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THE ROLE OF PROFESSIONAL LEADERSHIP IN DIFFUSION AGRICULTURAL INNOVATION IN SULAIMANI GOVERNORATE-KURDISTAN REGION-IRAQ

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ABSTRACT

The main objective of this research is to identify the role of agricultural professional leadership in the diffusion of agricultural innovation. In addition, it seeks to rank the main fields of this leadership role in innovation diffusion and to analyze its relationship with a set of independent variables. A questionnaire was developed to collect the research data, comprising two main sections: the independent variables and the role of agricultural professional leadership in the diffusion of agricultural innovation. The latter section was organized into two fields: the first field included eleven items addressing the preparation of agricultural innovation, while the second field encompassed nineteen items related to the diffusion of agricultural innovation. The research population comprised all 94 agricultural professional leaders in the extension centers of Sulaimani Governorate, distributed across its districts and sub-districts. The research findings indicated that the role of professional leadership in diffusing agricultural innovation in Sulaimani Governorate was moderate, with the diffusion dimension ranking higher than innovation preparation. Additionally, this role was significantly correlated with age, educational attainment, and attitudes toward innovation, while no significant relationships were found with gender, academic specialization, years of extension service, participation in training programs, or leadership style. Therefore, the researchers recommend involving professional leaders in the development and adaptation of agricultural innovations, not just in their diffusion, and consider experience, educational attainment, and positive attitudes toward innovation as key criteria for their selection and promotion.

1.Introduction

Agriculture is a fundamental component of the global economic structure, effectively contributing to supporting the overall economy of various countries, whether developed or developing economies, through its role in achieving food security, providing inputs for other productive sectors, and enhancing opportunities for sustainable development (Sabir and Hasan, 2025).Agricultural development is an essential component of comprehensive economic development. Most international experiences indicate that few countries have achieved sustainable economic development without significant growth in the agricultural sector (Sakinaa et al., 2023). Accordingly, various countries have adopted various methods and means to enhance the development of their agricultural sectors and overcome economic crises, including the development of effective policies to address agricultural risks, particularly those related to productivity and marketing (Rashid and Hasan, 2023). Agriculture is a key productive sector in the Kurdistan Region, supported by abundant natural resources, including agricultural land that sustains farmers' livelihoods through food production and export. Nevertheless, the agricultural sector in Sulaymaniyah Governorate faces significant challenges amid the ongoing information technology revolution (Hasan, 2021). particularly in adopting agricultural information technologies. These challenges include limited skills and experience, low awareness, lack of specialized training programs, and inadequate literacy and language skills among some farmers (Sakinaa et al., 2021)
;(Hamasalih and Layeeq, 2023).
. To support economic development, the government should implement strategies to advance technology and foster innovations that modernize production methods and enhance the use of smart and digital agricultural technologies (Raji et al., 2024).

In this context, the diffusion of agricultural innovation represents a highly complex process, extending beyond the mere development of technologies to include the creation of a supportive social and institutional environment that facilitates knowledge transfer, adoption, and adaptation within the local context (Klerkx and Rose, 2020). Given the increasing complexity of agricultural technologies and the diversity of their tools, it is essential to have actors capable of effectively conveying these innovations to farmers. Accordingly, agricultural professional leaders play a critical role, serving as intermediaries between agricultural research centers and farmers in the field (Rivera and Sulaiman, 2009). Agricultural professional leaders fulfill multiple roles, including technology transfer, technical training, facilitation, and motivation, as well as assessing the impact of innovations on farmers and their communities. They are instrumental in promoting the diffusion and adoption of agricultural innovations, not merely by conveying information, but by translating innovations into practical applications suited to local contexts. These leaders build trust with farmers, provide training, and foster social and professional environments conducive to adopting agricultural changes (Rogers, 2003),Moreover, they serve as key sources of knowledge and technical support, helping to address hesitation and concerns associated with innovation, particularly in rural communities that are cautious toward change (Vanclay, 2004).

Their effectiveness is maximized when supported institutionally, equipped with leadership skills, and capable of coordinating among the various actors within the agricultural innovation system (Sharifi et al., 2019).Despite the increasing recognition of the pivotal role played by agricultural professional leaders in fostering sustainable agricultural development and promoting innovation, the effectiveness of this role remains inconsistent across various geographical and socio-economic contexts. Empirical evidence suggests that leadership in the dissemination of agricultural innovations is frequently constrained by weak professional guidance, limited financial and human resources, insufficient training opportunities, and inadequate institutional support. Additionally, the absence of coherent policies for innovation transfer, along with poor coordination and integration among research, development, and extension institutions, further widens the gap between

scientific knowledge and its practical application in the field (Karimi et al., 2023), Accordingly, assessing the leadership role of agricultural professionals within developing agricultural contexts is essential to identify the underlying constraints, improve the efficiency of agricultural extension systems, and enhance their capacity for effective knowledge and technology transfer to farmers (Anderson and Feder, 2007)The absence of systematic reforms aimed at developing leadership capacities at both national and local levels continues to impede the effective diffusion of agricultural innovations. This highlights the necessity of adopting sustainable institutional strategies that empower agricultural leaders to play a more active and transformative role in advancing productive, resilient, and sustainable agricultural systems. Based on the foregoing discussion, the core research problem can be articulated through the following main questions:

1. What is the role of agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate?
2. Is there a correlation between each of the independent variables and the role of agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate?

2.THE REASERCH OBJECTIVES

1. Identify the role of Agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate.
2. Arranging the main fields of the role of Agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate.
3. Determine the correlation between professional leaders in diffusion of innovation and each of the variables (Age, Gender, Academic Achievement, Academic Specialization, Duration of agricultural extension service, Participation in Training courses, leadership style, Attitude towards diffusion agricultural innovation).

3.MATERIAL AND METHODOLOGY

3.1 Research Methodology: This research relied on a descriptive survey methodology using a questionnaire. According to (Imbeau et al., 2021), this method is useful for obtaining comprehensive and reliable information from the social reality. It seeks to describe and analyze the reality through data collection and interpretation, in order to understand the perceptions, attitudes, and reactions of agricultural professional leaders regarding their role in disseminating agricultural innovations in Sulaimani Governorate (Al-Abbassi, 2018).

3.2 Research area: Sulaimani Governorate was selected as the research area due to its status as one of the main agricultural governorates in the Kurdistan Region, where the agricultural sector constitutes a primary source of livelihood for the majority of the population. It is characterized by a diversity of agricultural activities, from crop cultivation to animal husbandry, making it a pivotal element in achieving food security in the region.

3.3 Research population: The research population consists of all agricultural professional leadership in agricultural extension centers in Sulaimani Governorate, distributed among the districts and sub-districts, numbering (114) agricultural professional leadership distributed among (12) extension centers. After excluding the pre-test sample of (20) respondents, the research population became (94) respondents, as shown in Table 1.

Table 1 : Distribution of respondents in the population of the research

Governorate	Agricultural Extension Centers	Number of respondents in agricultural extension centers	Number of respondents in the pre-test sample	Population
Sulaimani	Bakrajo	56	20	36
	Dukan	4	-	4
	Chawarqurna	3	-	3
	Chamchamal	8	-	8
	Karahanjir	13	-	13
	Sharazur	5	-	5
	Tanjaro	5	-	5
	Darbandikhan	4	-	4
	Kufri	4	-	4
	Kalar	4	-	4
	Bazian	4	-	4
	Chwarta	4	-	4
	Total	114	20	94

4 DATA COLLECTION TOOL:

A questionnaire is a structured research tool used to collect quantitative or qualitative data on specific variables. It is an effective means of descriptive and analytical studies to understand trends, behaviors, and attitudes (Sakinaa et al., 2023);(Cohen et al., 2002).

A specialized questionnaire was designed to achieve the research objectives, and it consists of two main sections. The first section focused on personal and professional information from respondents (Age, Gender, Academic Attainment, Academic Specialization, Duration of agricultural extension service, Training Program in leadership field, leadership style).As for the second section of the questionnaire evaluated the role of agricultural professional leadership in diffusion agricultural innovation which consisted of two fields; the first field defining of agricultural innovation preparation to diffusion the innovation, which consisted of (19) items, and the second field is the diffusion of agricultural innovation, which consisted of (11) items. For validity face and content validity, the questionnaire was submitted to a group of specialists in the field of agricultural management and guidance at Iraqi universities (Sulaimani, Kirkuk, Dohuk, Tikrit, Baghdad, and Wasit). Their feedback led to modifications, including the removal or addition of specific items within the questionnaire. To ensure the reliability of the questionnaire items, a pre-test was conducted in November 2024 on a sample of 20 agricultural employees assigned to extension work in the Directorate of Agriculture in Sulaimani

Governorate, outside the research population, Cronbach's alpha coefficient was applied, which is approved standard for evaluating the reliability of measurement tools and acceptable if its value reached 0.70 or more (Al-Jubouri and Al-Jubouri, 2023),A reliability coefficient of 0.89 was established for the scale of the role of professional leadership in diffusion agricultural innovation, and thus the scale obtained high reliability and validity, reflecting a substantial level of consistency among its items (Layeeq et al., 2023)

Data was collected in a questionnaire form and personal interview, after unloading and classifying the data, the SPSS program and a number of statistical tools were used to analyze the data, such as (percentage, arithmetic mean, Pearson's and superman correlation, Range, The standard deviation, frequency distribution).

5 Measurement of Search Variables

5.1 Measurement of the Dependent Variable

The assessment of agricultural professional leadership in promoting the diffusion of agricultural innovations comprised 30 items,

organized across two fields: the preparation of agricultural innovations and agricultural innovation diffusion**.**

Each item presented to respondents included a selection of alternatives: largely agree, agree neutral, disagree, and don't agree at all, which were assigned numerical values of 5, 4, 3, 2, and 1, respectively. Consequently, the scores within this scale spanned a range of 30 to 150 degrees.

5.2 Measuring Independent Variables

1. Age: measured by the number of years of age of the respondents at the time of data collection.

2. Gender: It was measured by placing the alternatives: male, female and these alternatives were given the following values : 1, 2 respectively.

3. Academic Specialization: It was measured through the two alternatives: Agricultural Extension and non- Agricultural Extension, and these alternatives were given values 1, 2 respectively.

4. Academic Attainment: It was measured according to the following alternatives: High School of Agriculture, Diploma of Agriculture, Bachelor of Agriculture, Higher Education, and weights were given to them 1, 2, 3, 4 respectively.

5. Duration of agricultural extension service, it was measured by the number of years spent by the respondents in agricultural extension work.

6. Training Program in leadership field: It was measured through the two alternatives: participant and non-participant and these alternatives were given values 1, 2 respectively.

7. Leadership style: It was measured by asking the interviewee about the Leadership through the three alternatives: (Autocratic, Democracy and Both) were given the values 1, 2, 3, respectively

8. Attitude towards diffusion agricultural innovation: This variable was measured through 8 items, 4 positive items, 4 items which are negative, according to the levels: largely agree , agree , neutral , disagree , largely disagree, and for measurement, scores 5, 4, 3, 2, 1 were given for the levels of positive items, while the values 1, 2, 3, 4, 5, respectively were given for negative items. Thus, the values of the agricultural professional leadership's attitude towards diffusion agricultural innovation were limited between 8-40 numeric values.

6 RESULTS AND DISCUSSION:

6.1 Identify the role of Agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate in general:

The results showed that the highest numerical value obtained by the respondents in the role of leadership are (149) degrees, and the lowest numeric value are (63) degrees, on a scale whose degrees ranged between (30-150), with an average of (117.9) degrees and a standard deviation of (13.83) degrees. The respondents were distributed according to their degrees of role of professional leaders into three categories (Low, Medium, High), as shown in table (2).

Table (2): Distribution of respondents according to their level of role of professional leaders in diffusion agricultural innovations.

Categories	Frequency	%	Average of role	$\bar{X}$	Std. Deviation
(63 – 91) Low	4	4.30	79.50	117.9	13.83
(92 – 120) Medium	49	52.10	111.43		
(121 - 149) High	41	43.60	129.61		
Total	94	100			

Table (2) indicates that the highest percentage of respondents is (52.10%), with an average of role of professional leaders (111.43) degrees in the medium category (92-120), while the lowest percentage of the respondents was (4.30%), with an average of (79.50) in the low category (63-91). The level of professional leaders' role in disseminating agricultural innovations, according to the respondents, was average and tending to increase. These results indicate that, according to the respondents' views, the role played by professional leaders in disseminating agricultural innovations was Medium and tending to High. This assessment reflects clear efforts by professional leaders to transfer and disseminate agricultural innovations, whether through extension, training, or supporting the adoption of

modern technologies. However, this level remains below ambition, indicating the presence of factors that may limit the effectiveness of these leaders, such as limited resources, weak institutional support, or a lack of professional development opportunities. This result is consistent with the findings of the studies of (Ataei et al., 2025);(Mukherjee et al., 2025);(Lee et al., 2024).

6.2 Identifying the level of agricultural professional leaders in the field of agricultural innovation preparation in Sulaimani governorate.

The results of the research showed that the highest numerical value obtained by the respondents in the field of preparation of new innovation is (94) degrees, and the lowest numerical value is (38) degree, on the scale with a theoretical range (19-95) degree, with an average of (74.24) degrees and a standard deviation of (10.15). The respondents were distributed according to their degrees of preparation into three categories (Low, Medium, High), as shown in Table (3).

Table (3): Distribution of respondents according to their role in the field of agricultural innovation preparation

Categories	Frequency	%	Average of preparation	$\overline{X}$	Std. Deviation
(38–56) Low	6	6.40	48.33		
(57–75) Medium	45	47.90	69.96	74.24	10.15
(76 – 94) High	43	45.70	82.35		
Total	94	100			

Table 3 indicates that the highest percentage of respondents is (47.90), with an average of preparation (69.96) degrees in the medium category (57–75), while the lowest percentage of the respondents was (6.40%), with an average of preparation (48.33) degrees in the low category (38–56), the medium and high categories constituted (93.60%) of the total number of respondents, This is due to the tangible efforts being made by these leaders to develop or adapt agricultural innovations to suit the reality of farmers, but these efforts are still below the high or ideal level. This result is consistent with the findings of the study of (Ruzzante et al., 2021) .

6.3 Identifying the level of agricultural professional leaders in the field of agricultural innovation diffusion stage in Sulaimani governorate

The results of the research showed that the highest numerical value obtained by the respondents in the field of diffusion of new innovation is (55) degrees, and the lowest numerical value is (25) degrees, on the scale with a theoretical range (11-55), with an average of (43.76) degrees and a standard deviation of (5.764). The respondents were distributed according to their degrees of innovation diffusion into three categories (Low, Medium, High), as shown in Table (4).

Table (4) :Distribution of respondents according to the level diffusion of new agricultural innovation

Categories	Frequency	%	Average of diffusion	$\overline{X}$	Std. Deviation
(25-34) Low	8	8.50	31.38		
(35– 45) Medium	53	56.40	42.15	43.76	5.76
(46- 55) High	33	35.10	49.33		
Total	94	100			

Table 4 indicates that the highest percentage of respondents is (56.40%), with an average of diffusion (42.15) in the medium category (35-45), while the lowest percentage of the respondents was (8.50%), with an average of diffusion (31.38) in the low category (46-55), this means that more than half of the respondents fall into the medium category, This may be due to the fact that agricultural professional leaders are a key player in the diffusion of agricultural innovations, but they need to strengthen their institutional and technical capacities to play a more integrated and effective role at all stages of diffusion, This

result is consistent
with the findings of the study of (Tegene et al., 2023).

6.4 Arranging the main fields of the role of Agricultural professional leaders in diffusion agricultural innovations in Sulaimani Governorate.

The main fields of the role of agricultural professional leaders in diffusion agricultural innovations in Sulaimaniyah Governorate consist of (2) fields: (the innovation preparation stage and the innovation diffusion stage). The averages of these fields ranged between 3.90 and 3.97 points, and their corresponding percentage weights ranged between 78.15% and 79.56%. These fields were arranged in descending order of prevalence among the respondents, as shown in Table 5.

Table (5) : Ranking the fields of the role of Agricultural professional leaders in diffusion agricultural innovations

Fields	Maximum degree	Average of role	Average weighted averages	Weight %	Std. Deviation	Rank
Diffusion	55	43.76	3.97	79.56	5.76	1
Preparation	95	74.24	3.90	78.15	10.15	2

According to the information in Table (5), the field of innovation diffusion stage at the top in terms of its importance and percentage weight, with an average weighted score of (3.97) and a percentage weight of (79.56%), this score is notably higher than those of the other sectors, This may be due to the fact that leaders are more effective in transferring and scaling up innovation among farmers, while their presence and role are less prominent in the preparation or planning stages of innovation, while the field of preparation ranked last according to a weighted average score of (3.90) and a percentage weight of (78.14%), This may be less important than the first field from the respondents' point of view. This result is consistent with the findings of the studies of (Lee et al., 2024);(Ruzzante et al., 2021);(Ojo et al., 2024).

6.5 Determine the correlation between professional leaders in diffusion of innovation and the set of independent variables.

- Age: The results of the research showed that the ages of the respondents ranged between (31-63) years, with an average age of (46) years, and a standard deviation of (7.66). The respondents were distributed according to their age groups into four categories, as shown in table (6). the research showed that the highest percentage of respondents falls within the groups in the categories (39-46) with a percentage of (42.6%) with an average score of (42.62) degrees, while the lowest percentage of respondents falls within the age group (31-38) with a percentage of (13.8%) with an average score of (35.23) degrees, to find out whether there is a correlation between the role of agricultural professional leadership in diffusion agricultural innovations and age, the simple correlation coefficient (Pearson) was used, whose value was (0.626) This finding indicates a significant correlation between the two variables at the 0.01 significance level, This may be due to the fact that older leaders often have accumulated experience and strong communication skills resulting from many years of work in agricultural extension.

- Gender: According to the research outcomes, males made up (71.30) of the overall respondents across all categories, in contrast to females, who accounted for (28.70%) as shown in table (6**).** the research showed that the ratio of males to females is high, and the reason may be due to the small number of female agricultural guides, as women are often judged not to do their job efficiently as compared to men; a circumstance which they believe is triggered by cultural and social constraints that affect women extension advisors' performance resulting from male-dominated societies that do not accept women's status as workers [19] , to find out whether there is a correlation between the role of agricultural professional leadership in diffusion

agricultural innovations and gender, the Spearman-Rank correlation coefficient was used, whose value was (0.002). This result indicates that there is no relationship between the two variables.

- **Academic achievement:** The results of the research showed that the academic achievement ranged between (High school and Higher education). The respondents were distributed according to their academic achievement into four categories, as shown in Table (6).Table (6) indicates that the highest percentage of respondents (44.7%) falls within the category bachelor, with an average of (119.86), and the lowest percentage of respondents was (14.9%) in the Higher education category, with an average of (118.86) degrees, to find out whether there is a correlation between the role of agricultural professional leadership in diffusion agricultural innovations and academic achievement the Spearman-Rank correlation coefficient was used, whose value was (0.49), This finding indicates a significant correlation between the two variables at the 0.05 significance level, This may be due to the fact that highly educated leaders have a better understanding of technical concepts related to agricultural innovations, and they also possess stronger analytical and communication skills that enable them to communicate knowledge to farmers in an effective manner. This result is consistent with the findings of the study of (Ruzzante et al., 2021).

- **Academic specialization:** According to the research outcomes that 5.30% of the total respondents belonged to the agricultural extension specialty, whereas the remaining respondents were categorized into various non-extension specializations, as illustrated in table 6. To find out whether there is a correlation between the roles of agricultural professional leadership in diffusion agricultural innovations and the academic specialization, the simple correlation coefficient (Pearson) was used, whose value was (0.022), and this indicates that there is no relationship between the two variables.

- **Duration of agricultural extension service:** The results showed that the highest years of service of the respondents was 30 years and the lowest value was 1 years, with an average of (15.43) years and a standard deviation of 13.83, the respondents were distributed according to their groups into three categories, as shown in table (6). Table (6) indicates that the highest percentage of respondents falls in the group (11-20) with a percentage of (52.10%) and an average role of (118.06) degrees, and the lowest percentage of respondents falls in the group (1-10) with a percentage of (23.40%) and an average role of (117.18) degrees , to find out whether there is a correlation between the role of leadership and Duration of agricultural extension service, the simple correlation coefficient (Pearson) was used, whose value was (0.054) and this indicates that there is no relationship between the two variables.

- **Participation in Training courses:**

The results of this research demonstrated that the training program divided in two categories (Participated, not participated), as shown in Table 6. Table (6) indicates that the highest percentage of respondents falls in the categories (not-participated) with a percentage of (56.40%) and an average role of leadership (118.71) degrees, and the lowest percentage of respondents falls in the categories (participated) with a percentage of (43.60%) and an average its value is (117.38) degrees, to find out whether there is a correlation between the role of leadership and Participation in Training courses, the simple correlation coefficient (person) was used, whose value was (-0.047) and this indicates that there is no relationship between the two variables.

- **Leadership style:** The results of the study indicate that leadership style divided in to three categories (Autocratic, Democracy and Both). as shown in Table (6).Table (6) indicates that the highest percentage of respondents falls in the categories (Democracy) with a percentage of (51.10%) and an average role of leadership of (118.15) degrees, and the lowest percentage of respondents falls in the categories (Autocratic) with a percentage of (11.70%) and an average it's value is (113.55) degrees, to find out whether there is a correlation between the role of leadership and leadership style, the simple

correlation coefficient (Pearson) was used, whose value was (0.102) and this indicates that there is no relationship between the two variables.

- Attitude towards diffusion agricultural innovation: Eight items were prepared to measure the agricultural professional leaders' attitude towards diffusion agricultural innovation, including four positive and four negative items. The evaluation was based on a four-point Likert scale (strongly agree, agree, rarely, disagree). For measurement purposes, the positive items were given values (4, 3, 2, 1), while the negative items were given values (1, 2, 3, 4) respectively. Thus, the total score for the agricultural professional leaders' attitude reached between (8-32) points. The results of the research showed that the lowest numerical value expressing the agricultural professional leaders' attitude towards diffusion agricultural innovation was (18) points, and the highest value was (32) points, with an average of (25) points. The respondents were divided into three categories according to the range and length of the category, as shown in Table (6). According to the data, the majority of respondents, comprising 60.0%, are classified as Neutral (23-27), with an average score of 119.53 degrees.

Conversely, the smallest percentage of respondents, at 6.40%, is classified within the positive (28–32) category, yielding an average score of 125.50. To find out whether there is a correlation between the role of leadership and Attitude towards diffusion agricultural innovation, the simple correlation coefficient (Pearson) was used, whose value was (0.230) This finding indicates a significant correlation between the two variables at the 0.05 significance level, That is, the more positive the attitudes of agricultural professional leaders towards agricultural innovation, the more effective the agricultural professional leadership will be in the diffusion and application processes.

Table (6): distribution of respondents based on independent variables

Variable	Frequency	Percentage %	Average of role	correlation coefficient	Sig.
Age					
31-38	13	13.8	112.08	0.626	**
39-46	40	42.6	118.68		
47 – 54	25	26.6	120.52		
More than 54	16	17	116.94		
Gender					
Male	67	71.30	116.56	-0.003	N. S
Female	27	28.70	118.52		
Academic achievement					
High School	15	16	116.60	.049	*
Diploma	23	24.5	114.91		
Bachelor	42	44.7	119.86		
Higher education	14	14.9	118.86		
Academic specialization					
Agricultural extension	5	5.30	118.60	0.022	N. S
Non-agricultural extension	89	94.70	117.92		
Duration of agricultural extension service					
1-10	22	23.40	117.18	0.054	N. S
11-20	49	52.10	118.06		
21-30	23	24.50	118.48		
Participation in Training courses					
Participation	41	43.60	118.71	-0.047	N. S
not participated	53	56.40	117.38		
leadership style					

Autocratic	11	11.70	113.55		
Democracy	48	51.10	118.15	0.102	N. S
Both	35	37.20	119.09		
Attitude extension workers towards agricultural innovation					
Negative (18-22)	31	33.00	113.61		
Neutral (23-27)	57	60.60	119.53	0.230	*
Positive (28-32)	6	6.40	125.50		
Total	94	100			

Variable	**Frequency**	**Percentage %**	**Average of role**	**correlation coefficient**	**Sig.**
Age					
31-38	13	13.8	112.08		
39-46	40	42.6	118.68	0.626	**
47 – 54	25	26.6	120.52		
More than 54	16	17	116.94		
Gender					
Male	67	71.30	116.56		
Democracy	48	51.10	118.15		
Both	35	37.20	119.09		
Attitude extension workers towards agricultural innovation					
Negative (18-22)	31	33.00	113.61	-0.003	N. S
Neutral (23-27)	57	60.60	119.53	0.230	*
Positive (28-32)	6	6.40	125.50		
Total	94	100			
Female	27	28.70	118.52		
Academic achievement					
High School	15	16	116.60		
Diploma	23	24.5	114.91	.049	*
Bachelor	42	44.7	119.86		
Higher education	14	14.9	118.86		
Academic specialization					
Agricultural extension	5	5.30	118.60	0.022	N. S
Non-agricultural extension	89	94.70	117.92		
Duration of agricultural extension service					
1-10	22	23.40	117.18		
11-20	49	52.10	118.06	0.054	N. S
21-30	23	24.50	118.48		
Participation in Training courses					
Participation	41	43.60	118.71	-0.047	N. S
not participated	53	56.40	117.38		
leadership style					
Autocratic	11	11.70	113.55	0.102	N. S

***Significant at the level of 0.05 **significant at the level of 0.01 N. S = Non – significant**

7 Conclusion:

In light of the research results, the following is concluded:

1. The level of professional leadership's role in spreading agricultural innovation in Sulaimani Governorate is generally considered average. We conclude from this that there is an indication of the existence of a professional leadership infrastructure, but it needs support and development in terms of enhancing training capabilities and providing the necessary resources to expand innovation diffusion activities and link field leaders with research and academic bodies.
2. Respondents rated the role of agricultural professional leaders in the "agricultural innovation diffusion phase" as more important and effective than their role in the "agricultural innovation preparation phase." That is, professional leaders in Sulaimani Governorate play a stronger and more visible role in implementing and disseminating innovation among farmers, compared to their involvement in planning or developing those innovations.
3. Independent variables, including age, educational level, and attitude towards diffusion agricultural innovation, contribute significantly to the role of professional leadership in diffusion agricultural innovation in Sulaimani Governorate. This leads us to conclude that:

- Older leaders may have a broader understanding of the local agricultural context, increasing their ability to influence and persuade.
- Higher academic achievement enhances the ability to interact with technology and research resources, increasing diffusion efficiency.
- Positive attitude express enthusiasm and an internal tendency towards the use of agricultural innovations.

4. The absence of a statistically significant relationship between the role of professional leadership in disseminating agricultural innovation and variables such as gender, academic specialization, Duration of extension service, training program, and leadership style indicates that these variables do not play a role in the tasks of professional leaders in disseminating agricultural innovation.

8 Recommendation and suggestion

1. Involve professional leaders in the development and adaptation stages of agricultural innovations, not just in their diffusion.
2. Redistributing roles so that leaders' role is not limited to diffusion and implementation only, but extends to contributing to the intellectual and strategic areas related to preparation.
3. Include appropriate age (experience), educational qualifications, and positive attitudes toward innovation as key factors in selecting or promoting mentor leaders.
4. Conducting a comparative study between the level of leadership role in Sulaimaniyah Governorate and other governorates in the Kurdistan Region or Iraq in general.
5. Conduct a comparative analytical study of the roles played by leaders in the various stages of the innovation cycle (preparation - experimentation - diffusion - adoption)
6. Study the challenges facing leaders at various stages of innovation diffusion (from awareness to final adoption), from their personal perspective.

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