

## Building a proposed training program for agricultural extension workers in the field of organic fertilizers and biofertilizers in North Sinai Governorate

Abdu Omran Mohamed<sup>1</sup>, Sohier Mohamed Ahmed El-Seretty<sup>2</sup>, Tarek Mahmoud Ahmed Alsaied<sup>3</sup>, Ahmed Hussein Abd El-Hammed El-Ghonemy<sup>4</sup>

<sup>1</sup>Department of Agricultural Economics, Agricultural and Biology Research Institute, Dokki, Giza, Egypt.

<sup>2</sup>Department of Project Management and Sustainable Development, Arid Lands Cultivation, Research Institute, City of Scientific Research and Technology Applications (SRTA-City), New Borg El-Arab, Alexandria, Egypt.

<sup>3</sup>Research of Agricultural Extension and Rural Development Institute, Agricultural Research Center, Giza, Egypt.

<sup>4</sup>Agricultural Economics Research Institute, Agricultural Research Center, Beheira, Egypt.

Corresponding author: Sohier Mohamed <[sohier\\_seretty@yahoo.com](mailto:sohier_seretty@yahoo.com)>

### Abstract:

The research aimed to build a training program for agricultural extension agents in the field of organic fertilizers and biofertilizers based on determining the level of knowledge of agricultural extension agents in the field of organic fertilizers and biofertilizers, identifying the training methods preferred by agricultural extension agents, determining the relationship between the studied variables and the degree of knowledge of agricultural extension agents in the field of organic fertilizers and biofertilizers, and to identify educational and technical problems in this field. The research was conducted in North Sinai Governorate on a regular random sample of 95 agricultural extension workers, and the data were collected by personal interview using a questionnaire form.

To analyze this research's data and display its tabular results, frequencies, percentages, arithmetic mean, mean percentage, and simple correlation coefficient, the computer was used through the SPSS statistical program.

**Keywords:** Training program, Agricultural extension workers, Organic fertilizers, Bio fertilizers.

### The most important results of the research for the construction of the training program were summarized as follows:

- The total level of knowledge of the counselors surveyed in the field of organic fertilizers and biofertilizers: that most of the respondents, by 73.7%, have low knowledge in the field of organic fertilizers and biofertilizers.
- as for organic fertilizers, it was found that nearly three-quarters of the respondents (72.6%) fall into the category of low level of knowledge.
- As for the biofertilizers, the results showed that more than three-quarters of the respondents

(75.8%) of the counselors fall into the category of low level of knowledge.

- The results indicate that there is a severe deficiency in the knowledge of the following guides: industrial organic fertilizers (49.3), argan (48.2), ceraline (36.3), saccharin (35.6), nitropine (37.5%), phosphorine (34.7%) and Bluegen (37.9). % and Micropine (38.6%).

- A proposed training program was built for the extension agents in the field of organic fertilizers and biofertilizers in the North of Sinai Governorate based on the actual needs of the agricultural extension agents.

## Introduction and research problem:

At present, agriculture is the main source of supplying the population with food and clothing. It is also one of the most important sources of income. The agricultural sector employs about 30% of the total labor force, and it has been found that the growth of some sectors has helped push the economic activity, such as the “agriculture” sector, with a real growth rate of about 2.9%, which represents about 15.6% of the GDP. The GDP (at constant prices) also contributes to about 814.6 billion pounds and about 883.5 billion pounds (at current prices) during the first half of 2012/2013, which makes the agricultural sector one of the important sources of national income (Al Borsa Newspaper, 2015).

- Increasing agricultural production horizontally and vertically is considered the cornerstone for achieving food security for developing countries in general and Egypt in particular. The increase in production depends on the expansion of cultivated areas and the use of chemical pesticides to protect crops (Al-Abdullah 2002, p.3), also with the expansion of the use of chemical fertilizers. Instead of organic fertilizers, this makes agricultural development depend, to a large extent, on the use of many productive elements from outside the farm, and this is called the chemical or industrial farming system (Hassanin and Nabil 2004, p.1), this resulted in the excessive use of chemicals, whether in the form of chemical fertilizers or pesticides, the emergence of negative effects on the environment poses a serious threat to human health and a direct impact on microorganisms in the soil, in addition to the contamination of food products with fertilizers as well as surface and groundwater, pollution of the rural environment and high humidity in fruits and vegetables, which weakened their storage capacity.

Research has shown that pesticide residues that have been used during the past forty years have moved to the food chain. Scientists have proven that the remnants of pollutants that reach humans through air, water, or food, even if they are taken in quantities less than the permissible, accumulate in the human body until they reach the harmful concentration, causing kidney or liver failure or cancer, and that these pollutants after reaching the human body travel through the blood to all parts of the body to find its way to the milk of nursing mothers and then to their

children, and from this point, Egypt adopted the trend towards clean agriculture based on the use of organic fertilizers and biofertilizers to fertilize various agricultural crops (Bahloul, 1999: 2), and the agricultural thought tended to find alternatives to chemical agriculture that would overcome these problems, improve the quality of agricultural products and reduce harmful environmental impacts. This was achieved by following the organic farming system, which is the method that ensures the preservation of soil fertility and avoidance of environmental pollution, and the production of clean, safe food free of substances harmful to human and animal health, and some of the agricultural alternatives are the organic farming method, the biodynamic method, the ecological farming method, and the continuous farming method (Hasb El-nabi 2004 p.6) where the organically cultivated area increased from 11.8 thousand acres in 1999 to 43.2 thousand acres in 2004 distributed over fifteen governorates (Qasim, 2003: 20), also a center for inspection of organic agriculture was also established, which is called The Center of Organic Agriculture in Egypt.

the Egyptian Ministry of Agriculture, through its conviction in organic agriculture, also began adding an article of the new agriculture law that allows the organization of these crops, which was entrusted to the Central Administration of Lands which is the authority responsible for disseminating land and water technology from the Agricultural Research Center to the extension agents through its performance as one of the specialized extension departments charged with preparing a regulation for organic agriculture that is consistent with the regulations approved by the European Common Market. After that, Egypt became one of the centers producing organic agriculture and the attention of importers turned to it. From Europe and the world, as many Egyptian companies began to enter this field, and the number of companies operating in this field of organic agriculture has grown to 40 companies. Now, Egypt produces a large number of organic crops, including vegetables, fruits, field crops, medicinal and aromatic plants (Talaba, 2008: 13), so organic agriculture should receive greater attention to overcome the problems of the environment, and human and animal health.

The trend towards applying organic farming methods in Egypt is growing at a slow rate, which calls for a comprehensive change in the current agricultural methods and techniques used in Egypt, which are characterized by the excessive use of chemicals in agriculture with the Egyptian farmer's lack of sufficient awareness of the side effects of using chemicals (fertilizers + pesticides) on the environment and man himself, in addition to his low consumer awareness (Ali, 2002: p.10). Which calls for a need to direct more extension efforts to spread organic agriculture by educating farmers and providing them with the knowledge and skills they need in this field.

-The agricultural extension can play a distinctive and effective role in rationalizing the use of chemical fertilizers as the main driver of a series of desirable behavioral changes in the knowledge and skills of agricultural extension agents through planning and implementing extension programs in this field, and raising their awareness of the optimal use of chemical fertilizers and the prevention of their various damages (Qotb, 2004: p.233) And the shift to the method of organic farming to produce safe food free of toxic substances for humans and animals, preserving agricultural lands from deterioration, preserving the environment from pollution, reducing agricultural production costs, and preserving the genetic differences of the agricultural system (Tolba, 2008: p.56), but this method did not reach the level of acceptance required by the vast majority of Farmers, due to their modernity, in addition to their fear of pests and diseases attacking their crops if they don't use fertilizers and pesticides, therefore, based on the role of agricultural extension in the delivery and dissemination of agricultural innovations, it seeks within its programs to pay attention to organic agriculture by introducing farmers to the importance of organic farming and clarifying the dangers of using pesticides And the importance of adopting integrated control methods, organic fertilizers and biofertilizers, in addition to raising farmers' awareness of knowledge and Technical practices of this new method to increase agricultural production and improve its specifications in line with global demand.

Given the increasing interest of the extension body in pushing farmers to apply the technical practices of organic farming, which depend to a large extent on the role of

agricultural extension workers, it was necessary to build a training program for agricultural extension workers regarding the technical practices of organic fertilizers and biofertilizers, so that they can play their role in raising awareness of farmers, providing them with information and providing them with skills For the use of organic fertilizers and bio-fertilizers.

For the agricultural extension agents to make the desired behavioral changes in the farmers' knowledge to reduce the use of chemical fertilizers, the extension workers need to provide them with information, skills, and positive attitudes in the field of biological fertilizers.

And in the view of the lack of studies that dealt with the level of knowledge of agricultural extension agents in the field of biological fertilizers, and the current interest of the extension method to push farmers to apply technical practices of biological fertilizers, which depend to a large extent on the knowledge and skills of agricultural extension agents.

According to the previous elements, the study problem seeks to answer the following questions:

- What is the level of knowledge of agricultural extension workers in the field of organic and biofertilizers?
- What are the training methods preferred by agricultural extension agents?
- What is the relationship between the studied variables and the degree of knowledge of agricultural extension workers in the field of organic and biofertilizers?
- What is the awareness of the counselors about the problems of applying organic and bio-fertilizers?

### **Research objectives:**

In line with the previously presented research problem, the following objectives could be formed:

- 1- Determining the knowledge of agricultural extension workers in the field of organic and biofertilizers.
- 2- Determining the relationship between the studied variables and the degree of knowledge of agricultural extension workers in the field of organic and biofertilizers.

3- Identifying the educational and technical problems facing agricultural extension workers when guiding farmers in the field of biofertilizers.

4- Building a proposed training program for agricultural extension workers in the field of organic and biofertilizers.

### Research hypotheses:

To achieve the third objective, the following research hypothesis was formulated:

There is a significant relationship between the degree of knowledge of agricultural extension agents in the field of organic and biofertilizers as a dependent variable and each of the following studied independent variables: the guide's age, academic qualification, academic specialization, length of service in agricultural work, length of service in extension work, upbringing, training experience, and degree of job satisfaction.

### Research method:

**Research area:** This research was conducted in North Sinai Governorate, where the number of those who perform agricultural extension work in that governorate is 120, and there are 7 extension centers in the governorate (Directorate of Agriculture in North Sinai Governorate, 2019).

**Comprehensive and sample research:** The comprehensive research reached the agricultural extension workers in the governorate, where their number was 121 agricultural extension workers covering the centers.

The number of agricultural departments in North Sinai Governorate is (7) departments. The number of agricultural extension inspectors is (7) in each department. The number of specialists in the district is (8). The number of specialists in the administration is (21). The number of guides in the villages of the governorate is (85). (The Directorate of Agriculture in the governorate North Sinai, 2016, unpublished data).

The research sample was selected from the total number of agricultural extension workers in the governorate on the basis of the "Krejcie &

Morgan" equation (Krejcie & Morgan: 1970: 610-607):

$$(P-1) P X^2 + (1 - N) d^2 \div (P-1) P N X^2 = S$$

By applying the previous equation, the size of the research sample was 95 respondents from agricultural extension workers. The sample members were randomly selected from each center in the governorate.

**Data collection method and tools:** A questionnaire form was used in the personal interview as a tool for collecting the necessary data for the research. It was prepared and ensured the validity and clarity of its statements through an initial test applied to 10 respondents. The field data was collected during the month of March 2021.

### Quantification of data:

**First:** Procedural definitions and quantitative data treatment for the most important independent and dependent variables included in the research:

- **Academic qualification:** It means the highest academic qualification obtained by the respondent extension worker until the time of data collection. This variable was measured by asking the respondent about the highest qualification he obtained. The extension workers were divided according to their qualification into three categories (intermediate - university - above university) and they were given the numbers 1, 2, 3 According to their response, in order.
- **Academic specialization:** It means the type of study specialization of the respondent, and the agricultural extension workers were divided in terms of their academic specialization into two categories (agricultural extension - other specialties), and they were given the numbers 1, 2, according to their response to the order.
- **The degree of job satisfaction:** It means the set of psychological and functional factors and environmental conditions that make the employee satisfied with his work. In measuring this variable, a scale was used that consists of 12 statements, each of which is responded to on a triple scale: "agree, to some extent, disagree". These responses were given grades "3, 2, 1" in order in the case of positive

statements, and vice versa in the case of negative statements, and by adding the scores obtained by the respondents from the units of the scale, a total score can be obtained that expresses the individual's emotional response to his work, which is called the degree of job satisfaction of the respondent.

**Second: dependent variable: the level of knowledge of the agricultural extension workers in the field of organic fertilizers and bio-fertilizers:**

The degree of knowledge of the respondents in each of the studied methods, namely (organic fertilizers), and (bio-fertilizers) was measured through a scale consisting of two levels, known and not known. The degrees of 1 and 0 were given to these responses, respectively, and the scores obtained were collected. Investigated in each of them, as follows:

- Concerning organic fertilizers: the respondents' opinions were surveyed about the extent of their knowledge related to the preparation and use of types of organic fertilizers for each of (municipal fertilizers, compost industrial organic fertilizers, green fertilizers, and poultry feed) through 21 phrases, and the theoretical range in this method ranged between Zero, as a minimum, and 21, as a maximum. Accordingly, the respondents were divided into three levels: low knowledge level (zero-7 points), medium knowledge level (8-14 points), and high knowledge level (15-21 points).
- Concerning biological fertilizers, the respondents' opinions were surveyed about their knowledge of using some types of biofertilizers, which are (Blugin, Microbin, Phosphorine, Cereline, Nitropin, Al-Aqdin, and Escorin) through 31 phrases, and the theoretical range ranged between zero, as a minimum, And 31, as a maximum, and accordingly, the respondents were divided into three levels: a low level of knowledge (0-10 points), a medium level of knowledge (11-20 points), and a high level of knowledge (21-31 points).

The total score of the studied methods was collected to express the level of knowledge in the field of organic fertilizers and biofertilizers. The theoretical range of their total knowledge in this field ranged between zero, as a minimum,

and 52, as a maximum. Accordingly, the respondents were divided into three levels: Low level of knowledge (0 - less than 18 points), medium level of knowledge (18 - less than 35 points), and high level of knowledge (35 points or more).

The average score of the respondents, which expresses their level of knowledge in each of the studied methods, was calculated by dividing the score obtained by the respondent in that method by the maximum total score. While the percentages of the average knowledge scores in a particular method are calculated by dividing the average knowledge score for that method by its maximum multiplied by 100. According to the percentage of the average knowledge levels of the respondents, it was possible to divide the knowledge level into three levels, a high level of knowledge (76% or more), an average knowledge level (50%-75%), and a low level of knowledge (less than 50%).

**Third: Descriptive data: Identifying the educational and technical problems facing agricultural extension workers when guiding farmers in the field of biological fertilizers:**

A scale consisting of 15 phrases was used in measuring this variable through a two-level graduated scale (yes, and no), and they were given the scores "2, and 1", respectively, and were arranged according to percentage.

**Statistical analysis:**

To analyze this research data and display its tabular results, frequencies, percentages, arithmetic mean, mean percentage, and simple correlation coefficient were used. The computer was used through the SPSS statistical program.

**The results and their discussion:**

**First: Personal variables of the respondents:**

The results (Table No. 1) showed the following:

**Age:** It was found that nearly half of the guides surveyed are over 47 years old, as for **Academic qualification:** the results showed that 40% of the counselors surveyed have intermediate education, as for **Academic specialization:** The results showed that 1.1% of the surveyed extension workers specialized in agricultural

extension, **And that** 44.2 of the surveyed extension workers in the category of medium service period (12- less than 23).

As for the **duration of service in extension work**: the results show that 56.8% of the extension workers surveyed in the category of service period are small (less than 10 years), and for the **upbringing**: the results show that 67.4% of the guides surveyed have an urban

background, while 32.6% of them have a rural background, whilst 1.1% of the extension workers surveyed live at the same village and 82.1% of them live in the city, the results also showed that 42.1% of the counselors surveyed had a low training experience (less than 3 courses) and that 61.1% of the counselors had high job satisfaction.

**Table (1): Distribution of the surveyed counselors according to their characteristics and Distinctive features**

Characteristics	Total counselors surveyed		Characteristics	Total counselors surveyed	
1. Age	No.	%	2. Educational qualification	No.	%
Young (<35 years)	17	17.9	Intermediate	38	40
Middle aged (35:47 years)	34	35.8	University	50	52.6
Old (>47 years)	44	46.3	postgraduate	7	7.4
3. Academic specialization			4. Duration of service in agricultural work		
Agricultural extension	1	1.1	Short service period (<12 years)	15	15.8
Other specialties	52	54.7	Medium service period (12:23 years)	42	44,2
General specialization	42	44.2	Long service period (>23 years)	38	40
5. Duration of service in extension work			6. Upbringing		
Short service period (<10 years)	54	56.8	rural	31	32.6
Medium service period (10:19 years)	25	26.4	urban	64	67.4
Long service period (>19 years)	16	16.8			
7. Residence			8. Training experience		
Same village (3 points)	1	1.1	Low (<3 courses)	40	42.1
Another village (2 points)	16	16.8	Medium (3:5 courses)	31	32.6
The city (1 point)	78	82.1	High (>5 courses)	24	25.3
9. Number of training courses attended			10. Degree of job satisfaction		
None attended	73	76.8	Low (<18 points)	4	4.2
One course attended	22	23.2	Medium (18:25 points)	33	34.7
			High (>25 points)	58	61.1

**Second: the dependent variable:** the level of knowledge of agricultural extension workers in the field of organic fertilizers and biofertilizers:

A. The total level of knowledge of the respondents in the field of organic fertilizers and biofertilizers: The results presented in Table (2) show that most of the respondents (73.7%) have

low knowledge in the field of organic fertilizers and biofertilizers, while (20%) have a medium level of knowledge in the field of organic fertilizers and biofertilizers, and the rest (6.3%) of the respondents have high knowledge in the field of organic fertilizers and biofertilizers.

B. The results in Table (3) indicate the low level of knowledge of the counselors of the respondents with respect to the studied methods, which are organic fertilizers and biofertilizers, as follows:

- Regarding organic fertilizers, it became clear that nearly three-quarters of the respondents (72.6%) fall into the category of low level of knowledge, while the percentage (21.1%) fall into the category of medium level of knowledge, and that (6.3%) fall into the category of a high level of knowledge.
- As for the biofertilizers, the results showed that more than three-quarters of the respondents (75.8%) of the counselors fall into the category of low level of knowledge, while (18.9%) of them fall into the category of medium level of knowledge, while (5.3%) of them fall into the category of medium level of knowledge a high level knowledge.

- This indicates a low degree of counselors' knowledge in the field of organic fertilizers and biofertilizers in general, and biofertilizers in particular, which necessitates the work of a counseling program for them to fill their knowledge deficit in the field of organic and biofertilizers.

C. Percentages of the averages of the counselors' knowledge scores in the studied technical methods of organic farming showed the results in the following table No. (4):

- The level of knowledge of the extension agents was high concerning the methods of municipal fertilizers with a percentage of (78.4%), and for poultry (79.4%),
- The level of knowledge of the counselors was medium concerning green fertilization (69.7%).
- The results also indicate that there is a severe deficiency in the knowledge of the following guides: industrial organic fertilizers (49.3%), argan (48.2%), cereal (36.3%), scurin (35.6%), Nitroline (37.5%), phosphorine (34.7%) and bluegen (37.9%) and Micropine (38.6%).

**Table (2): Distribution of the respondents according to the level of the counselors' total knowledge in the field of organic fertilizers and biofertilizers**

<b>The level of the general counselors' knowledge in the field of organic fertilizers and biofertilizers</b>	<b>No.</b>	<b>%</b>
High knowledge (>35 points)	6	6.3
Medium knowledge (18:35 points)	19	20
Low knowledge (<18 points)	70	73.3
Total	95	100

**Table (3): Distribution of respondents according to their knowledge of the methods of organic fertilizers and biological fertilizers studied**

	<b>The degree of knowledge of the surveyed counselors</b>	<b>No.</b>	<b>%</b>
Organic fertilizers	High knowledge (15-21)	6	6.3
	Medium knowledge (8-14)	20	21.1
	Low knowledge (0-7)	69	72.6
<b>Total</b>		95	100
Bio fertilizers	High knowledge (21-31)	5	5.3

	Medium knowledge (11-20)	18	18.9
	Low knowledge (0-10)	72	75.8
<b>Total</b>		95	100

**Table (4): Percentages of the average degrees of knowledge of the respondents in the studied technical methods**

technical methods	Technical techniques for organic and biofertilizers	The maximum knowledge score of the guides	The average knowledge of the guides	Percentage of guides' maximum knowledge score	Guides' knowledge degree
<b>Organic fertilizers</b>	- Municipal Fertilizer	4	3.13	78.4	High
	- Industrial organic fertilizer	8	3.94	49.3	Low
	- Green fertilization	6	4.18	69.7	Medium
	- Poultry	3	2.38	79.4	High
<b>Bio fertilizers</b>	- Bluegin	6	2.27	37.9	Low
	- Micropine	6	2.31	38.6	Low
	- phosphorine	7	2.42	34.7	Low
	- cerialin	4	1.45	36.3	Low
	- Nitropine	2	0.77	38.5	Low
	- Aleaqdayn	3	1.45	48.2	Low
	- scurin	3	1.07	35.6	Low

**Third: descriptive data:** Counsellors' awareness of the problems in the field of organic fertilizers and biofertilizers:

The results, which are shown in Table (5), indicate that the most frequent problems facing extension agents in the field of organic fertilizers and biofertilizers are as follows: Lack of incentives and financial rewards in the first order of problems in the field of organic fertilizers and biofertilizers with an average of (1.91), while the problem of lack of Rural educational programs on television for the field of organic fertilizers and biofertilizers ranked second with an average of (1.89), then the lack of extension aids in the third position with an average of (1.85), then the short period of time for training courses for

extension agents in the field of organic fertilizers and biofertilizers in the fourth position, and the lack of The means of transportation for the extension agents with an average of (1.83) in the fifth rank, and the lack of training programs for the counselors in the field of organic fertilizers and biofertilizers in the sixth rank with an average of (1.80), the lack of material capabilities for extension work in the seventh arrangement, then the lack of indicative bulletins on organic fertilizers And the biofertilizers averaged (1.77) in the eighth place, then the delayed arrival of agricultural extension publications in the ninth rank with an average of (1.71), and the assignment of extension workers to other work is in the tenth rank (1.68), which calls for the concern of the Agricultural



Extension Agency and other agencies in the Ministry of Agriculture, to work on studying

those problems facing agricultural extension agents and seeking to solve them.

**Table (5): Distribution of guides according to their awareness of the problems in the field of organic fertilizers and biofertilizers**

	Problem	Average	Rank
1	Lack of financial capabilities for extension work.	1.77	7
2	Growers of organic fertilizers and biofertilizers stuck to the old.	1.81	5
3	Assigning mentors other work.	1.68	11
4	Lack of incentives and financial rewards for agricultural extension workers.	1.91	1
5	The decrease in the number of agricultural extension workers.	1.83	4
6	lack of Rural educational programs on television for the field of organic fertilizers and biofertilizers	1.89	2
7	Lack of guidance brochures on organic fertilizers and biofertilizers.	1.77	7
8	lack of extension aids	1.85	3
9	Lack of training programs for extension worker in the field of organic and biofertilizers.	1.80	6
10	the short period of time for training courses for extension agents in the field of organic fertilizers and biofertilizers	1.83	4
11	Administrative problems at work	1.64	12
12	Poor participation of farmers in extension seminars.	1.75	8
13	Lack of transportation for guides.	1.83	4
14	Delayed arrival of agricultural guidance publications.	1.71	9

**Fourth: The relationship between the degree of knowledge of the extension workers in the field of organic fertilizers and biofertilizers and between each of the studied independent variables:**

The following statistical hypothesis was formulated:

"There is no significant relationship between the extension workers' knowledge of the field of organic fertilizers and biofertilizers as a dependent variable and each of the following studied independent variables: age, educational qualification, academic specialization, length of service in agricultural work, length of service in

extension work, upbringing, training experience, and degree of job satisfaction".

By testing the validity of the hypothesis using Pearson's simple correlation coefficient (R), the results, shown in Table (6), indicated the following:

1- There is a direct significant relationship at a significant level of 0.01 between the degree of knowledge of agricultural extension workers in the field of organic fertilizers and biofertilizers and between the age variables, where the calculated value (R) was 0.248, and the training experience with the calculated value (R) 0.246, which indicates this With the advancing age of the respondent, and the

increase in training experience, the degree of knowledge of agricultural extension workers in the field of organic fertilizers and biofertilizers increases.

2- There is a direct significant relationship at a significant level of 0.05 between the degree of knowledge of agricultural extension workers in the field of organic fertilizers and biofertilizers and between the following variables: Academic qualification, where the calculated (R) value was 0.192, and the academic specialization, where the calculated value (R) was 0.189, the length of service in agricultural work, where the calculated value (R) was 0.191, the length of service in the

extension work, where the calculated value (R) was 0.185, and the degree of job satisfaction, where the calculated value (R) was 0.184, which indicates that the increase Academic qualification, academic specialization, length of service in agricultural work, length of service in extension work and degree of job satisfaction, increases the degree of agricultural extension workers' knowledge in the field of organic and biofertilizers.

3- There is no significant relationship between the degree of knowledge of agricultural extension workers in the field of organic and biofertilizers and upbringing.

**Table (6): showing the values of the correlation coefficients for the relationship between the degrees of knowledge of agricultural extension workers and between each of the studied independent variables.**

	The studied independent variables	Pearson's simple correlation coefficient (R) values.
1	Age	**0.248
2	Qualification	*0.192
3	Study major	*0.189
4	Length of service in agricultural work	*0.191
5	Duration of service in extension work	*0.185
6	Foundation	0.106
7	Training experience	**0.246
8	Degree of job satisfaction	*0.184

**\*\* Significant at (0.01)**

**\* Significant at (0.05)**

#### **Fifth: Suggesting a training program for agricultural extension workers in the field of organic and biofertilizers:**

In the light of studying the existing situation, this program was proposed, based on the overall knowledge of the extension workers surveyed in the field of organic fertilizers and biofertilizers, identifying educational and technical problems, and determining the characteristics of the trained extension workers, The program included the following:

#### **First: Analysis of the current situation:**

The number of cadres working in agricultural extension work in the North Sinai Governorate is 120. The results showed that 76.8% of the surveyed extension workers did not receive a course on organic and biofertilizers, of which their benefit is low, and the quality of the training courses obtained by the extension workers are mostly not specialized in the field of organic fertilizers and biological fertilizers, most of them are not specialized in agricultural extension, and their service period in agricultural extension is small. Concerning organic fertilizers, it became clear that nearly three-quarters of the respondents (72.6%) fall

into the category of low level of knowledge. As for biological fertilizers, the results showed that more than three-quarters of the respondents (75.8%) of the extension workers fall into the category of low level of knowledge, and most of the training that the extension workers have received is not specialized in the field of organic fertilizers and biofertilizers, and the extension workers don't benefit much from training as the time period for the training courses is short and It is done in inappropriate ways, and there are administrative and functional problems facing the agricultural extension workers, which necessitate solving them to benefit from the training.

**Second:** Choosing the agricultural extension workers most in need of training:

The selection was made according to the following characteristics:

1. Young people: As the aging of the extension workers increases their degree of knowledge.
2. Less training experience: As the increase in the training experience of the counselors increases their degree of knowledge.
3. Low educational qualification: As the higher educational qualification for the extension agents increases their degree of knowledge.
4. Lack of specialization: the counseling specialist has a greater degree of knowledge than the non-specialist.
5. Short duration of service in agricultural work: As the increase in the period of service in agricultural work for extension workers increases their degree of knowledge.

6. Short duration of service in the extension work: As the increase in the length of service in the extension work of the counselors increases their degree of knowledge.

7. Low degree of job satisfaction: The increase in the degree of job satisfaction of the extension workers increases their degree of knowledge.

### Third: Objectives Report:

1. Developing the extension workers' knowledge in the methods of organic fertilizers and biofertilizers, which are (industrial organic fertilizers, aqadin, ceraline, saccharin, nitropine, phosphorine, bluegin, and Micropine).

2. Providing the extension workers with the necessary skills for each of them (industrial organic fertilizers, aqadin, cerialin, scurin, nitropine, phosphorine, bluegin, and Micropine).

### Fourth: Working Plan:

Since the working plan is a written document that includes all the procedures that will guide the trainee's actions in implementing the objectives of the training program, taking into account the availability of sufficient flexibility so that appropriate modifications can be made to meet the emergency conditions, and Table (7) shows a proposed scenario for a working plan (planning a training program) for development the knowledge of agricultural extension workers in the field of organic fertilizers and biofertilizers.

**Table (7): A proposed conception of an action plan (planning a training program) to develop the knowledge of agricultural extension workers in the field of biofertilizers**

<b>Knowledge Training goals</b>	<p>Knowing the importance and how to use organic fertilizers and biofertilizers and work on solving the problems facing agricultural extension workers, which are:</p> <p>Lack of incentives and financial rewards for agricultural extension workers, lack of extension aids, the short period of time for training courses for extension agents in the field of organic fertilizers and biofertilizers, lack of transportation means for extension workers, the delay in the arrival of agricultural technical publications, lack of training programs for extension agents in the field of agriculture.</p> <p>Organic fertilizers and biofertilizers</p>
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<b>Training messages</b>	The extension workers understanding the importance of using and how to use the organic fertilizers and the following bio-fertilizer methods according to the training need, which are in order:  Industrial Organic Fertilizers, Al-Aqdin, Cerealin, Scurin, Nitropin, Phosphorine, Bluegen, and Micropine
<b>Methods and training aids</b>	Field visits - Practical clarification - Guidance seminars – workshops - discussions for lectures - Video movie - Technical Bulletins
<b>Execution locations</b>	Agricultural Department of the Center - Research centers - Faculties of Agriculture
<b>Time frame</b>	Determining a period of 5-7 training days for each technical training level in each of the methods of vital establishment, and it can be increased as needed.
<b>Target audience</b>	Agricultural extension workers who are:  Young people - with least training experience - with the lowest academic qualification - nonspecialist - with the shortest duration of service in agricultural work - with the shortest duration of service in extension work - with the lowest degree of job satisfaction
<b>Activists</b>	- Researchers in research centers and the professors at the Faculty of Agriculture who specialize in this field.  - Researchers and specialists in bodies, organizations, and factories who are working in this field.
<b>Evidence of the happening progress</b>	- Extension workers' knowledge of the importance and how to use biological fertilizers in the following methods: Industrial Organic Fertilizers, Al-Aqdin, Cerealin, Scurin, Nitropin, Phosphorine, Bluegen, and Micropine.  - Agricultural extension workers making an extension program for farmers in organic fertilizers and biofertilizers.  - Increasing the use of organic fertilizers and biofertilizers by farmers.  - Questionnaires or case studies could be used to identify these cognitive changes.

## References:

- [1] Al-Abdullah, Gamal (prof.), A study of the effectiveness of biofertilizers on the productivity of wheat and barley, Al-Furat University, College of Agricultural Engineering, 2002.
- [2] Bahloul, Ahmed Kadri, The Impact of Chemical Technology on Continuous Agricultural Development in Egypt, Seventh Conference of Agricultural Economists, Egyptian Technology and Agriculture in the Twenty-first Century, Egyptian Association of Agricultural Economics, July 28-29, 1999.
- [3] Hasb Al-Nabi, Imam (prof.), Biological Diversity and Food Security, College of Food Systems and Agriculture, United Arab Emirates, 2004.
- [4] Hassanein, Somaya Ahmed, Nabil Fathi Al-Sayed Qandil (PhD), Clean Agriculture, Land, Water and Environment Research Institute, Research Bulletin No. 927, 2004.
- [5] Tolba, Abdel Rahman Farhat, Introducing Organic Agriculture and the Laws Governing It, Specialized Training Course in Organic Agriculture, Central Laboratory of Organic Agriculture in partnership with CARE - Egypt, 2008.
- [6] Ali, Heba Essam El-Din, Extension Needs of Farmers in the Field of Organic Agriculture in Fayoum Governorate, Master Thesis, Faculty of Agriculture in Fayoum, Cairo University, 2002.
- [7] Qasim, Hazem, a safe agricultural ecological system to increase exports of horticultural crops, Agricultural Journal,

- No. 535, June. Egyptian Ministry of Agriculture and Land Reclamation, 2003.
- [8] Qotb, Elham Ahmed, the awareness of workers in the extension system for the indicators of expansion in organic agriculture in Fayoum Governorate, Scientific Association for Agricultural Extension, Volume VIII, Faculty of Agriculture, Cairo University, 2004.
- [9] Al Borsa Newspaper, 2015
- [10] <http://www.alborsanews.com/2013>