The Role of Agricultural Extension to Facing Agricultural Risks in Sulaymani Governorate- Kurdistan Region - Iraq

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Article history:

Received: 27 December 2021
Accepted 14 March 2022
Published: 30 June 2022

Keywords: *Risks, Agricultural extension program, Agricultural risks, Sulaymani governorate.*

Abstract

The research aims to the role of agricultural extension in facing agricultural risks by diagnosing the personal and functional variables of the respondents, determining the reality of agricultural risks, and preparing an extension program to confront agricultural threats in the Sulaymani governorate. The research included (agricultural colleges and institutes, agricultural extension centers, and the Directorate of Agriculture). A proportional stratified random sample of (15%) was drawn for each lecture and agricultural extension worker, respectively. The research sample reached (111) respondents by selecting all agricultural directors in the Directorate of Agriculture. The indicative Program was prepared according to the following procedures: field visits to farmers' fields, records and documents in the Directorate of Agriculture, review of articles and research in agricultural research, agricultural literature, models and books, and expert notes in agricultural colleges and institutes, and in light of this, seven elements and 61 items were developed that make up the copy Initial Program. The questionnaire was presented in its initial form to a group of experts in agricultural extension and management. After taking their observations, the questionnaire consisted of 7 elements and 52 items. The research found several agricultural risks in the Sulaymani governorate and the approval of all the respondents on the terms of the extension program and the recommendation to apply it in the reality of agricultural work in the Sulaymani governorate.

https://dx.doi.org/10.52951/dasj.22140101

Introduction

The agricultural sector is an essential contributor to the global economy. In rural areas, around 75% of the world's poor are located, and most of them depend on agriculture as their source of income. There are about 500 million smallholder farmers worldwide (World Bank, 2016). The agriculture sector in Iraq and the Kurdistan region can contribute to political and economic stability because it can play an essential role in rural job creation and income generation. (Jongerden *et al*., 2019). The agricultural sector is given special care by the Kurdistan Regional Government for its essential role in economic development and providing food security. Therefore, the agricultural sector in the Kurdistan Region of Iraq faces great risks, especially in light of the current international conditions of globalization, liberalization of agricultural markets, privatization, and the information technology revolution. The agricultural sector in Sulaymani Governorate is one of the sectors affected by these risks, as this sector has weakened and the government relies on imported goods to cover the shortfall in local production, which leads to the loss of part of the agricultural income or causes direct or indirect losses to farmers.

Several studies have shown that risks and risk management in Agriculture are extensive (Jankelova *et al*., 2017; Adnan *et al*., 2020; Arifullah, 2020; Kozlova *et al*.,

2020). There have been many writings on the types of agricultural risks. Crane *et al.*, (2013) indicated that agricultural risks are (Financial Risk, Production Risk, Marketing Risk, Legislation risks, Human Risk). At the same time, Kahan (2008) clarified that agricultural risks are represented by five primary types: production risks, marketing risks, financial risks, human risks, and institutional risks. El-Moghazy *et al.* (2019) indicated that agricultural risks are represented by seven main types, which are production risks, marketing risks, and financial risks. From the above, agricultural risks can be summarized in seven main risks (production risks, marketing risks, financial risks, institutional risks, human risks, legislation risks, and environmental risks).

Production risks include weather, insects, disease, technology, and other factors that affect production quantity and quality (Dohlman, 2020). While marketing risk provides uncertainty in the market for your commodity, such as changes in the prices of inputs and/or outputs (Sciabarrasi, 2021). And financial risk refers to the risks associated with how the farm is financed and is defined as the additional variability of the farm's operating cash flow due to the fixed financial obligations inherent in the use of credit. De Mey *et al*., (2016). Meanwhile, Institutional risk changes in governmental and/or legal policies and standards affect agriculture. Tax laws, regulations for chemical use, rules for animal waste disposal, and the level of price or income support payments. (Dohlman, 2020). Also, Human risk refers to risks to the farm business caused by illness or death and the personal situation of the farm family. (Thomas, 2018). Also, Jesse and Richardson (2013) clarified that Legislation risks involve tort liability, contractual arrangements, business structures, tax, estate planning, and statutory compliance. Finally, Environmental risk requires analysis of information related to the environmental fate and behavior of chemicals in the environment integrated with research of data on their effects on humans and ecological systems. (Bartzas and Komnitsas, 2020). It is necessary to develop many development devices, confront risks and their repercussions on agricultural development strategies, and adapt them to respond and meet the continuous needs of farmers to build their agricultural productivity (Al Jaf, 2010). They were achieving food clothing security that targets the interests of all members of society and is concerned with a great deal of responsibility to contribute to addressing these challenges and achieving the goals of countries, especially developing countries, including Iraq and the Kurdistan region.

Several studies have indicated that the main reason for the decline in agricultural production and productivity can be blamed on ineffective and inefficient agricultural extension services (Mahmood and Layek, 2018; Mesterházy et al., 2020; Sebaggala and Matovu, 2020; Kshash and Oda, 2021).

such as the small number of agricultural extension agents at the local level, the large number of administrative work carried out by the agricultural extension, centralization in the administration, the lack of coordination between the extension apparatus and other agencies in the countryside, the lack of training of agricultural extension agents on new areas in agriculture and problems related to the capabilities necessary for agricultural extension work. (Draz and Abd El-Wahed, 2014), Hence the importance of addressing all risks and their repercussions on agricultural development strategies, setting a clear plan for the advancement of the agricultural sector in the Kurdistan Region, and reconsidering finding new mechanisms to confront agricultural risks to achieve food security and ensure the community's needs for agricultural products. The idea of this research emerged to address those risks. and potential problems, which necessitated the researchers to conduct this by answering the questions below:

1. What is the stage of agricultural risks in the Sulaymani Governorate?

2. What is the role of agricultural extension in facing agricultural risks in the Sulaymani Governorate?

Research Objective:

1. Determining the personal and functional variables of the respondents.
2. Exposing the reality of agricultural risks in Sulaymani Governorate.
3. Identifying agricultural extension's role in facing agricultural risks in Sulaymani Governorate.

Materials and Methods

Research Region: Sulaymani Governorate was chosen from the Kurdistan Region as a region to conduct the research.

The research population: The research population included the agricultural organizations in the Sulaymani Governorate represented by (Agricultural Extension Directorate, Agriculture Directorate, Agricultural colleges, and institutes), and a proportional stratified random sample of (15%) was chosen for each of the lectures and agricultural extension workers respectively, while all agricultural directors in the Directorate of Agriculture were selected due to the lack of Their number. Thus, the total number of the research sample members is (111) respondents.

Stages to the role of agricultural extension to face agricultural risks in Sulaymani Governorate.:

The first stage: the role of the agricultural extension was prepared upon these procedures: experts' observations, literature, and models, also the officials of agricultural departments and research articles, undertaking visits and official records, seven elements, and 61 items were developed, the total of the initial form of the Program.

The second stage: The Questionnaire was prepared in its initial form for a group of experts and specialists in the agricultural extension field at the Universities of Sulaymani and Dohuk. A total of twelve experts participated in the questionnaire to determine the level of their agreement on each field and item. Approval measure consisted of three groups: agree, agree with the amendment, disagree, and the given weights were 3, 2, and 1, respectively. As for the level of approval with the amendment procedure, a field related to the proposed amendment was set according to the standard level.

The third stage: As a percentage of the agreement, experts' opinions determined 80% as a criterion (condition), fields, or items within the initially proposed form as it obtained the approval of 80% of the experts' opinions, is entirely valid. The paragraphs that needed to be modified and merged with similar sections were reformulated. Some paragraphs were added from expert observations, as the sum of 7 elements and 52 items distributed over the proposed Program.

The 4^{th} stage: a Five-point scale of alternatives consisting of (very agree, agree, neutral, disagree, very disagree), the following weights are assigned successively (5, 4, 3, 2, and 1). To verify the apparent content validity, the questionnaire was presented to the exporters in each group of specialists in the Department of Agribusiness and rural development at the College of Agriculture at the University of Sulaymani. Their opinions were taken into consideration by deleting or adding to the questionnaire's items. A pre-test was conducted on the questionnaire to verify the validity of the questionnaire.

The data was collected in the personal interview in the form of a questionnaire for the respondents, which includes: 1st for personal and employment variables, 2nd are concerned with showing the reality of agricultural risks. 3rd part relates to the role of agricultural extension to face agricultural risks in the Sulaymani Governorate.

Results and Discussions

1. Determining the personal and functional variables of the respondents.

The study results showed that the lowest age of the respondents was 29 years, and the highest generation was 29 years, with an average of 46 years. The age of the respondents was divided into four age groups, as shown in Table No. (1).

Table (1) indicates that the highest percentage of the total respondent (35.1%) fall within the age group (32-39) years, and this shows that the majority of respondents are of young ages as the research results indicated that the highest percentage 31.5% was obtained by the category of Master's graduates, while the lowest rate (3.6) was for the category of Institute. The results also showed that 4.5% of all respondents are from agricultural extension specialization. The highest numerical value expresses the number of years of service for all respondents is 45 years. In contrast, the highest years of service out of the total number of respondents fall within the category 16-25 at 58.6%. However, the lowest percentage is included in the category (36-45) within 9% percentage. The research results also indicated that (76.6%) of the respondents of all groups had their place of work inside the city, while the rates of (23.4%) of all groups were from outside the city.

Table 1. Distribution of researchers according to personality and functional variables

Variables	Extension Workers		Directors		Teachers		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Age								
32 - 39	8	27.6	7	31.8	24	40.0	39	35.1
40 - 47	11	38.0	8	36.4	13	21.6	32	28.9
48 - 55	5	17.2	5	22.7	10	16.7	20	18.0
56 - 63	5	17.2	2	9.1	13	21.7	20	18.0
Educational attainment								
Institute	4	13.8	0	0	0	0	4	3.6
College	10	34.5	2	9.1	0	0	12	10.8
Higher Diploma	15	51.7	14	63.6	0	0	29	26.1
Master	0	0	5	22.7	30	50.0	35	31.5
PhD	0	0	1	4.6	30	50.0	31	28.0
Specialization								
extension	2	6.9	2	9.1	1	1.7	5	4.5
Other departments.	27	93.1	20	91.9	59	98.3	106	95.5
Length of service								
6 - 15	7	24.1	2	9.1	13	21.7	22	19.8
16 - 25	19	65.5	18	81.8	28	46.7	65	58.6
26 - 35	2	6.9	2	9.1	10	16.6	14	12.6
36 - 45	1	3.5	0	0	9	15.0	10	9.0
Workplace								
Inside	12	41.4	13	59.1	60	100	85	76.6
Outside	17	58.6	9	40.9	0	0	26	23.4
Total	29	100	22	100	60	100	111	100

2. Exposing the reality of agricultural risks in Sulaymani Governorate:

The results showed that (68.5%) of all respondents confirmed the existence of production risks in the Sulaymani governorate. In comparison (31.5%) of all respondents indicated their absence, as shown in Table (2), While (71.2%) of all respondents indicated that there are marketing risks in Sulaymani Governorate. In comparison, the percentage (28.8%) of all respondents showed their absence. In contrast, the rate of (73%) of all respondents confirmed the presence of financial risks for the agricultural sector in the Sulaymani Governorate. In comparison, the percentage of (27%) of all respondents indicated their absence. About institutional problems, the research results showed that (71.2%) of all respondents have institutional risks in the agricultural sector in Sulaymani Governorate. While (28.8%) of all respondents indicated their absence, the research results showed that (78.4%) of the respondents of all groups confirmed the presence of environmental risks in the agricultural sector in the Sulaymani Governorate.

In comparison, a percentage of (21.6%) of all respondents indicated their absence. About human risks, the research results showed that (64.9%) of the respondents of all groups confirmed the presence of human threats in the agricultural sector in Sulaymani Governorate. In comparison (35.1%) of all respondents indicated their absence. As for the percentage of legislation risks, the research results showed that (73.0%) of the respondents of all respondents confirmed the presence of legislation risks in the agricultural sector in the Sulaymani Governorate, while (27.0%) of the respondents of all respondents indicated their absence.

Table 2. Distribution of respondents about the reality of agricultural risks in Sulaymani Governorate

Categories of respondents / Risks	Extension Workers		Agricultural directors		Lectures		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Productivity risks								
Presence of the Productivity risks	20	68.9	14	63.6	42	70.0	68.5	76
Lack of Productivity risks	9	31.1	8	36.4	18	30.0	31.5	35
Marketing risk								
Presence of the Marketing risk	23	79.3	16	72.7	40	66.7	71.2	79
Lack of the Marketing risk	6	20.7	6	27.3	20	33.3	28.8	32
Financial risk								
Presence of the Financial risk	20	69.0	15	68.2	46	76.7	73.0	81
Lack of the Financial risk	9	31.0	7	31.8	14	23.3	27.0	30
Agricultural Institutions risks								
Presence of the Agricultural Institutions risks	23	79.3	13	59.1	43	71.7	71.2	79
Lack of the Agricultural Institutions risks	6	20.7	9	41.9	17	28.3	28.8	32
Environmental risks								

Presence of the Environmental risks	21	72.4	17	77.3	49	81.7	78.4	87
Lack of the Environmental risks	8	27.6	5	22.7	11	18.3	21.6	24
Human risks								
Presence of the Human risks	19	65.5	13	59.1	40	66.7	64.9	72
Lack of the Human risks	10	34.5	9	41.9	20	33.3	35.1	39
Legislation risks								
Presence of the Legislation risks	21	72.4	14	63.6	46	76.7	73.0	81
Lack of the Legislation risks	8	27.6	8	36.4	14	23.3	27.0	30
Total	29	100	22	100	60	100	100	111

3. Identifying the role of agricultural extension to face agricultural risks in Sulaymani Governorate:

3.1 Approval of the elements of an indicative program to confront agricultural risks in Sulaymani Governorate:

The numbers of an extension program to face agricultural risks among the proposed Agricultural colleges and institutes, Agricultural Extension Directorate, Agriculture Directorate, of (7) elements obtained weighted averages ranging between (4.19 - 4.28) degrees and with percentage weights located between (83.8 - 85.6%). Therefore all of these elements remain in the final figure for preparing an extension program to face agricultural risks because each of them is higher than the hypothetical mean score of (3) degrees, as shown in table 3:

Table (3) shows that two components (the risks of agricultural institutions, the dangers of legislation) ranked first in terms of importance and weight, as they achieved a weighted average of (4.28) degrees and a weight of (84.8%), respectively, which is higher than the weighted averages of the other elements. And the reason behind this is the lack of agricultural laws and a properly organized system in the agricultural sector in the sulaimani governorate. At the same time, the "Marketing risk" component scored the last rank in terms of importance and weight, as they achieved a weighted average of (4.19) degrees and a weight of (83.8%), which is lower than the average weighted averages of the elements, the reason for this is due to the insignificance of these risks compared to other risks, according to the respondents. To compare the categories of respondents in terms of the degree of approval of the elements in the Program, analysis of variance (F) was used, whose value was (0.281). It is less than its tabular value at a significant level (0.05) and two degrees of freedom (2, 108), and this shows that there are no statistically significant differences between the average degrees of respondents' approval of the extension program for facing agricultural risks in Sulaymani Governorate, as shown in Table 3:

Table 3. The percentage weighted and the Average weighted averages to the degree of respondents' agreement to the elements of the extension program

Elements	Ranking	Weighted Average			Aver. weighted averages	Weight %
		Extension Workers	Agricultural directors	Lectures		
Productivity risks	3.5	4.10	4.33	4.31	4.25	85.0
Marketing risk	7	4.21	4.12	4.25	4.19	83.8
Financial risk	6	4.06	4.05	3.96	4.02	80.4
Agricultural Institutions risks	1.5	4.32	4.43	4.09	4.28	85.6
Environmental risks	5	4.38	4.30	4.04	4.24	84.8
Human risks	3.5	4.43	4.25	4.09	4.25	85.0
Legislation risks	1.5	4.46	4.34	4.04	4.28	85.6
Average degrees of Elements		4.28	4.26	4.11	4..22	84.4
N=111						

3.2 Approval of the items of an indicative program to confront agricultural risks in Sulaymani Governorate: The 52 agricultural risk items obtained weighted averages ranging between (3.96-4.42) degrees and weights between (78.8-88.4%). Accordingly, all the paragraphs remain in the Program for each of them to obtain a weighted average of approval degrees higher than the hypothetical mean score of (3) degrees, as shown in table 4:

Table (4) shows that the item (The need to work to protect and support the local product and implement agricultural quarantine laws) ranked first according to importance, as it a weighted average of (4.42) degrees and a percentage weight of (88.4%), which is higher than the weighted averages of the other items. This may be because of protecting the local product. Agricultural quarantine is an essential strategy in The development of agriculture in the governorate, while paragraph (Loading the Ministry of Agriculture's financial resources to cover the costs of some urgent expenses) As for the last rank, the average weighted averages reached (3.96) degrees and the percentage weighted (78.8%), which is less than the weighted average of the other items and maybe less important compared to the other items from the respondents' point of view.

Table 4. The percentage weighted and the Average weighted averages to the degree of respondents' agreement to the items of the extension program

Elements	Items	Weighted averages				Aver Weighted averages	Weight %
		Ranking	Extension Workers	Agricultural directors	Lectures		

Productivity risks	1. Using modern irrigation methods to counteract the drought and use water economically.	41	3.93	4.18	4.22	4.11	82.2
	.2. The exploitation of arable and unused lands through joint Investment between companies and farms.	25.5	4.20	4.36	4.15	4.24	84.8
	3. The use of improved high-yield seeds produced by their cultivation agronomist agricultural patterns.	5	4.20	4.45	4.37	4.34	86.8
	4. The need to develop a new strategy for developing the agricultural sector based on the economic feasibility study for agricultural projects.	25.5	3.86	4.45	4.42	4.24	84.8
	5. Providing accurate statistical data for each crop to use in setting an agricultural policy	30.5	4.03	4.27	4.37	4.22	84.4
	6. Encouraging vertical agricultural expansion by intensifying agricultural production factors.	4	4.27	4.40	4.39	4.35	87.0
	7. The necessity of publishing and programming agricultural technologies on a website.	38	4.06	4.09	4.29	4.15	83.0
	8. Maintaining the vegetation cover with optimal use and effectively addressing its protection by preventing cutting and overgrazing	11.5	4.27	4.41	4.27	4.32	86.4
	Weighted averages Productivity risks		4.10	4.33	4.31	4.25	85.0
Marketing risk	9. Provide detailed data on imported and exported materials by origin.	7.5	4.36	4.36	4.27	4.33	86.6
	10 The need to work to protect and support the local product and implement agricultural quarantine laws.	1	4.46	4.45	4.37	4.42	88.4
	11. Activating and issuing the customs on imported agricultural commodities.	7.5	4.46	4.27	4.27	4.33	86.6
	12. Organizing marketing and helping the product away from intermediaries so that it can increase its returns.	39.5	4.20	4.00	4.19	4.13	82.6
	13. Preventing speculation in the market so as not to deteriorate prices.	43	4.03	4.13	4.12	4.09	81.8
	14. Increasing marketing awareness among the categories of dealers in the field of marketing.	50.5	3.97	3.73	4.24	3.98	79.6
	15. Establishing marketing offices and providing services for export crops.	42	3.93	4.13	4.24	4.10	82.0
	16. Design and implementation of promotional programs for products in foreign markets	34.5	4.17	4.09	4.32	4.19	83.8
	17. The need to provide a marketing information base that includes the tastes and desires of consumers.	34.5	4.37	3.95	4.25	4.19	83.8

	Weighted averages for Marketing risk		4.21	4.12	4.25	4.19	83.8
Financial risk	18. Reducing taxes on agricultural producers and adjusting them by the authority of the Ministry of Finance.	48.5	3.88	4.14	4.00	4.00	80.0
	19. Developing the banking sector and giving banking and customs facilities to the activities of the private sector.	47	4.07	4.04	3.95	4.02	80.4
	20. The need to increase the allocated loans in coordination with the farmers' groups.	50.5	4.00	4.09	3.86	3.98	79.6
	21. Working on developing financial systems on an ongoing basis to avoid risks and reduce their occurrence.	46	4.00	4.14	3.96	4.03	80.6
	22. Loading the Ministry of Agriculture's financial resources to cover the costs of some urgent expenses.	52	3.96	4.00	3.86	3.94	78.8
	23. Determining the impact of stopping funding on the current status of existing projects.	48.5	4.00	4.00	4.00	4.00	80.0
	24 Increasing national income from agriculture, leads to an increase in total income.	45	4.27	3.91	4.03	4.07	81.4
	25. Provide the necessary financial resources to implement programs and support investment.	36.5	4.31	4.14	4.08	4.17	83.4
	Weighted averages for Financial risk		4.06	4.05	3.96	4.02	80.4
Agricultural Institutions risks	26. Work to strengthen the relationship between extension, scientific research, agricultural education, and farmers.	14.5	.4.58	4.50	4.08	4.30	86.0
	27. Creation of a risk management department in the organizational structure of the Agricultural Extension	14.5	4.27	4.59	4.06	4.30	86.0
	28. Redefining the role and duties of agricultural extension agents related to agricultural risk management.	28	4.13	4.59	3.96	4.23	84.6
	29. The government needs to continue supporting the extension system in the transfer and delivery of modern agricultural technologies to farmers.	32.5	4.20	4.31	4.08	4.20	84.0
	30. The need to encourage agricultural institutions and research centers by relying on modern agricultural technology in the province.	17	4.55	4.13	4.21	4.29	85.8
	31. Existence of cooperation and coordination between agricultural institutions, including developing a common framework for agricultural risk management.	2.5	4.44	4.5	4.15	4.36	87.2
	Weighted averages for Agricultural Institutions risks		4.32	4.43	4.09	4.28	85.6

Environmental risks	32. Establishing an insurance system for crops against natural and climatic hazards.	28	4.45	4.09	4.15	4.23	84.6
	33. The need to reconsider the prevailing crop composition, as a preventive method to confront agricultural risks.	23.5	4.62	4.09	4.05	4.25	85.0
	34. Expansion of organic farming and dissemination of its technologies.	21.5	4.45	4.54	3.82	4.27	85.4
	35. Adoption of a clear policy by the Ministry of Agriculture to support strategic crops.	28	4.28	4.36	4.06	4.23	84.6
	36. Working on activating the integrated agricultural pest control method instead of the chemical control method.	44	3.96	4.22	4.06	4.08	81.6
	37. Developing a strategy to address the challenges facing the land from desertification.	23.5	4.34	4.32	4.08	4.25	85
	38. The use of information and data systems for agricultural weather stations.	2.5	4.58	4.45	4.05	4.36	87.2
	Weighted averages for Environmental risks		4.38	4.30	4.04	4.24	84.8
Human risks	39. Measuring employee satisfaction periodically, identifying and addressing weaknesses.	39.5	4.34	4.00	4.05	4.13	82.6
	40. Working to follow up agricultural activities and know the rights and duties of workers.	11.5	4.55	4.27	4.13	4.32	86.4
	41. Obligating employees to carry out training and rehabilitation programs.	30.5	4.41	4.00	4.20	4.20	84.0
	42. It is necessary to work on the development of an administrative structure in the agricultural departments by placing the right person in the right .place	32.5	4.51	4.13	4.03	4.22	84.4
	43. Paying attention to the education and guidance of farmers to achieve an increase in agricultural production and improve quality and efficiency.	7.5	4.34	4.54	4.11	4.33	86.6
	44. Providing job opportunities for the unemployed and reducing disguised unemployment.	11.5	4.44	4.45	4.06	4.32	86.4
	45. Educating modern agriculture and sending guides and experts outside the country to develop their skills.	21.5	4.44	4.36	4.03	4.27	85.4
	Weighted averages for Human risks		4.43	4.25	4.09	4.25	85.0

Legislation risks	46. Reconsidering the laws issued after 2003, which caused great damage to the agricultural sector.	36.5	4.24	4.27	4.01	4.17	83.4
	47. Making unremitting efforts by the government to solve the water problem with neighboring countries by signing legal agreements.	19.5	4.41	4.32	4.11	4.28	85.6
	48. Legislation of laws to encourage the manufacturing industries of agricultural products.	17	4.45	4.36	4.06	4.29	85.8
	49. Reforming systems and laws of small property ownership that stand in the way of economic adoption of .modern technologies in agriculture	17	4.48	4.32	4.06	4.29	85.8
	50. Activating the laws and legislation related to land use to stop the infringements on agricultural lands.	7.5	4.65	4.40	3.91	4.33	86.6
	51. Activating (customs acknowledgment law, consumer protection law, and agricultural products protection law).	11.5	4.45	4.40	4.13	4.32	86.4
	52. Protecting the local product by enacting laws to set duties on crops and imported foods.	19.5	4.52	4.31	4.00	4.28	85.6
	Weighted averages for Legislation risks		4.46	4.34	4.04	4.28	85.6
Average degrees of respondents' agreement with the items			4.28	4.26	4.11	4.22	84.4

Conclusions

1- The results showed that all respondents supported the elements and paragraphs of an agricultural extension program and improved the extension reality to confront agricultural risks. We conclude from this a very important step that there is interest in developing and improving the extension process and its workers by agricultural cadres and experts in the governorate, so their knowledge capabilities must be developed and skills in the field of risk management through specialized training programs in the aforementioned field.

2- There are many agricultural risks facing farmers and the agricultural sector in Sulaymani Governorate. We conclude that there are weak programs to provide production, environmental, and marketing services to farmers in the governorate. The regional government must develop plans and programs to offer production, environmental, and marketing services in the agricultural and rural areas of the governorate.

3- Most respondents have high experience in agricultural work in the governorate. This is an important indicator in developing an extension program to face agricultural risks, so they must participate in building agricultural strategies and plans in the governorate.

4- The legal and institutional risks are among the most critical risks facing agriculture in the Sulaymani governorate. We conclude that the laws and legislation are weak to protect agricultural resources in the governorate. We recommend activating and applying rules and legislation to protect

agricultural resources and building a new organizational structure for the agricultural sector by linking it to all official and non-official organizations in the governorate.

5- The paragraph on protecting the local product and the laws of agricultural quarantine is one of the most important paragraphs of building the extension program. We conclude that there is no marketing awareness for farmers and consumers. We recommend encouraging local goods through marketing awareness and financial support to reduce the costs of primary production inputs in the governorate.

Conflict of interests

The authors declare no conflict of interest.

Acknowledgments

We extend our sincere thanks and appreciation to the directors in the agricultural directorates and all the agricultural extension workers and lectures at the University of Sulaimani for all they provided us with valuable information that contributed to enriching the subject of our study in its various aspects.

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