The Performance Level of Agricultural Extension Workers in The Field of Transferring Agricultural Technologies in The Tikrit District, Salah Al-Din Governorate

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Abstract

Abstract: This study aimed to identify the performance level of agricultural extension workers in the area of technology transfer and to assess their performance for each objective—planning, implementation, and evaluation—of the extension program. It also sought to explore the relationship between extension workers' performance and a set of independent variables. Salah al-Din Governorate, Tikrit District, was selected as the study area, and a questionnaire was used as the data-collection tool. The research included all employees of the Salah al-Din Agriculture Directorate, totaling 200 staff members. A proportional random sample of 45 % of the directorate's employees was drawn, yielding 90 respondents. Ninety questionnaires were analyzed, and one was excluded due to non-objective responses. A test was performed on the sample. The results showed that overall worker performance is low (initial pre-test). The study concluded that the performance level of agricultural extension workers in the field of technology transfer was moderate, leaning towards low, which indicates that the respondents' performance level is still below the required standard. Therefore, it can be concluded that the respondents need training courses on agricultural technology transfer to raise their performance level.

Introduction

The agriculture sector is considered one of the most important economic sectors in most developing countries, and this importance stems from the fact that a large proportion of natural and human resources are concentrated in agriculture and rural areas. Since agriculture is one of the main activities at the national level, its development is a cornerstone of economic and social development [3]. Agriculture is also a vital development tool for achieving goals, as it is a powerful option for stimulating growth, overcoming poverty, and enhancing food security, because the growth of agricultural productivity is essential for spurring growth in other sectors of the economy. Moreover, the rapid expansion of local and global markets, institutional innovations in markets, financing, and teamwork, as well as the biotechnology revolution and information technologies, are all driving factors for using

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agriculture as a main engine of development worldwide today [15]. Agricultural development is one of the important dimensions of the economic and social development agenda and a major source of the national economy. Agricultural production occupies the top priority among issues that contribute to activating a development program track and achieving its objectives, as it serves as the main lever for improving and expanding crop yields in line with the concept of food security, especially in light of continuous population growth [1]. Agricultural extension is the practical tool relied upon by those interested in and responsible for the agricultural sector to develop and improve it [13]. It is considered one of the most important instruments through which a set of agricultural-development goals can be achieved, particularly those related to improving rural livelihoods, ensuring food security, and enhancing natural-resource management. Extension services in different countries aim to address the problems faced by agriculture in rural areas, whether they relate to production (the economic dimension) or human-development aspects (the social dimension). They seek to spark an economic renaissance by exploiting all rural opportunities, resources, and natural and human capacities, raising farmers' awareness, building their capabilities, improving their skills, and changing their attitudes and ways of thinking so that they can uplift their local communities [7]. The main goal of most agricultural extension systems worldwide is to increase agricultural production by modernizing farming practices and transferring and introducing agricultural technologies into the targeted farming systems [10]. The entire extension process depends on the agricultural extension worker himself; he is the fundamental element in all extension activities. If the extension worker is not able to respond to this type of work efficiently and enthusiastically, then the sophistication of the adopted extension methodology and the scale of the inputs and resources allocated to it are of little importance. The efficiency of the agricultural extension worker largely determines the success or failure of any agricultural program. Consequently, the nature of extension work requires those who carry it out to possess specific qualities and characteristics that enable them to deliver the extension message as intended, help them perform their agricultural extension tasks correctly and efficiently, and necessitate that agricultural extension workers—who are the main pillar in the success of extension work, the base of the pyramid, and the front line of extension services—possess ethical, scientific, and value-based traits [14]. The agricultural extension worker represents the pivotal pillar responsible for achieving the goals of this institution. Moreover, the performance of the extension worker is affected by many factors, often stemming from their difficult working conditions compared with those of staff in many other development institutions. Their performance may depend largely on how satisfied they are with their work when they are subject to direct monitoring and supervision, and some studies have indicated a weakness in the

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performance level of extension workers [9] [5] [12]. The success of the extension institution in performing its mission excellently and achieving its goals largely depends on the competence, skill, capability, and experience of its staff. The innovative nature of extension work requires those involved to be fully aware of every development in agricultural sciences and research as they occur [16]. Consequently, agricultural technology transfer programs in Iraq are described as having weak effectiveness in improving productivity and developing agricultural systems. A primary reason for this is the poor performance of staff in extension institutions in the field of technology transfer. The problem facing extension personnel is no longer limited to a lack of information, as it was previously, but to how to intelligently handle the diverse and massive amount of information provided by the extension institution through modern communication channels, which are either not used or, if used, are employed in an unorganized manner. Moreover, applying that information is difficult due to the staff's lack of experience in identifying appropriate means to implement this information in practice, especially in the area of agricultural technology transfer. Numerous scientific and extension studies have pointed out the weak performance and management of field extension work, including study [6], as well as studies [4] and [11], which indicated the low performance level of agricultural extension workers tasked with technology transfer. Study [8] also highlighted the weak reality of agricultural extension in transferring modern technologies, while study [2] noted the weak mechanism for generating and transferring modern agricultural technologies to the field level. This calls for an integrated, scientifically based framework to develop the capacities of agricultural extension staff in technology transfer. Hence, the present research idea emerged to answer the following research questions:

1-What is the level of performance of agricultural extension workers in the field of technology transfer in the Tikrit district?

2- Identifying the performance level of agricultural extension workers in technology transfer for each of the following areas: (the objectives of the extension program for technology transfer, the program's plans for technology transfer, implementation of the program plan, and program evaluation?

3- What is the correlation between the performance level of agricultural extension workers in the field of technology transfer in Tikrit District and each of the following independent variables: age, gender, number of years of extension service, educational attainment, and sources of information?

Research Objectives:

1.Identify the performance level of agricultural extension workers in the transfer of agricultural technologies in the Tikrit district.

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2- Identify the performance level of agricultural extension staff in the area of technology transfer for each of the following domains: extension program objectives, technology-transfer program plans, implementation of the program plan, and program evaluation.

3- Identify the correlation between the performance level of agricultural extension workers in technology transfer and each of the independent variables.

Importance of the Research:

1-the research comes within the framework of contributing to activating the role of agricultural extension and raising the level of extension services for farmers through relying on sound scientific principles to develop the capabilities of workers in the field of agricultural extension by improving their performance level in order to increase the effectiveness of the process of transferring agricultural technologies, and thus increase agricultural production and productivity.

2-the importance of this research lies in the fact that it addresses a crucial aspect of agricultural extension work, which is the transfer of agricultural technologies, and a key element of this work, which is the agricultural extension workers. This is due to the role they play in rural society by accelerating the desired change process, working to develop the individual and collective skills of farmers, and helping them understand and adopt modern agricultural technologies, thus assisting them in performing their roles, increasing productivity, and raising income.

3-the research contributes to identifying the basic requirements in building and improving the institutional extension capabilities in order to increase the efficiency of their performance in the process of transferring agricultural technologies to farmers, by understanding the reality of those capabilities for employees in these extension institutions.

Procedural definitions:

1- Agricultural employees: all agricultural employees working in the Salah al-Din Governorate.

2- Technology transfer: It is the process by which modern agricultural technologies are

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transferred to farmers through the efforts of agricultural extension workers.

3-Performance: It refers to the indicators that reflect the work supported by the agricultural employee and his practice in carrying out his duties to transfer agricultural technologies to farmers.

4-Performance Level: an indicator that reflects the performance status of agricultural extension workers in their extension tasks related to the transfer of agricultural technologies.

Research Methodology:

The research methodology provides a methodological framework that is especially important for any research study, as it enables the achievement of scientific and objective results closely linked to the research topic [17]. "Methodology" is defined as a set of rules and general systems established to reach acceptable facts regarding the issue under investigation [18]. The researcher employed a descriptive approach because it is the most suitable method for achieving the objectives of the study titled.

Research Area:

The Tikrit district was selected, which is one of the administrative and agricultural regions in Salah al-Din Governorate. The district is noted for its agricultural significance, encompassing a variety of farming activities and housing several agricultural extension centers that play an important role in supporting farmers and transferring modern agricultural technologies to them. Tikrit was chosen because it provides a suitable environment for evaluating the performance level of extension workers in technology transfer as well as identifying the challenges and factors influencing their efficiency.

Data-collection tool:

To gather the research data, a questionnaire was prepared because it fit the nature of the study. The questionnaire consisted of two parts. The first part contained questions aimed at obtaining data on the independent variables related to the respondents, represented as follows: Age expressed as the respondent's number of years. Gender assigned weights (2, 1). Number of years of advisory service recorded as the number of years of advisory service at the time the data were collected. Educational attainment coded (4, 3, 2, 1) respectively. Sources of information presented as six options indicating the information sources an employee could refer to, using a five-point Likert scale; consequently, the values for this variable range between 0 and 18. The second part comprised items distributed

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across the domains used to measure the performance of agricultural extension workers in technology transfer. Each domain contained several questions, totaling 23 standardized items spread over the four domains, as shown in Table 1.

Table (1) shows the research areas.

Total	Field	Number of items
1	Program Objectives	6
2	Technology Transfer Program Plan	7
3	Implementation of the Program Plan	5
4	Program Evaluation	5
Total		23

Therefore, I used statistical tools—including the range, percentage, arithmetic mean, as well as the simple Pearson correlation coefficient and the Spearman correlation coefficient—for the purpose of analyzing the data and extracting results from it.

Results and Discussion

First Objective: Determining the level of performance of workers in agricultural extension in the field of agricultural technology transfer in Tikrit district in general.

The results showed that the lowest value for the performance level of agricultural extension workers is 28 and the highest value is 90 on the performance scale, which ranges from 0 to 90, with a mean of 52.7 and a standard deviation of 16.30. The respondents were divided into three categories using the range rule, and it was found that the greatest proportion of respondents fell into the low-performance category, as shown in Table 2.

Table (2) Distribution of respondents according to their performance level in the field of technology transfer in general.

categories	Number	%	Average
Low (28-45)	36	40	36
Middle (46-63)	24	27	55
High (64 and above)	30	23	71
Total	90	100%	

It is clear from Table 2 that the largest proportion of respondents falls into the low category, so the respondents' performance level is described as low. This can be attributed to several reasons, such as the respondents' weak knowledge of the methods and techniques related to agricultural technology transfer to farmers,

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or their lack of participation in training courses on agricultural technology transfer, which indicates a deficiency in their knowledge.

Second objective: Determine the performance level of the respondents in each area of research.

First section: Program objectives.

The results showed that the lowest performance level score of the respondents in the program objectives area was 7, the highest was 21, with a mean of 12.07 and a standard deviation of 3.88. The respondents were divided into three categories using the range rule, and it was found that the largest proportion of respondents fell into the low-performance category, as shown in Table 3.

Table 3: Distribution of respondents according to the categories of program objectives.

categories	Number	%	Average
Low (7-11)	50	55.5	9.16
Middle (12-16)	26	28.86	13.9
High (17and above)	14	15.54	18.9
Total	90	100%	

It is clear from Table 3 that 55.5 % of the respondents fall into the low category, so the respondents' performance level is described as low. This can be attributed to several reasons, including the respondents' insufficient knowledge or their lack of interest in the information and experience they gain from carrying out guidance activities, or the absence or scarcity of guidance services.

Second domain: Technology transfer program plans

The results showed that the lowest performance level score among the respondents in the area of agricultural technology transfer program plans was 7, the highest was 27, with a mean of 17.94 and a standard deviation of 6.09. The respondents were divided into three categories using the range rule, and the largest proportion of respondents fell into the high-performance category, as shown in Table 4.

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Table (4) Distribution of respondents according to the categories of the agricultural technology transfer program plan.

Categories	Number	%	Average
Low (7-13)	30	33.3	10.87
Middle (14-20)	17	18.87	15.94
High (21 and above)	43	47.73	23.72
Total	90	100%	

It is clear from Table 4 that 47.73 % of the respondents fall into the high category, so their performance level is described as high. This may be because the respondents recognize the importance of information related to the technology-transfer program plan. In contrast, 52.27 % of them fall into the medium and low categories, indicating that this portion needs more information and expertise regarding the importance of information related to the program plan for agricultural technology transfer.

Third domain: implementing the program plan

The results showed that the lowest performance level score among the respondents for implementing the agricultural technology transfer program plan was 6, the highest was 18, with a mean of 11.50 and a standard deviation of 3.67. The respondents were divided into three categories using the range rule, and it was found that the largest proportion of respondents fell within the low-performance category, as shown in Table 5.

Table (5): Distribution of respondents according to categories of program plan implementation.

Categories	Number	%	Average
Low (6-9)	32	36	7.5
Middle (10-13)	29	32	11.4
High (14-18)	29	32	15.9
Total	90	100%	

It is evident from Table 5 that 36 % of the respondents fall into the low category, so the respondents' implementation level is described as low. This may be because the implementation processes of the technology-transfer program plan involve procedures and operations that can be difficult for respondents to understand when they do not receive sufficient information about the programs and their objectives.

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Fourth domain: Evaluation of the program plan:

The results showed that the lowest value for the respondents' performance level in evaluating the agricultural technology transfer program plan is 5, the highest value is 16, with an average of 11.24 and a standard deviation of 3.06. The respondents were divided into three categories using the range rule, and it was found that the greatest proportion of respondents fall within the high-performance level category, as shown in Table 6.

Table (6): Distribution of respondents according to the categories of program-plan evaluation.

Categories	Number	%	Average
Low (5-8)	22	24	7
Middle (9-12)	32	36	10.71
High (13and above)	36	40	14.3
Total	90	100%	

It is clear from Table 6 that 40 % of the respondents fall within the high category, so the performance level of the respondents in evaluating the technology-transfer program plan is described as high. The evaluation process requires information on how to formulate criteria as well as to collect evidence for the purpose of comparing them and issuing an evaluative judgment, and the respondents may possess sufficient information on how to formulate the criteria and gather the evidence.

Objective three: Identify the correlation between workers performance level and each of the independent variables, which are:

First: Age

The research results indicated that the ages of the respondents ranged from 23 to 59 years, with a mean of 38.89 years and a standard deviation of 10.40. The respondents were divided into three categories using the range rule, and the results are presented in Table (7).

Table (7) Distribution of respondents according to age categories.

Categories	Number	%	Mean	value R	significance
Low (5-8)	35	39.85	53	_0.037	non-meaningful
Middle (9-12)	32	35.52	55		
High (13and above)	23	25.53	49.13		
Total	90	100	Non-Significant		

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To examine the relationship between the respondents' performance level and the age variable, a simple correlation coefficient was used, which yielded a value of 0.073. This indicates no relationship between the two variables, leading us to accept the statistical hypothesis stating that there is no significant correlation between the performance level of the employees and age. In other words, the respondents' performance level is not affected by their age, possibly due to a lack of training courses or limited participation in guidance activities.

Second: Gender After extracting, classifying, and analyzing the data, the respondents were divided by gender into two categories, as shown in Table (8):

Table (8) Distribution of respondents according to categories of the gender variable

Categories	Number	%	Mean	value R	Significance
Male	67	74.37	88.35	_0.016	non meaningful
Female	23	25.53	76.14		
Total	90	100	Non-Significant		

To find the correlation between the performance level of the respondents and the gender variable, the rank correlation coefficient was used, the value of which was (0.016_), indicating no relationship between the two variables. Therefore, we accept the statistical hypothesis which states (there is no significant correlation between the performance level of the employees and gender). This means that the performance level of the respondents is not affected by gender, as self-development, obtaining information, and benefiting from experiences are not limited to males over females, and vice versa

Third: Educational Level: After emptying and analyzing the data, the respondents were distributed according to their educational level into four categories, as shown in Table (9):

Table (9) Distribution of respondents according to educational level categories

Categories	Number	%	Mean	value R	significance
Agricultural Preparatory School	17	18.87	31.29	0.934	**
Diploma in Agriculture	15	16.65	38.33		
Bachelor of Agriculture	43	47.73	58		
Postgraduate Degree	15	16.65	76.4		
Total	90	100	Significant at the 0.01 probability level		

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To find the correlation between the performance level of the employees and the educational level, Spearman's rank correlation coefficient was used, which was (0.934 **). This indicates a positive correlation between the two variables, hence the null hypothesis is rejected and the alternative hypothesis is accepted. This means that the performance level of the respondents increases with the increase in educational attainment. This result may be attributed to the fact that the higher the educational attainment of the respondents, the better their performance in technology transfer programs, as a result of the acquired academic knowledge they obtain during their studies.

Fourth: Number of years of career extension service:

The search results showed that the years of service of the respondents ranged between (3-23) years with an average of 9.72, and a standard deviation of 4.54. The respondents were divided into three categories using the range rule, and the results were as shown in Table (10).

Table (10): Distribution of employees according to the variable of the number of years of extension service

categories	Number	%	Mean	value R	significance
Young age (3-9)	54	59.94	41.9	0.861	**
middle age (10-16)	26	28.86	65.42		
Elderly (17- and above)	10	11.1	78.1		
Total	90	100	Significant at the 0.01 probability level		

To find the correlation between the performance level of the respondents and the variable of the number of years of extension service, Pearson's simple correlation coefficient was used, which had a value of (0.861**). This indicates a positive correlation between the two variables. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. This means that the performance level of the respondents increases with an increase in the duration of the extension service. This result may be attributed to the fact that the longer the respondents serve in extension work, the more their experience and knowledge increase, and consequently, they become more effective in technology transfer programs due to the accumulation of experience from repeating activities and benefiting from previous experiences.

Fifth: Information Sources

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the search results, it was found that the values expressing the degree of connection with information sources ranged between (18-6), and the respondents were divided into three categories using the range. The results were as shown in table (11).

Table (11) shows the distribution of respondents according to the variable of sources of information

Categories	Number	%	Mean	value R	significance
Few (6-9)	28	31.08	33.5	0.924	**
medium (10-13)	39	43.29	50.05		
High (14-18)	23	25.53	70.52		
Total	90	100	Significant at the 0.01 probability level		

To determine the correlation between the level of performance of the respondents and the variable of information sources, Spearman's rank correlation coefficient was used, and its value reached (0.924 **). This indicates a positive correlation between the two variables. The reason is that relying on multiple and varied sources of accredited information may make them more knowledgeable about agricultural technology transfer information than those who rely on a single source.

Conclusions and Recommendations:

First: Conclusions

1-The results showed that 40% of agricultural extension workers fall into the low category (28-45) in terms of age, while 47.73% fall into the Bachelor's degree category, and 59.94% fall into the young age category (3-9 years of extension service). Additionally, 43.29% access information sources in the medium category. From this, we conclude that the proportions of workers cluster around the medium and low ranges, which impacts the weakness of their knowledge regarding their performance level in transferring agricultural technologies.

2-The results show that the general level of knowledge of agricultural technology transfer workers is low to medium. We conclude from this the necessity of providing workers with scientific training programs to raise their performance and efficiency in agricultural technology transfer.

3-The results showed a significant difference for each of (educational level, number of years of agricultural extension service ، and information sources), which is an indicator of the importance of these variables in the level of knowledge of agricultural extension workers.

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Second: Recommendations

1-The necessity for the agricultural extension service to focus on providing the greatest possible amount of information and supplying extension workers with it to raise their level of performance.

2-It is important to follow appropriate guidance methods and approaches tailored to the workers' levels to enhance their performance efficiency, and it is essential for the employees in the research area to apply the scientific guidance recommendations.

3- The necessity of taking into consideration the independent variables that showed results indicating a significant difference when implementing training programs for agricultural extension workers.

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