Knowledge Needs of Agricultural Extension Agents in the Biological Control of Some Diseases and Pests of the Potato Crop in Some Governorates of Egypt.

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Abstract

This research aims to determine the degree of knowledge needed by the agricultural extension agents researching the biological control of some diseases and pests of the potato crop in some governorates of Egypt. As well as determining the differences between the agricultural extension agents in the studied governorates concerning the degree of their knowledge needed for the biological control of some diseases and pests of the potato crop. Moreover, to determine the relationship between the total degree of knowledge needed by agricultural extension agents on the biological control of potato diseases and pests and each of the following independent variables: age, educational qualification, specialization, work period in the Ministry of Agriculture, work period in agricultural extension, training courses, and information sources. Moreover, to identify the sources of the respondents' information related to the biological control of some diseases and pests of the potato crop. Moreover, identify the problems related to the control of diseases and pests of the potato crop. Finally, identifying the most critical topics suggested by the respondents to be included in the training program on biological control of diseases and pests of the potato crop.

The research was conducted in three governorates, namely Beheira, Dakahlia, and Menoufia, where 337 agricultural extension agents were included. The sample size was 185 agricultural extension agents at the level of the three studied governorates. The data was collected through a personal interview using a questionnaire form. It was used to present the data and analyze it statistically, frequencies, percentages, the arithmetic mean, and the F-test to determine the differences between the respondents, and correlation coefficients, using the SPSS statistical analysis program.

Keywords: Knowledge Needs, Biological Control, Diseases and Pests, Potato Crop

The most important results were the following.
- That (22.7%) of the respondents had a high knowledge of the biological control of diseases and pests that affect the potato crop.
- There are significant differences between the respondents in the studied governorates regarding the degrees of their knowledge needs about the biological control of diseases and pests that affect the potato crop.
- There is a significant direct relationship at the level of 0.01 between the total degrees of knowledge needed for biological control of diseases and pests that affect the potato crop and all the studied independent variables.
- All the agricultural extensionists agents (100%) need to get their information about the biological control of some diseases and pests of the potato crop from each training course, technical bulletins, books, and references.

The high prices of pesticides, adulteration of pesticides, and the lack of scientific experience of those in charge of selling pesticides in pesticide shops came to the forefront of the problems related to the control of diseases and pests of the potato crop.

- The subject of pesticide alternatives used in the control of potato pests is one of the most training topics that the respondents suggested being included in the training program on biological control of diseases and pests of the potato crop.

Introduction and research problem:

The concept of need or need is one of the essential concepts that have received significant attention

among researchers in the field of social sciences in its various fields in general and in agricultural extension in particular. As a result of the divergence of interests and specialization. As seen by (66:1987) Bhatnagar, the need arises at any time when the actual state - the already existing level - differs from the desired state - the level to be reached - that is, the difference between what is and what ought to be.

Ghaith (1979: 301) mentions that the need is a state of tension or lack of satisfaction felt by a particular individual and prompts him to act towards the goal he believes will achieve his satisfaction. The need is defined as the complaint of a deficiency or disturbance in a specific aspect of the individual's daily behaviour. It is also a deficiency in one of the requirements of life (Suwailem 1997, 189). Al-Turki (1993: 36), quoting Kelsey & Hearne, states that the need is a gap between the desired and actual levels. On the other hand, Sharshar (2007: 3) believes that the need expresses the gap between the current situation and the situation to be reached.

Rageh (1987: 81) believes that need is a state of deficiency, lack, or physical and psychological disorder, which causes an imbalance that soon disappears when these needs are satisfied.

From the preceding, it is clear that the need represents a gap between what is and what should be; as a consequence of not satisfying it is tension, turmoil and disruption of the individual's balance, which drives him to seek knowledge in order to reach everything that would satisfy these needs.

Knowledge is the set of meanings, perceptions, opinions, beliefs and facts formed in a person due to his repeated attempts to understand the things and phenomena surrounding him. (Mai Attia, 2002: 20)

Al-Rafei (1993: 8-9) states that knowledge is the ability to perceive and remember things and information. Each individual has a cognitive map governed by his physiological characteristics, surrounding environment, goals and experiences.

Knowledge plays a vital role in improving the quality of life, as it is the starting point in human behaviour, as what a person possesses of information in quantity. Quality is the basis of his behaviour (Al-Kamil 1985, 53-54) and the ability to remember things, concepts and facts (Omar et al. 1973, 53). Information and knowledge are the basis for any progress, which confirms the need to pay attention to them, focus on them, and work to provide them from the various available sources.

Through its employees, the Agricultural Extension Authority seeks to provide the guides with knowledge and skills that help improve their rural lives, increase agricultural productivity, and educate them to deal with all pests and diseases that may threaten agricultural productivity. The biological

control of diseases and pests is one of the most essential pillars of agriculture that contributes to reaching a safe agricultural product free from pollution in all its forms to preserve human health.

Biological control is defined as using all appropriate methods to control pests and diseases leading to minor economic damage (Ismail: 2009).

Barrell (1979:7) defines biological control as making the most of the means in the environment, including agricultural, mechanical, legislative and biological control in various fields.

Biological control seeks to preserve and protect the environment (Al-Shafi`, Abdel Mawla: 2007: 2). By adjusting the numerical densities of pests and reducing their damage, depending on predators, parasites, and pathogens.

Accordingly, biological control does not aim to eliminate the pest but rather seeks to reduce the number of this pest to the extent that it is economically harmless despite its presence on the crop. This helps in obtaining a healthy and safe product to preserve human health and achieve high productivity of various crops, especially vegetable crops, including potatoes.

The potato crop is considered one of the oldest crops in human history, and its cultivation was introduced in Egypt during the reign of Muhammad Ali in the late nineteenth century, as it was imported at that time as a vegetable crop for the use of foreigners, and then its spread gradually expanded. (Abdul-Haq, 2005: 5) Potato is considered the first alternative to cereal crops that can be relied upon to solve the global food problem, in addition to the possibility of cultivating it in more than one loop (Abdul-Haq ,2009: 6). Potato occupies an essential economic position among vegetable crops in terms of production, consumption and export, which requires the use of appropriate biological control methods to reduce the gathering of pests and diseases that cause damage to the production of the potato crop. Furthermore, the study of Madkour and others (2009), and the study of Magda Abdel-Rahman (2012), to a severe lack of knowledge and information about farmers related to the potato crop, and this deficiency may be due to the agricultural extension workers' lack of complete knowledge of combating some diseases and pests that affect the potato crop. Agricultural extension is the primary device for transferring packages of recommendations, results of agricultural research, and new technological methods into practice. Agricultural extension as an informal educational process aims to improve the clients' standard of living and change their negative attitudes to positive ones. Agricultural extension is also known as one of the agricultural social sciences specialized in

technology transfer. Agriculture in a transparent manner to farmers in the countryside and help them understand, assimilate and apply it through clear and specific scientific methods, and therefore an agricultural extension is considered the driving force in the process of developing the countryside (Soliman,2022 4-5)

The success of agricultural extension in carrying out its developmental mission depends to a large extent on the competence and experience of its employees at all organizational levels, especially those working at the local levels, who are the agricultural extension agents (Al-Adly, 1972):

This is because these extension agents are the actual implementers of the extension programs, and upon them lies the burden of direct contact with the extension workers (Omar, 1978: 73), and they also have to shape and change the behavior of the rural people in living and in production, and for this reason the success of agricultural extension in developing the countryside depends on the culture and capabilities of these agricultural extension workers. (Omar, 1978: 74). Their vigilance and constant attention to the social and economic changes that vitally affect the lives of rural people (Al-Khouli, 1968: 40). . With their full knowledge and full awareness of all the developments of agricultural science and research on a regular basis (Al-Adly, 1972: 189) in order for them to play the role assigned to them.

Because of the foregoing, the research problem can be summarized in an attempt to answer the following questions: What is the degree of knowledge needed by the agricultural extension workers researched about the biological control of some diseases and pests of the potato crop in some governorates of Egypt? Moreover, to determine the differences between the agricultural extension agents in the studied governorates regarding the degree of knowledge needed about the biological control of some diseases and pests of the potato crop. Moreover, to identify the sources of the respondents' information related to the biological control of some diseases and pests of the potato crop. Finally, it identifies the problems facing farmers in the biological control of diseases and pests affecting the potato crop from the point of view of agricultural extension agents.

Research aims:
1- Determining the degree of knowledge needed by the agricultural extension agents researching the biological control of some diseases and pests of the potato crop in some governorates of Egypt.
2- Determining the differences between the agricultural extension agents in the studied

governorates regarding the degree of knowledge needed about the biological control of some diseases and pests of the potato crop.
3- Determining the relationship between the total degree of knowledge needed by agricultural extension agents on biological control of potato diseases and pests and each of the following independent variables: age, educational qualification, specialization, work period in the Ministry of Agriculture, work period in agricultural extension, training courses, and information sources.
4- Identifying the sources of the respondents' information related to the biological control of some diseases and pests of the potato crop.
5- Identify the problems related to the control of diseases and pests of the potato crop.
6- Determine the most important topics that the respondents propose to include in the training program on biological control of diseases and pests of the potato crop.

Research hypotheses:

T**o achieve the second and third research objectives, the following research hypotheses were formulated:**
First: "There are differences between the agricultural extension agents surveyed in the three studied governorates regarding the degree of their knowledge need about the biological control of some diseases and pests of the potato crop."
Second: There is a correlation between the total degree of knowledge needed by agricultural extension agents for biological control of potato diseases and pests and each of the following independent variables: age, academic qualification, specialization, work period in the Ministry of Agriculture, work period in agricultural extension, training courses, and information sources.
The statistical hypothesis corresponding to the research hypothesis was formulated.

Research method

Procedural definitions:
Agricultural extension agents: They are those who carry out agricultural extension work at the village level
The degree of knowledge need for biological control of some diseases and pests of the potato crop: It means the difference between the degree of the actual level of knowledge about the biological control of some diseases and pests of the potato crop and the total score of the knowledge test on that control.

Research area: Three governorates were chosen, namely Beheira, Dakahlia, and Menoufia, to represent the research area, as they are among the largest governorates in terms of the cultivated area of the potato crop. (Economic Affairs Sector) In addition to the presence of a large number of agricultural extension agents in those governorates, who are responsible for developing and developing farmers' information and practices in the various productive fields. They numbered 337 agricultural guides.

Table 1. A statement of the cultivated areas of potatoes at the governorate level.

Governorate	Area	Prod
Menoufia	24710	255705
Dakahlia	33338	394539
Beheira	24707	238751
Total	52755	888955

Comprehensive research: The comprehensive search consisted of all agricultural extension agents in the three governorates of the study and their number was (337) agricultural extension agents (152 of whom were agricultural extension agents in Menoufia Governorate, 107 agricultural extension agents in Dakahlia Governorate, and 78 agricultural extension agents in Buhaira Governorate).

Research sample: To determine the size of the research sample from the total population of the three studied governorates, the following equation was used, which determines the size of the sample by knowing the size of the population (Isrel, 2013)

$$n = \frac{N}{1+N(e)^2}$$

Overall size = N   sample size = n   Estimation error (e) 5% = 0,05

The following table shows the total and sample size in the three studied governorates (Monofia, Dakahlia, and Beheira). The sample was randomly selected from the comprehensive lists.

Table 2. The size of the overall and the sample in the three studied governorates

Governorate	general	the sampling
Menoufia	152	83
Dakahlia	107	59
Beheira	78	43
Total	337	185

Data collection: Data was collected in a personal interview using a questionnaire designed to achieve the objectives of the research. The initial test was conducted on 30 agricultural extension agents in Qalyubia Governorate. After verifying its validity in its final form to achieve the purpose for which it was prepared, the data were collected within two months—August and September of 2022.

Quantitative measurement and processing:

First: Measuring the dependent variable, "the degree of knowledge needed for biological control of some diseases and pests of the potato crop": The dependent variable was measured by designing an achievement test for the most essential information related to the various subjects related to the biological control of some diseases and pests of the potato crop and the methods of biological control thereof. The respondent's answers to the achievement test were corrected, and the grade he obtained was calculated. The scores ranged between a minimum score of "zero" in the case of the wrong answer to all test questions and a maximum score of "65" in the case of the correct answer to all test questions. The achievement test questions varied between fuller questions, which amounted to 16 degrees, multiple-choice questions, which amounted to five degrees, and true-false questions, which amounted to 44 degrees. The degree of cognitive need was determined by subtracting the score obtained by the respondent from the upper limit of the test score, which is equal to 65 degrees, meaning that:

The degree of cognitive need = 65 degrees - the degree obtained by the respondent

Second: Measuring the Independent Variables:

Age: was measured by the crude degree of the number of years.

Academic qualification: it was measured by dividing it into (obtaining an intermediate qualification, obtaining a higher qualification (Bachelor), and obtaining a higher qualification than the bachelor's degree, "Master's - PhD". Grades (3, 2,

1) were given as a numerical indicator to measure this variable.

Specialization: It was measured by dividing it into (agricultural extension, general division, and others mentioned) and grades (3, 2, 1) were given as a numerical indicator to measure this variable.

Duration of service in the Ministry of Agriculture: It was measured in crude grades for the length of service of the respondent in his work in agriculture.

Duration of service in agricultural extension: It was measured in raw degrees for the length of service of the respondent in his work in agricultural extension.

Training Courses: It was measured by asking the respondent about his training courses during the past five years, to which the respondent responded (yes or no).

Exposure to information sources: It was measured by asking the respondent about the degree of his exposure to information sources related to the research subject. The respondent responds to them on a continuum of three points (always, sometimes, rarely, and not used), and the respondent receives grades (4, 3, 2, 1), respectively.

Statistical analysis:

To display the data and analyze it statistically, frequencies, percentages, the arithmetic mean, and the F-test was used to determine the differences

between the respondents, and correlation coefficients, using the SPSS statistical analysis program.

Results and discussion

First: Determining the degree of knowledge needed by the agricultural extension workers researched the biological control of some diseases and pests of the potato crop in some governorates of Egypt.

The degree of cognitive need for agricultural extension agents ranged between 9 degrees as a minimum and 44 degrees as a maximum, with an arithmetic mean of 25.83 and a standard deviation of 7.23. The respondents were divided according to the actual range into three categories: those with low cognitive needs (less than 20 degrees), those with medium cognitive needs (from 20-31 degrees), and those with high cognitive needs (greater than 31 degrees).

It is clear from Goal (3) data that half of the respondents (50.3%) were in the category of those with medium cognitive need, and (27.0%) of the respondents were in the category of those with low cognitive need, while the percentage of those who were in the category of cognitive need was High cognitive (22.7%) of the respondents.

Table 3. Distribution of the agricultural extension agent's respondents according to the categories of knowledge needed about the biological control of some diseases and pests of the potato crop

Class	Repetition	%
The category of people with low cognitive needs (less than 20 marks)	50	27,0
The category of people with average cognitive needs (from 20-31 degrees)	93	50,3
People with high cognitive needs (greater than 31 degrees)	42	22,7
Total	185	100

Second: the differences between the agricultural extension agents in the studied governorates regarding the degree of knowledge needed about the biological control of some diseases and pests of the potato crop.

To achieve the research hypothesis, the following statistical hypothesis was formulated: "There are no differences between the agricultural extension agents surveyed in the three studied governorates about the degree of their knowledge need for biological control

of some diseases and pests of the potato crop." The data of Table (4) indicated that there were significant differences between the agricultural extension agents in the degree of Their knowledge needs about the biological control of some diseases and pests of the potato crop, where the calculated value of (F) was 1.47, which is greater than its tabular counterpart at a significant level of 0.05, and a value of (2, 182). Then the statistical hypothesis was rejected, and the alternative research hypothesis was accepted.

Table 4. is a summary of the results of the variance analysis of the total knowledge needs scores of the agricultural extension workers surveyed about the biological control of some diseases and pests of the potato crop

Governorate	sum of squares	degrees of freedom	f value
between groups	154,087	2	1,47
within groups	9483,718	182	
Total	9637,805	184	

By calculating the least significant difference, L.S.D, between the average scores of the knowledge needs of the agricultural extension agents researched about the biological control of some diseases and pests of the potato crop, it was found that its value was 0.097, and this is indicated by the data of Table (5). Moreover, by comparing the differences between these averages with the value of the least significant

difference, it was found that they are all significant, as they are greater than or equal to the tabular value, which reflects the different averages of the cognitive needs of the agricultural extension workers researched about the biological control of some diseases and pests of the potato crop for each of the studied governorates.

Table 5. The values of the least significant difference, L.S.D, between the average scores of the knowledge needs of the agricultural extension workers researched about the biological control of some diseases and pests of the potato crop

Governorate	Menoufia	Dakahlia	Beheira
Menoufia	----		
Dakahlia	1,890	----	
Beheira	1,793	0,097	---

Third: The relationship between the total degree of knowledge needed of agricultural extension agents for biological control of potato diseases and pests and each of the studied independent variables:

The data in Table No. (6) indicate that there is a significant direct relationship at the level of 0.01 between the total degree of knowledge need of agricultural extension agents for biological control of potato diseases and pests and each of the independent

variables studied, where the correlation coefficients were 0.336 for the age variable, 0.364 for the educational qualification variable, And 0.599 for the variable of specialization, and 0.648 for the variable of the duration of work in the Ministry of Agriculture, and 0.628 for the variable of duration of work in agricultural extension, and 0.569 for the variable of training, and finally 0.618 for the variable of exposure to information sources.

Table 6. The values of the correlation coefficients between the total degree of knowledge needed of agricultural extension workers for biological control of potato diseases and pests and each of the studied independent variables

Variable	Correlation coefficient values
Age	336,**
Educational Qualification	364,**
Profession	599,**
Duration of a career in the Ministry of Agriculture	648,**
Duration of work in agricultural extension	628,**
Get training courses	569,**
Direction to knowledge starts	618,**

Fourth: Respondents' sources of information related to the biological control of some diseases and pests of the potato crop.

It is clear from the data of Table (7) that all the agricultural extensionists surveyed (100%) do not obtain their information about the biological control of some diseases and pests of the potato crop from each of the training courses, technical bulletins, books and references. Also, television programs and scientific journals are not a source of information on the biological control of some diseases and pests of

the potato crop for more than three-quarters of the respondents (80.5%) and (81.1%), respectively. The conferences are not a source of information on the biological control of some diseases and pests of the potato crop for more than three-quarters of the respondents (77.8%).

More than a quarter of the respondents (27%) indicate that they rarely rely on their colleagues and extension seminars as a source of information on the biological control of some diseases and pests of the potato crop.

The data of the same Table also indicates that (43%) of the agricultural extension workers surveyed depend on the Agricultural Research Center permanently as a source of information on the biological control of some diseases and pests of the potato crop. At the same time, (40%) of the respondents indicated that their sources of information about the biological control of some diseases and pests of the potato crop were always from the heads of work and colleges of agriculture.

In light of the preceding, it is necessary to pay attention to those sources from which the respondents draw their information in general about the biological control of some diseases and pests of the potato crop.

Table 7. Sources of information for agricultural extension agents on the biological control of some diseases and pests of the potato crop. n = 185

Sources	Always		sometimes		Barely		Do not use	
	Number	%	Number	%	Number	%	Number	%
Agriculture Research Center	79	43	41	22,2	48	26,1	17	9,2
Agriculture faculties	74	40	41	22,2	30	16,2	40	21,6
Chiefs at work	74	40	21	11,4	25	13,5	65	35,1
associates	69	37,3	31	16,7	50	27	35	19
Counselling seminars	39	21,1	41	22,2	50	27	55	29,7
training courses	...	...	...	...	...	...	185	100
discussions	...	...	...	...	40	21,6	144	77,8
TV performances	...	...	15	8,1	20	10,8	149	80,5
Scientific journals	9	4,9	15	8,1	10	5,4	150	81,1
Technological releases	...	...	...	...	...	...	185	100
Books and references	...	...	...	...	...	...	185	100

Fifth: Problems related to the control of diseases and pests of the potato crop

The respondents identified many problems related to the control of diseases and pests of the potato crop. They are arranged in descending order, as shown in Table (8): high prices of pesticides, adulteration of pesticides, lack of scientific experience for those in charge of selling pesticides in pesticide shops, farmers' spraying of diseases and pests, and failure to carry out preventive spraying. Before infection, mix pesticides and nutrients in one container while spraying, and not using pesticides and nutrients in the recommended quantities.

Table 8. Problems related to the control of diseases and pests of the potato crop, n = 185

The issue	Repetition	%
High prices of pesticides	150	81,1
Pesticide adulteration	149	80,5
Lack of scientific experience for those in charge of selling pesticides in pesticide stores	144	77,8
Farmers spraying for diseases and pests	79	43
Need to do preventive spraying before the infection.	79	43
Mix pesticides and nutrients in one container while spraying	74	40
We are not using pesticides and nutrients in the recommended quantities.	69	37,3

Sixth: The most important topics suggested by the respondents to be included in the training program on biological control of some diseases and pests of the potato crop.

Table (9) shows that the topic of alternatives to pesticides used in potato pest control is the most important topic that the respondents propose to include in the training program on biological control of some diseases and pests of the potato crop, as indicated by 81.1% of the respondents.

The effect of using pesticides on vital enemies came in second place from the point of view of 59.4% of the respondents.

The topic of the role of some predators in controlling insect pests that afflict the potato crop came in third place, as indicated by 51.3% of the respondents.

Hence, the research recommends the importance of developing the capabilities of agricultural extension workers through the preparation of training programs.

Table 9. The most important topics suggested by the respondents to be included in the training program on biological control of some diseases and pests of the potato crop. n = 185

Suggested subjects	Repetition	%
Alternatives to pesticides used to control potato pests	150	81,1
The effect of using pesticides on biological enemies	110	59,4
Role of some predators in controlling insect pests of the potato crop	95	51,3
Identify the manifestations of diseases affecting the potato crop.	85	45,9
Identify the most crucial insect pests affecting the potato crop.	80	43,2

References

Abdel-Haq, Mounir Zaki (2005) Potato Production and Storage in Egypt, Ministry of Agriculture, General Administration of Agricultural Culture, Bulletin No. 9 of 2005

Abdel-Haq, Mounir Zaki (2005) Potato Production and Storage in Egypt, Ministry of Agriculture, General Administration of Agricultural Culture, Technical Bulletin No. 18 of 2009

Al-Adly, Ahmed Al-Sayed, Agricultural Extension Science, New Publications House, Alexandria, 1972.

Al-Kamil, Faraj (1985): The Impact of Communication - Psychological and Social Foundations, Dar Al-Fikr Al-Arabi, Cairo.

Al-Khouly, Hussein Zaki, Agricultural Extension and its Role in Rural Development, Dar Al-Maarif, Egypt, 1968

-Al-Rafei, Ahmed Kamel (1993): Agricultural Extension "Science and Application", Ministry of Agriculture and Land Reclamation, Agricultural Research Center, Agricultural Extension and Rural Development Research Institute.

Al-Shafea, Hamdto Abdel-Faraj, and Abdel-Mawla, Awadallah Abdullah, Alternatives to Chemical Pesticides and Prospects for Biotechnology Uses in Pest Control, Sudanese Organization for Standardization, workshop from 4-5 September 2007, Khartoum - Friendship Hall.

Al-Turki, Mahmoud Mohamed Ragab (1993): An analytical study of the extension needs of fishermen and owners of fish farms in Lake Burullus, Kafr El-Sheikh Governorate, PhD thesis, University of Alexandria.

Barrell, D.F, 1979, Integrated Pest Management Council on Environmental Quality, U.S.A. December.

-Bhatnagar, O.P.,(1987): Evaluation Methodology for Training, Theory and Practice, Oxford &LBH Publishing, Co. PVT. LTD, New Delhi.

Ghaith, Mohamed Atef (1979) Dictionary of Sociology, Egyptian General Book Organization.

Ismail, Iyad Yousef Al-Hajj, Integrated Management of Insect Pests, University of Mosul, College of Education, Department of Life Sciences, www.Pdfactory., 2009

Israel Gleen D., (2014) , Determining Sample Size, University Florida IFAS Extension in :www.edis.ifas.ufi.eduLPD006, 20- 7- 2014

Mai Attia Saad Zaghloul Mohamed (2002) Counseling and executive needs of fish farm owners in Kafr El-Sheikh Governorate, an unillumined master's thesis, Faculty of Agriculture, Cairo University.

Madkour et al., Knowledge needs of agricultural extension agents in some organic farming techniques in Kafr El-Sheikh Governorate, Agricultural Research Journal, Kafr El-Sheikh University, Vol. 35, 2009.

Magda Abdullah, Abdel-Aal Abdel-Rahman, Study of the Effect of Some Variables on the Agricultural Extension Extensions' Knowledge and Attitudes Toward the Use of Organic Agriculture in Sharkia Governorate, Volume 39, Fourth Issue, 2012.

Omar, Ahmed Mohamed, Agricultural Extension, Offset Printing, Cairo, 1978.

Omar, Ahmed Mohamed and others (1973): Reference in Agricultural Extension, Dar Al-Nahda Al-Arabiya, Cairo.

Rageh, Ahmed Gharib (1987): Fundamentals of Psychology, Dar Al-Maarif, Cairo.

Sharshar, Abdul Hamid Amin (2007): Agricultural Extension Programs, Faculty of Agriculture, Al-Azhar University.

Soliman Mohamed Abu El-Maaty (2022): The role of civil society organizations and the private sector in the digital transformation of agricultural extension, within the Qatari training course on digital agricultural extension, the Arab Organization for Agricultural Development, from 11-15/9/2022

Swailem, Mohamed Nasim Ali (1997): Agricultural Extension, Cairo, Egypt for Scientific Services.