999) concluded that the present extension system of Iran has many drawbacks to accomplish the goals of the agricultural development and that given the organizational and functional stagnation after the merging of two ministries of Jihad-e Sazandegi and agriculture, it is necessary to revise the functions of the agricultural extension system from organizational and technical perspective.

Similarly, Moradi Kafraj et al. (2014) argue that the traditional extension systems should be transformed in order to be able to meet the new demands. This can, by itself, ensure food security and alleviate rural poverty. However, ensuring food security requires re-understanding and redefining the priorities of the extension service and reforming the functions of the national extension systems. In this respect, Emadi and Shirzad (2006) emphasize the need for the revision of the theories and renewal of the executive organizational structure of the extension system.

In an evaluation of Iran's agricultural extension system in terms of five indicators including planning, organizational structure, evaluation and supervision, link with other institutions, and extension activities, Mirzaei et al. (2008)

found that from extension agents' view, just extension activities could be assessed to be good and the other indicators were found to be moderate. In the overall evaluation, about 84 percent of the agents supported the need for a fundamental revision of the agricultural extension system in Iran.

Methodology

We applied a qualitative-quantitative approach to explore the status of the key functions of the extension system for ensuring the national food security. The first phase applied the Delphi technique to recognize the functions of the extension system for accomplishing national food security from the perspective of all extension experts across the country. The Delphi technique was implemented in three rounds and five functions were identified including support, consultation, training, service-infrastructure, cooperation, research, and interaction-information. The second phase used a quantitative survey to explore these functions from the viewpoint of the extension experts of Jihad-e agriculture organization in Kohgiluyeh and Boyerahmad province, Iran. At this phase, data were mainly collected by structured interviews. The data collection tool was a structured, self-designed questionnaire designed in two sections. Section 1 was related to the assessment of the status of extension system functions as to the accomplishment of food security under the present and optimum conditions, and Section 2 addressed the demographic attributes of the experts. The statistical population was composed of the experts of Jihad-e agriculture organizations across Kohgiluyeh and Boyerahmad province. The sample size calculation and sampling were carried out in two stages. Among 25 Jihad-e agriculture organizations across the province, 14 organizations were selected by the experts of Extension Coordination Office of the province as the organizations with high potential and more experts. We found that 116 experts were working in these 14 organizations. Then, the sample size was estimated at 89 individuals by Krejcie and Morgan (1970)'s table. At the next step, simple randomization with proportional allocation method was applied to take the sample from each organization.

The validity of the questionnaire was determined by a panel of academic experts. To check its reliability, a pilot studied was carried out outside the statistical population (in Jihad-e Agriculture Organization of Boyerahmad). Cronbach's alpha was estimated at 0.781 and 0.904 for the two sections of the questionnaire, proving the reliability of the items in research instrument. Data were analyzed both descriptively and inferentially. The descriptive analysis was composed of the frequency table, percentage, standard deviation, mean, coefficient of variations, and graphs. The inferential statistics included means comparison and determining the significance of the differences between the means of the groups using dependent t-test. Finally, the difference in the means of the components of each function was multiplied in the optimum status of that component to calculate the gap between the attributes of the functions under status quo and optimum conditions and to prioritize the key actions for the functions of the extension system for ensuring food security and also to prioritize the components. The higher priorities were assigned to components with higher mean in optimal status and lower mean in the status quo. Accordingly, the key actions for each component were prioritized and ranked according to their overall score as summarized in the respective tables. The research results were analyzed by the SPSS (ver. 22) software package.

Results and Discussion

Demographics of participants

According to the descriptive analysis of the participants' demographics, 89 individuals were studied among which 44 individuals (49.4 percent) were male, 43 individuals (48.3 percent) were female, and two individuals were unspecified. The average age of the respondents was 35 years (SD = 4.97). Among their academic majors, the highest frequency was 31 individuals (34.8 percent) majored in "agriculture and plant breeding". The lowest frequency was related to "agriculture extension and training" and "fishery" with just one participant (1.1 percent) majoring in each one.

Status assessment of food security-related functions of the extension system

A) Support function

As is evident in Table 1, the mean support function differs between the status quo and the optimal status significantly ($P = 0.001$). In other words, the farmers are not optimally supported to contribute to food security. Among the components of this function, the first priority was found to be related to supporting poor farmers by subsidy; in other words, this component had the greatest difference between the status quo and the optimal status. Experts claimed that the subsidy supports of farmers have been focused on providing pressurized irrigation system, but since most local farmers are smallholders, extensive actions are required in this respect. This finding is

consistent with Sharifi Moghaddam (2012), Barghi and Ghanbari (2012), Khaledi and Vazin (2007), and Parra Lopez et al. (2005) about the support of farmers by subsidization to move towards the production of safe crops. The items “coordination for the marketing of the crops” and “vocational development of the human resource in the agricultural sector” were ranked the second and third, showing the deep gap between the status quo and the optimal status with respect to marketing and vocational development. So, basic actions should be taken in this respect (Table 1). Respondents argue that farmers have problems in the sale of their crops, especially citrus and apple growers, and they often have to sell their crops at low prices through middlemen. This discourages farmers and may even make them change their orchards to other uses.

B) Consultation and guidance function

Table 2 shows that the status quo and the favorable status differ in the consultation and guidance function and also in their components significantly ($P = 0.001$). The prioritization of the key actions for each individual component of this function reveals that “motivating farmers to produce safe crops” and “directing users to explore the problems and identify the new opportunities in the production process” were ranked the first and second showing the highest difference in their means, respectively. So, it is imperative to take actions to solve them. Providing the support and consultation to establish consultation and technical enterprises can create job and income opportunities for the graduates on the one hand and can contribute to solving farmers’ problems, at least, at the technical level on the other hand. These enterprises can improve farmers’ awareness as to how to use pesticides in a timely manner, how to apply fertilizers correctly, how to use pressurized irrigation systems, and so on.

C) Training function

The training function of the extension system for realizing the food security is compared between the status quo and the desirable status in Table 3. As can be observed, there are significant differences in all components of this function at $P = 0.001$ level, implying the lack of effective training by Jihad-e agriculture organizations towards food security. The respondents believe that “the training and presence of experts with deep knowledge about sustainable agriculture and food security” is a crucial factor in ensuring food security, but Jihad-e agricultural organizations do not adequately take care of it. It seems that a major reason for farmers’ ignorance of the food security is the professional incompetence of extension agents. This is confirmed by Ahmadpour et al. (2015)’s finding on the professional incompetence of these agents in providing effective training services.

D) Service-infrastructure function

Table 4 compares the service-infrastructure function of the extension system and its components with respect to ensuring food security between the status quo and optimal status. It also summarizes the priorities of key actions to accomplish food security. It shows significant differences in all components ($P = 0.001$). Jihad-e agricultural organizations rarely believe in the effectiveness of demonstration farms and orchards and have rarely launched such farms to demonstrate how to produce safe crops. This is why a significant difference ($P = 0.001$; $t = 9.85$) is observed between the status quo and the optimal status and why launching demonstration farms and orchards for promoting safe crop production has been ranked the first. In other words, experts believe that practical demonstration allows people to compare the modern and traditional practices. This is in agreement with Morshedi et al. (2012). The item “promotion and development of modern practices about food security”, also, shows a significant difference ($P = 0.001$; $t = -9.51$) between the status quo and the optimal status and has been ranked the second.

The experts argue that the training and consultation in the agricultural extension system are usually done by the traditional methods. According to them, food security which has not been already in priority is perceived to be necessary more than ever. Other researchers, e.g. Emadi et al. (2004), have also criticized this status and have stated that the agricultural extension service still uses the traditional one-way communication methods, like holding training courses, displaying movies, launching demonstration farmers, exhibiting posters, and so on, existed since the formation of this service.

E) Cooperation function

The results of the dependent t-test in Table 5 shows a significant difference in the status quo and optimal status of the cooperation function of the extension system and its components with respect to the realization of food security ($P = 0.001$). In other words, in spite of the significance of the agricultural cooperatives, it was found that the studied regions lack agricultural and marketing cooperatives for the advertisement and sale of safe crops. Similarly, there are no cooperatives for the processing of crop and animal wastes. Indeed, despite the emphasis of

the Ministry of Jihad-e Agriculture to increase the food availability in order to ensure food security, no attempts have been made to launch, support, and empower the cooperatives in the agricultural sector. According to the respondents, the lack of these cooperatives in the studied region can be attributed to the income inadequacy as well as the lack of support by the government and respective organizations such as Jihad-e agriculture organizations. Therefore, a great part of the agricultural crops is spoiled due to the lack of advertisement and on-time sale and even the wastes are not processed. These factors influence the accomplishment of the food security and the rural development, respectively. Therefore, the establishment of marketing cooperatives and waste processing cooperatives was ranked the first and second among the key actions pertaining to this function.

F) Research function

The results of the dependent t-test for the comparison of research function and its components are presented in Table 6. Means comparison displays significant differences ($P = 0.001$) between the two statuses in all components. The experts argue that food security is not considered a priority in research agenda of the academic and research centers and, at the same time, such research has not been supported. Therefore, this component showed the highest difference between the status quo and the optimal status and was ranked as the first priority among the components of research function. Also, not only are there no studies in cooperation with farmers, but also the research findings of the research centers are not provided to the farmers in a timely manner. These findings are in line with Ghorbani et al. (2009) and Ajoudani and Mehdizadeh (2009).

G) Interaction-information function

The comparison of the present status of the interaction-information function of the extension system and its components to attain food security with their optimal status (Table 7) shows a significant difference ($P = 0.001$) in all components of this function. This can be explained by the fact that since the province is located in a mountainous climate, the rural roads including those connecting the farms are not in a good condition at all, especially in winter. The experts believe that the managers, officials, and even they themselves do not have enough expertise about safe crops and their production methods. Therefore, they cannot have effective interactions to encourage and motivate consumers towards the use of desirable agricultural commodities. Furthermore, they have failed to motivate the consumers to familiarize themselves with the safe and unsafe commodities by the use of various educational media and to change their behavior.

Jihad-e agriculture organizations have had good interactions with farmers which can be related to their informal communications with native experts and their common language and culture which has helped their support, for example by their recommendation to Agri-bank, agriculture development fund and so on. But, the experts argue that these interactions by themselves do not suffice to motivate farmers towards contributing to food security. After being recommended to refer to different organizations, farmers face many problems. This requires the facilitation and coordination by Jihad-e agriculture organizations at all stages of an activity. These findings are consistent with Ahmadi (2016) about the need for the interaction and cooperation of the governmental agencies like Jihad-e Agriculture Organization and also their interaction with the users.

Conclusion and Recommendation

The importance of analyzing the status of food security and the functions of the agricultural extension system with respect to the food security in a province like Kohgiluyeh and Boyerahmad province lies in the fact that this province is one of the five insecure provinces of Iran in terms of food security and is one of the unsustainable provinces according to the assessment of agriculture sustainability with five indicators of agricultural resources, agricultural advancement, environment, the status of the rural communities, and training. Thus, this study and similar works can help to take practical actions and plans. Also, given the impacts of the extension and development of food security on the alleviation of global hunger and poverty, it is imperative to have a comprehensive plan encompassing all agricultural aspects and sub-systems including the extension and training systems. Today, the agricultural extension systems are posed to critique by different scientific and executive circles and its performance is closely assessed and judged in different dimensions. In this respect, we applied means comparison test to compare the present status of the extension system functions with respect to food security and its optimal status. The results showed that the present status of all components differs significantly ($P = 0.001$) with their optimal status, implying the gap in these functions towards food security. Therefore, the following recommendations can be put forth:

1. Establishing independent consulting and marketing units for the agricultural crops in Jihad-e agriculture organizations in the village centers by the extension agency in order to cut the hands of middlemen and brokers, sell the crops timely, reduce wastes, and boost the sale of the crops.

2. Planning for financial support by the government to finance the crop-specific transportation in order to reduce the wastage and market and export agricultural crops in a timely manner.
3. Revising skill-vocational training courses of the extension system in order to fuel the movement towards food security.
4. Fitting the organizational positions with the academic majors of the experts and extension agents at the line and staff level for maximum use of human resource potential in the extension system.
5. Considering the demand-orientation and customer-orientation in food security by performing training needs assessment, public-oriented extension plans, cooperative research, and so one.
6. Providing the training and consultations about the responsible organizations and the official procedures to those who are interested in running greenhouses, home employment, and so on.
7. Including the subject 'food security' in the curriculum of the training centers and the academic system of the agriculture extension system
8. Planning and presenting the subjects related to "food security" as research priority o research organization, Jihad-e agriculture organization, and other relevant organizations.
9. Forming food security research workgroup including the experts of Agriculture Research, Extension, and Training Center and academia.
10. Forming a workgroup to supervise, monitor, and control the activities of Jihad-e agriculture organization with respect to food security.
11. Forming, organizing, and managing a database of safe crop producers and the methods of safe crop production in accordance with the latest research findings at the village, township, province, national, and international level to grant producers the access to up-to-date nutritional information and to allow them to exchange information.

Table 1. Comparison of the status quo and optimal status of the support function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Subsidy support of poor farmers	1.87	3.92	-12.09**	8.03	1
Coordination for the marketing of the agricultural crops	2.33	4.03	-10.75**	6.85	2
Job development of human resource in agricultural sector	2.34	3.94	-10.78**	6.30	3
Financial supports by granting low-interest loans for small-scale exploitation systems	2.38	3.96	-10.76**	6.25	4
Creating the motives for the adoption of new techniques	2.56	4.02	-10.15**	5.86	5
Providing supports to empower the cooperatives of the agricultural sector	2.40	3.86	-10.15**	5.63	6
Coordination for the construction of silos, greenhouses, and storages for the agricultural crops	2.56	3.93	-8.01**	5.38	7
Investment and allocation of specific credits to relevant research in the field of food security	2.06	3.91	-11.53**	5.12	8
Extension and development of crop insurance	3.04	3.77	-10.78**	2.75	9
Support function	2.39	3.93	-13.67**		

* The range of means: 1-5 (P ≤ 0.001**)

Source: Research findings.

Table 2. Comparison of the status quo and optimal status of the consultation and guidance function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Motivating producers to produce safe crops	3.07	3.79	-8.00**	5.50	1
Guiding users towards exploring the problems and identifying the new opportunities in the production process	3.17	3.89	-4.72**	5.42	2
Motivating consumers to use safe crops	2.87	3.62	-7.94**	5.28	3
Helping to establish and development consultation and technical service enterprises	2.57	3.96	-7.34**	4.73	4
Helping the growth farmers' opinions, thoughts, and views	2.69	3.73	-6.45**	4.46	5
Directing and creating problem-solving mindset in users	2.64	3.97	-6.45**	3.87	6
Guiding and informing producers about the consequences of unsafe crop production	3.00	3.93	-6.22**	3.65	7
Encouraging farmers to change inappropriate traditional production goals and practices	2.78	3.92	-4.59**	2.80	8
Guiding the users towards voluntarily changing the traditional production methods	3.16	3.66	-4.94**	2.72	9
Helping the expansion of researching morale in the field of food security	2.62	3.85	-3.56**	2.97	10
Consultation and guidance function	2.86	3.83	-8.27**		

* The range of means: 1-5 ($P \leq 0.001^{**}$)

Source: Research findings.

Table 3. Comparison of the status quo and optimal status of the training function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Developing people who are aware of the sustainable agriculture profession	2.88	4.13	-8.43**	5.37	1
Planning for and considering the inclusion of the subject "food security extension" in the curriculum of the extension system in academia and agriculture training centers	2.86	3.87	-8.06**	5.28	2
Fostering a positive attitude among users about group work and cooperation for the participation in the relevant plans and cooperative research	2.75	4.07	-6.23**	5.16	3
Conveying technical knowledge of food security to users	2.96	3.97	-7.23**	5.16	3
Assessing the training requirements of agricultural food security in each city	2.76	4.02	-8.71**	5.06	4
Planning for the training of rural women to empower them in the field of safe crop production	2.95	4.14	-8.79**	4.92	5
Preparing extension booklets, flyers, and posters about different themes of food security	2.85	3.82	-6.43**	4.67	6
Empowering the users to cooperative in training and extension courses of food security	2.57	3.80	-7.23**	4.00	7
Training adult farmers about food security	2.79	3.78	-6.13**	3.90	8
Training function	2.82	3.96	-10.06**		

* The range of means: 1-5 ($P \leq 0.001^{**}$)

Source: Research findings.

Table 4. Comparison of the status quo and optimal status of the service-infrastructure function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Launching demonstration farms of safe crops	2.68	3.95	-9.85**	6.95	1
Developing modern methods and subjects of food security	2.91	3.86	-9.51**	5.97	2
Facilitating the procurement of agricultural inputs to the users by input supply firms	2.67	3.89	-8.34**	5.01	3
Developing a database of active and inactive producers at different levels in the field of food security	2.75	3.95	-8.03**	4.85	4
Planning food security-based extension activities	2.55	3.82	-7.83**	4.74	5
Facilitating the construction of irrigation and drainage canals by extension methods	2.59	3.77	-8.15**	4.74	5
Facilitating the presence of supervisors and advisors in farms and gardens	2.52	4.01	-7.65**	4.70	6
Appraisal of extension-training activities towards accomplishing food security	2.46	4.14	-6.60**	4.44	7
Extension and development of small investments in safe food industries in the agricultural sector	2.68	3.89	-7.65**	3.66	8
Service and infrastructure function	2.64	3.92	-11.08**		

* The range of means: 1-5 (P ≤ 0.001**)

Source: Research findings.

Table 5. Comparison of the status quo and optimal status of the cooperation function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Facilitating the establishment of marketing cooperatives	2.24	3.84	-12.56**	8.42	1
Facilitating the establishment of processing cooperatives for animal and crop wastes	2.33	3.96	-9.23**	6.89	2
Planning to lay the ground for the use of private sectors' opinions in macro decision-making on food security	2.59	3.97	-10.60**	6.45	3
Motivating the users to cooperate in financing for the design and implementation of food security ideas	2.43	3.68	-10.60**	6.14	4
Motivating the users to cooperate in proposing ideas compatible with the local conditions for the production of safe crops	2.46	3.66	-8.85**	5.47	5
Restoring and strengthening the cooperation morale among users	2.73	3.85	-9.97**	4.82	6
Motivating the users to cooperate in micro decision-making on food security at different dimensions	2.57	3.83	-7.83**	4.60	7
Facilitating the consistency of interactions between those involved in extension system and the agricultural sector	2.06	3.85	-8.15**	4.39	8
Motivating the users to cooperate in conveying local and environmental knowledge to extension agents	2.00	4.07	-7.72**	4.31	9
Cooperation function	2.38	3.83	-11.83**		

* The range of means: 1-5 (P ≤ 0.001**)

Source: Research findings.

Table 6. Comparison of the status quo and optimal status of the research function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Officially prioritizing "food security" in research agenda of the extension system of the academia and research centers	2.07	4.08	-14.78**	8.20	1
Conducting cooperative comparative studies on food security	2.28	3.93	-11.69**	7.35	2
Supporting the relevant theses and research financially and non-financially	2.35	4.02	-11.87**	6.98	3
Collecting statistical data in the research on food security and insecurity	2.19	4.02	-12.71**	6.71	4
Cooperating in and facilitating research projects on food security and relevant topics with non-extension groups like healthcare and agricultural disciplines	2.26	3.88	-11.81**	6.48	5
Forming research workgroups on food security in cooperation with the extension system, research centers, and relevant organizations	2.08	3.88	-11.81**	6.28	6
Research function	2.21	3.97	-14.88**		

* The range of means: 1-5 (P ≤ 0.001**)

Source: Research findings.

Table 7. Comparison of the status quo and optimal status of the interaction-information function of the agricultural extension system and its components and their prioritization

Component	Mean (present status)	Mean (optimal status)	t-statistic	Optimal (present-optimal)*	Rating
Facilitating the land communications and rural transportation for the transport of the agricultural crops	2.32	3.98	-11.94**	7.45	1
Facilitating the effective communication to motivate the consumers to get acquainted with safe and unsafe crops and the use of desirable crops	2.38	4.05	-12.91**	6.76	2
Facilitating the effective communication to motivate the producers to use the production methods for safe products	2.40	4.06	-12.18**	6.73	3
Developing and facilitating information exchange with producers of the agricultural sector	2.48	4.02	-12.18**	6.60	4
Facilitating the effective communication with users to make volunteer changes towards food security	2.31	4.12	-12.03**	6.19	5
Interaction-information function	2.38	4.05	-15.22**		

* The range of means: 1-5 (P ≤ 0.001**)

Source: Research findings.

REFERENCES

- Ahmadi, Z. (2016). *A study on the challenges and barriers of the development of safe crop production: A case of tomato farmers in Khaki County (M.Sc. Thesis)*. Yasuj, Iran: Yasuj University Press. (In Persian)
- Ahmadpour, A., Nouri, M., & Alikhani Dado Kolaei, M. (2015). Analyzing the required professional qualification for agricultural extension experts in operational level in the Mazandaran Province. *Rural Development Strategies*, 2 (2), 101-120. (In Persian with English Abstract)
- Ajoudani, Z., & Mehdizadeh, H. (2009). The feasibility of developing and extending organic farming from the viewpoint of agricultural experts in Kermanshah province. *Agriculture Extension and Education Journal*, 2 (4), 65-73. (In Persian)
- Allahyari, M.S. (2008). Redefining of Agricultural Extension objective toward sustainability in Iran. *American Eurasian journal Agriculture & environment science*, Vol.4, No.3, pp. 4349-353.
- Allahyari, M.S. (2009). Agricultural sustainability: Implication for extension system. *African Journal of Agricultural Research*, Vol.4, No. 9, pp. 781-786.
- Barghi, H., & Ghanbari, Y. (2012). A study on the issues and challenges of subsidy reform in the development of the agricultural sector. *Rahbord*, 30, 53-63. (In Persian)

- Emadi, M., & Amiri Ardakani, M. (2004). Integration of native knowledge and formal knowledge: The need for accomplishing sustainable agriculture development. *Agricultural Economics and Development*, 10 (37), 11-36. (In Persian)
- Emadi, M., & Shirzad, H. (2006). *Structural reforms in the process of crop insurance extension*. Ministry of Jihad-e Agriculture. (In Persian)
- Farrokhi, S., & Sedighi, H. (2005). A study on farmers and experts' attitudes towards privatization of the agricultural extension in Ilam Province. *Iranian Journal of Agricultural Science*, 36 (2), 399-408. (In Persian)
- Gharib, H. (2013). Current situation of food security in Iran and future outlook. *Rahbord*, 65 (21), 346-369. (In Persian with English Abstract)
- Ghorbani, R., Koocheki, A., Jahan, M., Nassiri, M., & Rezvani-Moghadam, P. (2009). National organic standards for Iran: I. Concepts, principles and aims of organic production and standards for agronomic and horticultural products. *Agroecology*, 1 (1), 129-149. (In Persian with English Abstract)
- Graham, R. & Ferrari, T.M. (2012). Trends affecting Ohio State University Extension in the 21st century and the implications for human capital. *Journal of Agricultural Education*, Vol. 53, No.2, pp. 43-57.
- Heidary, A., Hosseini, S., & Shahbazi, E. (2006). Comparison of various characteristics of extension workers in former ministries of Jihad-e Sazandegi and Agriculture to identify and prioritize the desirable status for extension system in Ministry of Jihad-e Agriculture. *Iranian Agricultural Extension and Education Journal*, 2 (2), 18-28. (In Persian with English Abstract)
- Khaledi, M., & Vazin, S. (2007). Conventional farmers' attitudes towards the barriers and motives of transition to organic farming. *Proceedings of 2nd Iranian Conference on Eco-Agriculture*. Gorgan, Iran: Gorgan University of Agriculture and Natural Resources. (In Persian)
- Kianmehr, N., & Hayati, D. (2013). An appraisal of agricultural extension staff's attitude towards poverty-oriented agricultural extension: The case of Fars province. *Iranian Agricultural Extension and Education Journal*, 8 (2), 119-138. (In Persian with English Abstract)
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, Vol. 30, pp. 607-610.
- Mirzaei, A., Hosseini, S. M., Hejazi, Y., & Movahhed Mohammadi, H. (2016). Pluralism: An approach to structural modification of the agricultural extension system in Iran to enhance network synergy. *Proceedings of 6th Iranian Conference on Agriculture and Natural Resources Extension and Training Science*. Shiraz: Shiraz University Press. (In Persian)
- Mirzaei, R., Sedighi, H., & Falsafi, P. (2008). Assessment of agricultural extension system in Iran. *Iranian Agricultural Extension and Education Journal*, 3 (2), 57-67. (In Persian with English Abstract)
- Moradi Kafraj, M., Rezvan Far, A., & Malek Mohammadi, I. (2014). Effective factors on success of decentralization of agricultural extension in Iran. *Iran Agricultural Extension and Education Journal*, 9 (2), 1-24. (In Persian with English Abstract)
- Morshedi, L., Hosseini, J., & Laskarara, F. (2012). The role of extension-training methods on enhancing innovation potential of the members of the fund supporting the agricultural activities of rural women. *Agricultural Extension and Education Research*, 5 (4), 27-36. (In Persian)
- Nazarzadeh Zareh, M., Durrani, K., & Lavasani, M. (2011). Obstacles and problems of agriculture extension training courses from farmers points of view participating in the extension training courses in Dezful City. *Research in Curriculum Planning*, 2 (1), 3-15. (In Persian with English Abstract)
- Parra Lopez, C., and Calatrava, R, equena, J. (2005). Factors related to the adoption of organic farming in Spanish olive orchards. *Spanish Journal of Agricultural Research*, Vol. 3, No.1, pp. 5-16.
- Saadi, H., Kalantari, K., & Irvani, H. (2008). Determination of preferable extension system for preventing desertification: An application of analytical and hierarchical process (AHP). *Iran Agricultural Extension and Education Journal*, 4 (1), 1-13. (In Persian with English Abstract)
- Sabouri, M. (2009). Assessment of consensus of opinions about the role of extension in agriculture development from the viewpoint of actors of agriculture knowledge and data system (A case of Mazandaran Province). *Journal of Agricultural Economy and Extension*, 2 (1), 45-56. (In Persian)
- Sharifi Moghaddam, M. (2012). The indicators of sustainability in agriculture and extension. *Moravej*, 124, 10-11. (In Persian)
- Sharifzadeh, M. (2014). Sustainable entrepreneurial agriculture: In a quest for an approach to facilitate agricultural entrepreneurial business development. *Journal of Entrepreneurship in Agriculture*, 1 (1), 103-129. (In Persian)
- World Bank.(2009). Agriculture Investment Sourcebook. 3rd Edition, *World Bank, Washington DC, USA, and ISBN: 08213-6085x: 508*.