Determinants of the Use of Individual Extension Methods by Agricultural Extension Agents in Al-Shirqat District, Salah al-Din Governorate

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Abstract

The research was aimed at finding the determinants of the use of individual extension methods that face agricultural extension agents in Al-Shirqat District / Salah al-Din Governorate. In addition, it aimed to determine the correlation between the usage determinants and personal factors of the employees such as (age, education level, gender, working years and extension activities). All agricultural extension agents in Al-Shirqat District / Salah al-Din Governorate; agricultural population (222) agents and distributed it in four agricultural divisions. They sampled a 30% of the population, which translates to a research sample of 67 respondents. The following questionnaire form was designed, which comprised two parts, namely: personal factors of extension agents and determinants of the use of individual extension methods in the research area as (15) items. Data were analyzed to meet the research objectives using SPSS program for social sciences and different kinds of statistical methods. Results indicated high level of determinants for using individual extension methods with tendency towards the average. The determinants of using individual extension methods had also been found to be highly correlated with most of the factors studied. The researcher suggests that individual extension methods should be given to extension agents for them to use and younger extension agents to be recruited into extension activities and trained on how they can reduce the determinants of extension work in the research area.

keywords for this research are Determinants of individual extension methods in Al Shirqat district.

Introduction:

The agricultural sector is one of the most significant components of rural development and it represents the main source of rural families' income, and is the main source of economic and social security in rural communities (1). It also serves an effective purpose in the food supply to the population in rural areas as well as in absorbing a certain number of workers, which helps to lower migration from rural to urban areas and maintain social stability. Agriculture has continued to be one of the most profitable businesses in the economy (2). Agriculture has an impact on economic growth, food security, poverty alleviation, and livelihoods for rural and environmental development. In addition, half of the population receives a larger benefit from agriculture than from the overall economic growth (3). Agricultural extension is one of the important instruments of modern agriculture which make the information simple and the knowledge and agricultural sciences generated by scientific research are formulated and

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conveyed in an applicable way to the target group (4). Agricultural extension is regarded as non-formal education which involves the sharing of experiences and knowledge between the agricultural extension agents and the farmers, in the hope that behavioural change will be realized among the farmers, which in turn will help enhance their social and economic lives (5). Agricultural extension continues to play a significant role in training farmers and enhancing their capacities for better decision making and to boost their income and standard of living in rural households. In addition to science, agriculture extension is the cornerstone of agricultural development because it plays a significant role in raising agricultural output and providing better quality through the dissemination of scientific research findings to the clientele as extension recommendations which helps in improving their capacity to solve their problems. Extension activities and programs are actually implemented at the local level by agricultural extension agents, who bear the responsibility of educating, guiding and directly communicating with the extension clients (6). The change achieved by agricultural extension in the agricultural sector and rural development processes depends largely on the extension communication process. Extension communication is a participatory process between two or more parties that seeks to influence the desired behavior, where one party is the change agent (agricultural extension agent) and the other is the farmer. The agent and the clientele strive to expand the scope of interactions between them by creating effective communication situations and through their positive role in this process, both parties plan, conduct and review their procedures, making use of their interaction with each other (7). Communication is regarded as the beginning of the agricultural extension process. No matter what is the goal of the extension educational process – whether education, training, media or decision making – the need of communication between the agricultural personnel and the clientele is essential. To achieve these purposes in an efficient and effective way, this communication should be two-way or feedback oriented (8). The agricultural development process is based on linking new ideas developed by the clientele and the method of delivering them to the target farmers. In the current era, extension communication methods in the agricultural production process is one of the more significant and essential pillars of development, as a result, more countries are investing in the extension, setting up Agricultural research stations, connecting them to various agricultural production locations and bringing them to farmers (15). Extension objectives and extension goals can be carried out by using many extension communication methods, which can reach and influence all members of the target clientele by disseminating scientific research results and more modern agriculture ideas. Hence, the extension apparatus employs several old fashioned methods of extension communication including individual, group and mass communication methods because of their importance

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in disseminating agricultural information to the farmers. Individual methods are one of the most important and most effective methods in influencing clientele due to the face to face interaction with the individual. They also increase the confidence of the farmers and provide them with a platform to voice their opinions and issues. This also results in a good relationship between the agent and the clients (9). Although individual extension methods can contribute effectively to the farmer, there are several issues farmers are experiencing, such as the small number of agricultural extension agents; some agricultural extension agents have low skills and capacities; and many problems in the process of agricultural extension methods, particularly traditional methods. These are the most dominant such as no knowledge of agents about them, they have no understanding of suitable extension methods for community conditions and how to use them, geographical scale of area covered by the agricultural extension agent, and there isn't any suitable agricultural media for agents (10). Hence, the idea of studying the determinants of using individual extension methods faced by agricultural extension agents in Al-Shirqat District arose, by answering the following questions:

What are the individual factors that agricultural extension agents encounter in Al-Shirqat District / Salah al-Din Governorate in using individual extension methods?

1- What is the descending order of the determinants of using individual extension methods faced by agricultural extension agents in Al-Shirqat District?
2- Is there any correlation between the determinants of using individual extension methods faced by agricultural extension agents in Al-Shirqat District and each of the variables (age, education, gender, job tenure, and extension activities)?
3- Research Objectives:
4- To get an understanding of what factors affect individual extension methods that agricultural extension agents encounter in Al-Shirqat District / Salah al-Din Governorate.
5- To rank the determinants of utilizing individual agricultural extension methods, which are faced by agricultural extension agents in Al-Shirqat District.
6- To determine the relationship between the determinants of using individual extension methods faced by the agricultural extension agents in Al-Shirqat District and each of the independent variables (age, level of education, gender, tenure of job, extension activities).

Statistical Hypotheses:

1- Based on the parameters studied in this study, statistical hypotheses were developed as follows:
2- There is no significant correlation between the determinants of using individual extension methods faced by agricultural extension agents in Al-Shirqat District and age.
3- Agricultural extension agents in Al-Shirqat District do not have a significant correlation between the determinants of using individual extension methods they face and their educational attainment.
4- There is little evidence of association between the determinants of use of individual

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extension methods faced by agricultural extension agents in Al-Shirqat District and the gender.

5- There is no significant correlation between the determinants of using individual extension methods faced by agricultural extension agents in Al-Shirqat District and job tenure.

6- The agricultural extension agents in Al-Shirqat District express a significant correlation between the determinants of using individual extension methods and the participation in extension activities.

Operational Definitions:

1. Determinants: These are all the things that restrict the agricultural extension agent work in employing individual extension methods in Al-Shirqat District.

2. Individual Extension Methods: Contact between the agricultural extension agent and a single farmer or farming family, directly or indirectly, in two opposite directions, where the exchange of agricultural information and experiences takes place.

3. Agricultural Extension Agents: All employees in the agricultural divisions affiliated with Al-Shirqat District with an agricultural scientific qualification.

Materials and Methods:

Research Methodology:

The descriptive method was used in this research. This is performed by describing correctly, using scientific methods, the contents being studied. The researcher's results are transformed into numbers which can be accurately interpreted. One of its benefits is to give authentic information which contributes to the understanding of human and social phenomena (11).

Research Area:

Al-Shirqat District, affiliated with Salah al-Din Governorate, was chosen as the area for conducting the research to identify the most important determinants in using individual extension methods faced by agricultural extension agents in Al-Shirqat District, and because, to the researcher's knowledge, no such research has been conducted there.

Research Population:

The research population consisted of all agricultural employees who worked in the agricultural divisions in Al-Shirqat District, and was (222) agricultural employees distributed among four agricultural divisions. A simple random sample of 30% was employed and a research sample of 67 employees was obtained as indicated in Table -1-.

Research Population and Sample (Table –1-):

Below is the list of table contents that was not included in the text (Note: Content may be limited.

No	Al-Shu'bah	Research Community	Research Sample
1	Al-Sharqat	60	18
2	The Green Plain	25	8

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3	Ashur	79	24
4	Tulul al-Baj	58	17
	Total	222	67

Preparation of the Questionnaire Form:

The questionnaire form was prepared after studying the previous research, literature, conducting personal interviews with the specialists and the study pertaining the current study. It involved two aspects of conservation:

Part one consisted of several questions to collect information regarding the independent variables pertinent to the respondents, that is age, educational level, gender, job tenure and extension activity participation.

The second part was a scale comprised of (15) items for determinants of individual extension methods use. For each item three options were presented: (High, Medium, Low).

The following steps should be considered when measuring independent variables:

Age (1): Number of years of the respondent's age at the time of data collection.

2. ducational Attainment: Alternatives (Agricultural Preparatory, Agricultural Institute, Bachelor's in Agriculture, Higher Degree) with the values (1, 2, 3, 4) respectively.

3. Gender -- specified as (Male, Female) and given the values (1, 2) respectively.

4. Job tenure: Asked the respondent the number of years in agricultural extension work.

.5Extension Activities: Alternatives (Participant, Non-Participant) with values (1, 0) respectively.

The Dependent Variable is measured by:

The (15) items representing the determinants of using individual extension methods were measured from the employees' perspective of the Green plain Agricultural Division in Al-Shirqat District. The alternatives (High, Medium, Low) were presented in front of each item, which were assigned the values (3, 2, 1). Therefore, the usage determinants' values were between (15 – 45) numerical values.

Statistical Methods:

Data were analysed through the use of Statistical Package for the Social Sciences (SPSS) and some of statistical methods adopted include:

1- Range: Used to categorize variables (12). Its formula is:
Range = Highest Value – Lowest Value.

2- Class Length: It is a ratio used to determine the length of classes with respect to one class to another, is an expression of the difference between categories divided by the number of categories needed (13). Its formula is:
Class Length = Range / Number of Categories (rounded off to next whole number).

3- Frequency Distribution: It is used to classify the respondents on the basis of

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the variables used in the research.

4- Percentages: Describing the respondents by how they are distributed according to the categories of the research variables (14).

6- (16) $\overline{X} = \frac{\sum X}{n}$.

$\overline{X}$ = Mean

$\sum X$ = The sum of the numbers' values

n = The number of values or number of respondents.

5- Standard Deviation (s.d): This was used to measure the spread or dispersion of the data from the arithmetic mean of the variables that were included in the study (17). Its formula is:

$$S.d = \sqrt{\frac{\sum xi^2 - \frac{(\sum xi)^2}{n}}{n-1}}$$

Σ_{xi}^2 = The sum of the numbers' values

n = The number of values or number of respondents

6- Spearman's Rank Correlation Coefficient (r□):(17) used this non-parametric statistical measure to find strength and direction of association between independent categorical (ordinal) variables and the determinants of adoption of individual heuristic approaches. It is determined by the following equation:

$rs=1-\frac{6\sum di^2}{n(n^2-1)}$

$r_{s=}$ Spearman's rank correlation coefficient.

di^2 = Squared differences of ranks

n= Number of respondents

7- Pearson's Simple Correlation Coefficient (Pearson's r): This parametric statistical measure was used to measure the strength and direction of the linear association between independent quantitative (continuous) variables and the determinants of adopting individual heuristic approaches (18). It is determined by the following equation :

$$\frac{\sum xiyi - n\dot{x}\dot{y}}{\sqrt{(\sum xi^2 - n\dot{x}^2)(\sum yi^2 - n\dot{y}^2)}} \quad r = \frac{\Sigma\Sigma\Sigma}{\sqrt{\Sigma \quad \Sigma\Sigma\Sigma}}$$

r = correlation coefficient

x_i = values of the independent variables.

y_i = values of the dependent variable (determinants)

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n= Number of respondents

8- t-test:

It was used to test the significance of the correlation relationship between the determinants of using individual heuristic methods and each of the independent variables under study, by comparing the calculated (t) value with the tabulated (t) value (1). Its formula is:

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

t = calculated t-value

r = the value of the correlation coefficient of two variables

n = number of respondents

The results were presented and discussed based on the following research objectives:

First Objective: To identify the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district / Salah Al-Din Governorate.

From the respondents' point of view, the values indicating the determinants for using individual heuristic methods ranged from (26–41) with an arithmetic mean of (34.46) and a standard deviation of (5.05). The respondents were classified into three categories according to the range and class interval length. Table (2) shows the results.

Table (2) shows the distribution of respondents in relation to the determinants of use.

Categories	number	Percentages	Aveage Determinants
Low level (26–30)	15	22.39	28.00
Medium level (31–35)	18	26.86	32.88
(36 and above)	34	50.75	38.15
total	67	%100	

It is evident from Table (2) that more than half of the respondents fall within the **high category**, accounting for (50.75%) with a mean score of (38.15), followed by the **moderate category** at (26.86%). Accordingly, the determinants of using individual heuristic methods are **high, tending toward moderate**. This may be attributed to the vast geographical area covered by the extension agents, weak institutional support, limited capabilities of the agents in conducting field or home visits to the farmers, in addition to the insufficient number of

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agricultural extension agents compared to the number of farmers.

Second Objective: To rank the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district.

The items of the study were ranked in descending order according to their arithmetic means. The results are presented in Table (3).

Table (3): Ranking of study items in descending order according to arithmetic mean

ت	Paragraph	Mean	Rank
1	The absence of resources for the implementation of extension programmes.	2,70	1
2	Weak support from the agricultural divisions for extension agents	2,56	2
3	Large geographic area of agent's work	2,52	3.5
4	Lack of necessary transportation means for field/home visits	2,52	3.5
5	Low extension awareness among some farmers	2,46	5
6	Insufficient number of extension agents in agricultural divisions	2,30	6
7	Remoteness of some villages and difficulty of access	2,26	7
8	Large number of farmers in the agent's work area	2,23	8.5
9	Inadequate modern communication, among farmers	2,23	8.5
10	Farmers have access to the farm.	2,21	10
11	Farmers access the farm in security conditions.	2,20	11
12	Poor communication skills of some extension agents	2,13	12
13	Not enough time spent in the field visits.	2,11	13
14	Low farmers' confidence in the usefulness of extension activities	2,10	14
15	Low educational level of farmers	1,96	15

Maximum Value = 3 (refers to the highest score of the dependent variable's response alternatives), meaning the first item scored (2.7 out of 3).

It is evident from Table (3) that the item **"Lack of financial allocations for implementing extension programs"** ranked first, with an arithmetic mean of (2.7). This may be attributed to the fact that financial

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allocations represent the main nerve of any extension activity, and that insufficient funding implies an inability to implement activities that require financial costs, as well as a failure to provide incentives and rewards for extension agents to encourage their field performance.

In contrast, the item **"Climatic conditions that hinder the agricultural extension agent from reaching farmers"** came in the last rank. This may be because rain or extreme heat waves are only temporary obstacles and do not permanently prevent the agricultural extension agent from meeting with farmers in the agricultural division or conducting field or home visits within their work area.

Third Objective: To find the correlation between the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district and each of the following independent variables:

1- Age: The ages of the respondents ranged between (30–50) years. They were distributed using the range rule into three categories, as shown in Table (4).

Table (4): Distribution of respondents according to age

Categories	number	Percentages	Average usage parameters	value r	value t
Younger(36-30)	28	41.79	38.79	0,29 **	2.45
Middle-aged group (43 - 37)	25	37.31	32.98		
Older(50 -44)	14	20.90	28.45		
Total	67	%100			

Means there is a high correlation at the (0.01) level.

From Table (4) it is seen that the largest percentage of respondents are young (41.79%) having mean determinant score (38.79). Pearson's correlation coefficient (Pearson) was used to check if there was a correlation between the age and mean determinants of use. The correlation coefficient value obtained was (0.29). The significance of this correlation was tested by (t-test) and a calculated t-value of (2.45) was obtained which shows that there is a significant correlation at (0.01) level. So we reject the null hypothesis, which is "there is no significant correlation between the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district and age. This could be explained by older workers having more experience with extension work that allows them to face many of these

determinants and adjust to work environment.

2- Educational Attainment: The respondents were distributed according to their educational attainment into four categories as shown in Table (5).

Table (5).The distribution of respondents by mean determinants of use and educational attainment is presented

Categories	number	Percentages	Average usage parameters	value r.s	value t
Agricultural Preparatory School / Agricultural High School Diploma	26	38.80	33.17	0.31	2.63
After completing the Agricultural Institute Diploma, students can continue their education and enter into the Agricultural College Diploma program, a two-year course.	23	34.33	34.22		
Bachelor's Degree in Agriculture / B.Sc. in Agriculture	15	22.39	36.54		
Classes for Higher Degree (Master's or PhD) or Postgraduate Degree	3	4.48	37.12		
Total	67	%100			

Means a significant correlation at the 1% level of significance.

As can be seen from Table (5) the mean determinant score of using individual heuristic methods was (37.12) for respondents with higher education degrees (postgraduate studies) than the other educational levels. To determine the correlation between the two variables, Spearman's rank correlation coefficient (r□) was used. For the purpose of testing the significance of this correlation t-test was used and the value of t obtained is (2.63) and it is found that (t) is greater than the tabulated value of t at (0.01) level of significance and hence it is concluded that this correlation is significant at (0.01) level. So, the null hypothesis is rejected because it was assumed that "There is no significant correlation between the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district and educational attainment" is rejected. This can be explained by the fact that students graduating from preparatory schools or agricultural institutes are mostly from rural areas, and have the customs and traditions of the rural community, they can communicate directly with the farmers, use individual heuristic method.

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3- Gender: The respondents were divided by gender into two categories as illustrated in Table (6).

As shown in Table (6), the distribution of respondents based on level of determinants of use showed that the proportion of males were higher than that of females in the level of determinants of use, except for one of the determinants.

Sex	number	Percentages	Average usage parameters	value r.s	value t
man	58	86.57	34.21	-0,23	1,91
female	9	13.43	36.09		
Total	67	%100			

Signs a strong correlation at the (0.05) level.

As shown in Table (6), the male was found to be the largest group of respondents with a mean of (34.21) determinant score, followed by the young female and elderly male, and the elderly female, respectively. To determine the correlation between the two variables, Spearman's rank correlation coefficient (r□) was used. The value of correlation coefficient was (-0.23). To test the significance of this correlation the t-test applied and the t value calculated was (1.91), which was significant at (0.05) level. So, the null hypothesis is rejected that: there is no significant correlation between the determinants of using individual heuristic method faced by agricultural extension agents in Al-Sharqat district and gender. This could be due to social norms and traditions that limit women's interaction with farmers and are unable to conduct individual extension interventions like home or field visits.

4- Job Experience (Years of Service): The years of job experience for the respondents ranged between (3–38) years. They were categorized by applying the range rule, and divided into three categories as presented in Table (7).

Job experience (years of service) and mean determinants of use were presented as a distribution table (Table (7)).

Categories	number	Percentages	Average usage parameters	value r.s	value t
Short service (3 – 14)	34	50.75	35.49	0.14-	1.14
Medium service (15 – 26)	28	41.79	33.53		
(27+ above)	5	7.46	32.67		
	67	%100			

As seen in Table (7), it is clear that the first group of respondents who had short service experience represented (50.75%) of the total respondents. Pearson's correlation coefficient was used to calculate the correlation between the two variables. The value of the correlation coefficient was (-0.14). For statistical significance, the t-test was used and the result is t = (1.14) showing that there was no significant relationship between the two variables. Thus, the null hypothesis, "There is no significant correlation between the determinants of using individual heuristic methods faced by agricultural extension agents in Al-Sharqat district and job experience (years of service)," is accepted.

5- Participation in Extension Activities: The respondents were divided according to their participation in extension activities into two categories, as shown in Table (8).

Participants by participation in extension activities and level of determinants of use (Table 8)

Categories	number	Percentages	Average usage parameters	value r.s	value t
Participant	59	88.06	36.52	0.63**	6.55
Non-Participant	8	94,11	19.27		
total	67	%100			

If the calculated t value is significant at (0.01) level, then it is indicated with an asterisk (*).

The table (8) shows that most of the respondents engage in extension activities (88.06%) and an average of (36.52%). A (t)-test was used to test the significance of the correlation between the two variables and the value obtained was (6.55) which shows that the two variables are significantly correlated at (0.01) level. Hence, the null hypothesis, which claims that there is no significant correlation between the determinants of using individual extension methods faced by agricultural extension agents in the Al-Shirqat district with the participation in extension activities, is rejected. This could be explained as the agricultural extension agents that participate more in extension activities, expose themselves to more determinants than those who participate less.

Conclusions:

The results indicated that the factors affecting the use of individual extension methods faced by agricultural extension agents in Al Shirqat district have high levels, which tend to average. The above leads us to a conclusion that the necessary requirements must be provided for the agricultural extension

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agents to implement individual extension activities, and the training of agricultural extension agents to implement them. The results revealed that lack of financial provisions for implementing extension programs was the first determinant encountered by agricultural extension agents when using individual extension methods. From the above, it is concluded that, money is the major nerve of any developmental or field activity; if not financial funding, then the agents will not be able to print extension publications, conduct seminars or home visits which involve financial costs, or offer incentives and rewards for agents' continuous field activity by the agricultural division. According to the results, there was a significant relationship between the determinants of agricultural extension agents' use of individual extension methods and the following factors (age, educational level, sex and involvement in agricultural extension activities). From this, we conclude the importance of considering these factors when assigning agricultural extension agents to plan and implement extension activities in the study area.

Recommendations:

1. Agricultural divisions should make available the necessary conditions to the extension agents to carry out individual extension activities they require when visiting the farmers' field or home.

2. Provide private offices for agricultural extension agents equipped with some extension publications to distribute to farmers when they visit the agent at the agricultural division.

3. (This item is unfinished in the original text; it is likely a reference to the most important determinant mentioned above.)

4. Think about gender-specific issues that need to be addressed in planning and implementing extension programs and make it suitable for both genders to have an environment for their work and train them in fair extension work by reducing the determinants of using individual extension methods.

6. Engage younger workers into field extension activities and support them by offering continuous job training as well as materials and resources to be able to apply individual extension practices effectively and efficiently.

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