



The new lands farmers' adoption for bio fertilizer on sugar beet area

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Abstract: The Research aimed to determine the level of adoption of bio fertilizers, identify the sources of information about bio fertilizer reliable growers, Identify adoption barriers from the standpoint of the growers, the relationship between adoption of bio fertilizers as a dependent variable and the studied independent variables, this research was conducted in the area of sugar beet , this region is considered as a biggest reclamation area, a random regular sample was selected using records of land tenure, it reached 309 growers, to achieve the research objectives a questionnaire was prepared, data were collected during May 2015 by personal interview. Data has been analyzed by using SPSS program, arithmetic mean, standard deviation, simple correlation coefficient, and K^2 . The most important results clarified that; low credibility of growers' sources of agricultural information, most of growers refused adopting bio fertilizer in sugar beet, they represent about 85.8%, also 54.4% from the adopters belong to the low adoption category, 25% from adopters belong to the medium adoption category, and about 20.5% from adopters belong to high adoption category. This may be attributed to bio fertilizers adoption barriers which identified in lack of information available to growers, the problem represents about 96% of respondents, absence of change agents 'role in farmers' awareness of the importance of the bio fertilizers, it represents about 95% of respondents, the problem of missing field demonstration represents 90%. Data clarified significant negative relationships between degree of farmers' adoption of bio fertilizers and each of farmers' ages, and years of farm work, and positive significant relationships with degree of farmers' education , specialty education, the degree of modernization, degree of cosmopolitan, the degree of the attitudes toward technology, degree of social participation, and degree of opinion Leadership, also there is a significant negative relationship between the bio-fertilizers adoption level and degree of complexity of the innovation, and positive significant relations with relative advantage in saving cost , time, effort ,and compatibility with previously introduced ideas, trial ability, and portability degree to transfer from person to another, it can be communicated to others .

Keywords: Farmer's adoption- Bio fertilizer- New land- Sugar beet.

Introduction and the research problem:

Increased agricultural productivity is a horizontally and vertically is the cornerstone to achieving food security for developing countries in general and Egypt specially, Egypt is one of the largest density on the

Medium East region, and then they face serious challenges in two fields of human and economic development, its population enumeration has doubled over the past 30 years, in face of the steady population enumeration and limited resources we Had to consider how to achieve the goals of the extension in a relatively short time, and that through vertical expansion, by increasing productivity through the dissemination of ideas and innovation farming methods and horizontally by claiming more land and increase production depends on expanding the acreage with the use of chemical pesticides for crop protection ¹.

Chemical fertilizers have been used extensively in plant nutrition instead of bio fertilizers, this means that agricultural development relieved largely on using a lot of productive elements from outside the farm, and became called the chemical farming or manufactured ², this resulted in excessive use of chemicals, whether chemical fertilizer or pesticides appear negative effects on the environment which poses a serious threat to human health, direct impact on soil microbiology, addition to nitrate contamination of food products as well as surface water and ground water, rural environmental contamination and high humidity in the fruit and vegetables, which lead to Weakened it's storage capacity , so turn thought the agricultural chemical alternatives being overcome these problems and improve the quality of agricultural products and reduce the adverse environmental impacts, that has been achieved by a system of organic agriculture³.

The bio fertilizer or Microbial Inoculants is known as plugins are dynamic asset pollinate land or plants seeds with them for the purpose of improving the dynamic characteristics of the soil and encourage the growth and the fruits of the plants where the developing leaf food requirements and impedance of certain environmental conditions ⁴.

Bio fertilizer products are composed of microorganisms processed from nutrients for plants and these substances present in the soil, but with a few percentages, And scientific research had a role in the re-use of these products in the laboratory to pollinate various crops, which leads to improved productivity and increased soil fertility and reduce the salinity of the soil, as given to the acre additional revenue of between 500 to 1000 EGP output of chemical fertilizer availability, giving them competition effective for chemical fertilizers ⁵.

Bio fertilizers have played an important role in many useful vital processes, including analysis of organic, residues of the previous crop, to facilitate certain elements (such as phosphorus is installed in the soil) to become fit for plant absorption, and contribute to the improvement of natural and chemical soil properties, and confirmation air nitrogen in or around plant roots ⁶. It also improved crop characteristics and raise its quality level, In addition to providing the use of chemical fertilizers by more than a third of fertilizer Courses which helps to reduce the costs of production inputs ⁷. Hence unclear the importance of Spreading bio fertilizer between different crops farmers and the importance of doing the agricultural extension for this role as he cares about improving the methods of agricultural production and promote it as one of the main areas of work as it seeks to develop the knowledge and skills of farmers and modifying attitudes to be more responsive to effective participation in the development of agricultural incomes and become more receptive to change their behavior towards desired better relying on to simplify the particular application of innovation ideas and our education and persuasion leads to the Spreading and adoption of these ideas ⁸.

Bio fertilization would like in spread any novelty farmer in agricultural knowledge and adoption process go through the classic form with five stages are: feeling the new idea stage and hear about them for the first time, interested stage and desire for more information on the new idea, and evaluation stage, which happens on it a type of experimentation or mental application on the current position and What is expected in the future and then decide the experiment newly or not experiment, and experimentation where innovation is used on a small space to determine interest in the particular circumstances of the individual, and finally adoption stage and usually determines the individual to continue to make full use of the idea ⁹.

Rogers ¹⁰, developed a more accurate and comprehensive term to describe the adoption of innovations, which called the Innovation-decision process, and it is the process which individual or adoption unit passes throw to gain knowledge about innovation, to configure a trend to innovation, to make a decision to accept or reject it to application the new idea, to confirm this decision. He explains that this process it consists of a set of choices and actions taken by individual or system to evaluate new or innovative idea, and then decide whether to accept it as a part of his behavior or not.

Decision process passes through a series of the following stages:

- **Knowledge Stage:** It is the stage which individual recognizes the newly created, acquire some information about this newly created and nature, practical knowledge is linked to the need for newly created, it's mean the need is the result of knowledge.
- **Persuasion Stage:** On this stage the individual Direction is pro or non-pro of the novelty, however may not make a decision yet, because the adoption decision or rejection depends on other factors, and are fixing it in the next stage, and it called the decision stage.
- **Decision Stage:** Occurs when the individual Choose the decision by adopter reject the newly created, the decision it may be accepted or rejected with that the individual continues in accepted the idea and may not continue, he may switch his rejection and decides it to accept and Implement it recently, so it was natural to enters a new stage and it called implementation stage.
- **Implementation Stage:** They occur when the individual is ready or willing to use and implement of the newly.
- **Confirmation Stage:** They occur when an individual is research for strengthening of the decision stage during implementation, and may the individual amend his previous decision if he exposed to conflicting and conflicting messages about the newly created.

Rogers ¹⁰ Clarify that there are many factors that effect on adoption process or of innovation: (A) A set of circumstances or situations that precede the individual Implementation or adoption for newly created, the most important of these conditions or situations: pervious practices or techniques , and needs or perceived problems, and the degree of Innovative or innovation at individual who shall adopt the new technique, which simply means its velocity (relative precession)in the Implementation and use of new technologies, standards of social systems which individual belong to, and promote standards for the change process. (B) Properties which Distinction the individual as a decision unit, it including: social and economic properties, variables and the pattern of personality, and behavior communication of individuals. (C) The characteristics or properties which Distinction the newly created, there are: The relative advantage of the newly created which introduced the degree of preference or new technical Distinction what proceeded by techniques Perform the same purpose may be less expensive or saving time or effort...etc.

The compatibility or consistency the new technical with local cultural and norms of social systems which individual belong to, complexity or difficulty using the new technology, new technology ability to experiment as the ability to implement this technology on a small space to make sure To make sure your suitability for the position of the individual, The ability of new technology to Note, meaning ability to observe or see the results or effects of using this technique. As shown in shape no. 1 ¹¹.

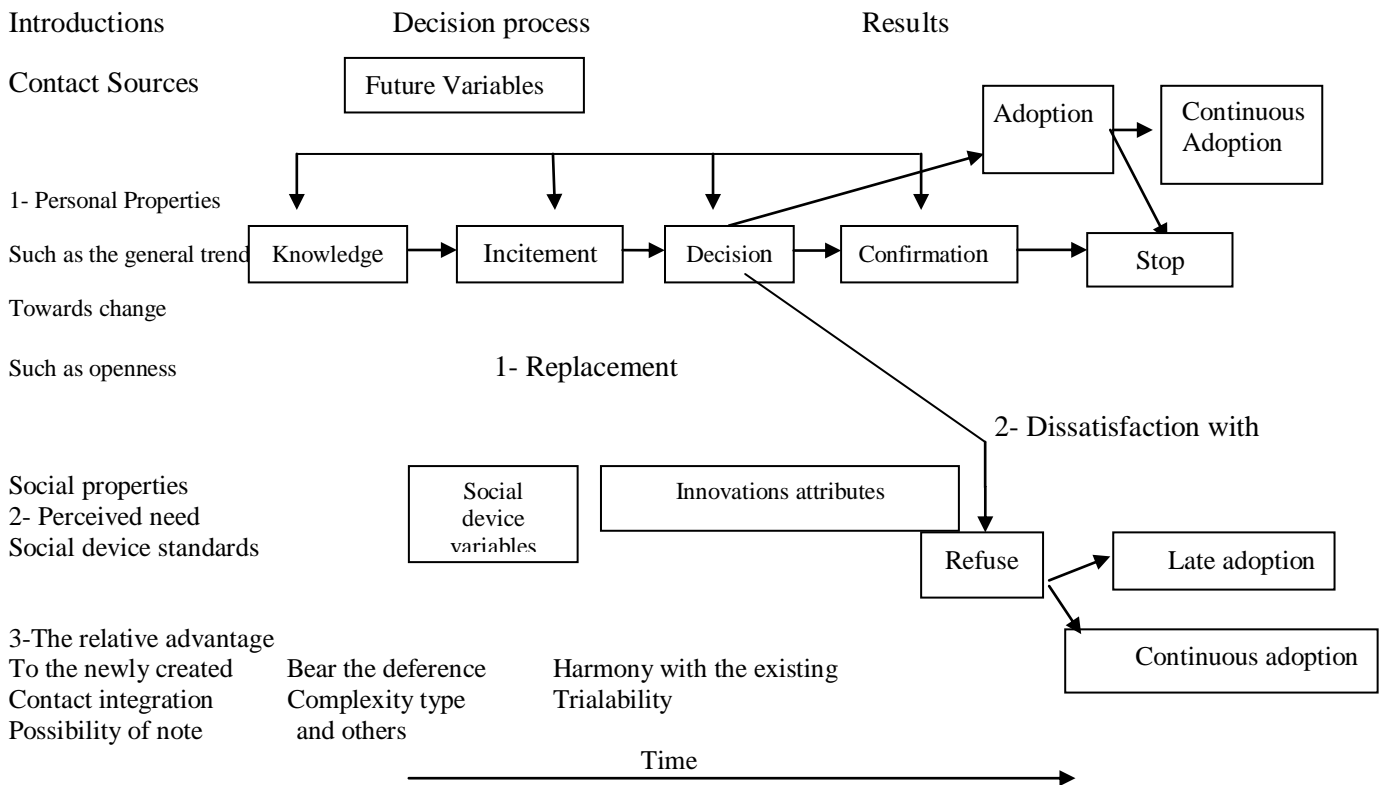
Rogers ¹⁰, clarify that there are many factors affecting on adoption process or Implementation of innovations: (A) a set of circumstances or situations that precede its accepted and its used depends on the contribution of guidance devices awareness of the importance of bio fertilizers use of and training on how to use it.

The study of Chalabi and others ¹², sign to the most important barriers to spread bio fertilizer Represented in: Farmers unknown about its price. And destitution for make guidance Seminars and meetings, absence of guidance messages and scarcity of specialty publication, then the non-clarity of the Results aware for bio fertilize using.

Considering the study of adoption presses for agricultural Ideas and practices more modern between farmers of great importance in our current on due to the above highlights **the study problem in a set of questions as follow:**

- What is the level of farmer's samples adoption for bio fertilizers?
- What is the sources which farmers samples take information about bio fertilizers in study villages?
- What are the Bio fertilizers Adoption Barriers from the standpoint of farmer's samples?

Resolution introduced ¹¹



The research aimed to:

Determine the farmer's samples adoption level for bio fertilizers, identify the sources from which Farmers samples take their information about bio fertilizer in study villages, identify bio fertilizers Adoption Barriers from the standpoint of farmer's samples, and to define the relationship between farmers samples adoption level for bio fertilizers and some of independent variables.

Research hypotheses:

- There is a relationship between farmer’s samples adoption level for bio fertilizers and each of the independent variables studied.
- There is a relationship between farmer’s samples adoption level for bio fertilizers and some of Innovations attributes (bio fertilizers).

Materials and Methods:

Research method:

The search area:

The research was conducted in the area of sugar beet as the area which Considered as a greatest reclamation areas In terms of area, which Reaching reclaimed lands on it approximately 40.62 thousand acres, about 9.1 acre from it is field crops and about 20,71 thousand acres is vegetables crops, and 808 acres is fruits, spreading on it investment farms and territory's alumni and many studies indicate a high proportion of their adoption of modern agricultural innovations, as there are many companies and distribution for bio fertilizer. was selected the largest three villages in terms of size and number of farmers, they are the El-Ulla villages, the flowers village , development village with total area 9.2 thousand acres of the total or planted area in sugar beet area as shown in table (1) ¹³.

Table 1: Area and percentage and number of farmers on study villages

Serial	Village Name	Planted area by Acre	Percentage of the village to the sugar beet area	The number of farmers
1	El-Ulla	2275	8 %	560
2	Flowers	3031	7.5%	530
3	Development	2863	7 %	507
Total		9169	22.5%	1597

Source: Collected and calculate from Control of sugar beet records, 2015.

Comprehensive research and appointed:

Comprehensive volume (1597) farmers, to determine the size of the sample was using the equation

Krejcie & Morgan ⁽¹⁴⁾:

$$S = \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P (1-P)}$$

Where:

S = the sample size needed

X² = Value of K² on degrees of freedom 1, and Significant at (0.05) and it is a constant amount = 3.841.

N = overall size required sampled.

D = the degree of precision and it is a constant amount 0.05.

P = fit the sample and it is a constant amount 0.05.

The random regular sample was selected using records of land tenure, it reached 309 growers.

The data collection method:

To achieve the research objectives was the design of a questionnaire consists of several of questions related to the adoption of agricultural bio fertilizer and variables of the study, and has been considered that they relate to the general framework of the problem of the study and its objectives, the simplicity of her style. In accordance with the conditions and the respondents' situations and do a pre-test for questionnaire on a sample of 16 farmers from Khalid Bin El Waleed village, to checking for clarity and easy of understanding phrase to study samples and data were collected during May 2015 with personal by interview.

The processing quantity of the data:

1-Induced characteristics:

These variables were measured by asking the study samples about the degree of availability of induced properties in seven bio fertilizers which are: Blogin (6 Items), Microbein (6 Items), Vosforan (7 Items), Cyrialin (4 Items), Ntorpan (2 Items) decades (3 Items), Aschorin (3 Items) and that through measurement of five major components for this variable which are: Induced complexity, compatibility with previously introduced ideas, the relative advantage of bio fertilizer developed, the trialability, finally the ability to move from person to another, to measurement the we have been given the following grades of the responses to the study samples for each component as follows:

1. The degree of Induced complexity for use:

BY asking the study samples about the possible application of practices for each exercise in seven bio fertilizers, He has given three degrees in the case of his response function on its ability to easily use, two degrees in the case of his response function to be used some extent, one degree in the case of his response function to be used difficulty.

2. The compatibility with previously introduced ideas:

The study sample was asked about the compatibility of these fertilizers and its practices content with his experiences and his Values and his previous familiarity in this field, the study sample was requested to express his opinion on if the used of the studied bio fertilizers need to familiarity and new experiences differs from the previously existing, he has given three degrees in the case his answer is the bio fertilizers do not need to experience, and two degrees in case his answer function that they need different experience to some extent , one degree in case his answer function that they need a completely different experience.

3. Trial ability:

The study sample was asked about his experience possibility for each skill of skills in seven bio fertilizers (studied), he has given three degrees in the case of his ability response to experiment it in any space, two degrees in the case of his function response to experiment it in the medium space, one degree in the case of his ability response to experiment it in large space.

4. Portability degree to transfer from person to another:

The study sample was asked about ability transfer for studied bio fertilizers and its content of practices from person to another, he has given three degrees in case his answer is studied bio fertilizers is easily transferred to others, two degrees in case his answer is that transfer in slow motion, one degree in case his answer is difficult transfer to others.

5. The relative advantage for vital-fertilizer:

It's measured by asking the study samples about the following indications function on the relative advantage to contain bio fertilizers through three sub-features are: Saving time, saving effort, and cost-saving, it has been given the following degrees for the components of this measure as follow: For saving time it was given to the study samples, three degrees in the case of his answer function that the studied bio fertilizers is saving time, and two degrees in the case of his answer function that there is no difference, one degree in the case of his answer function that the studied bio fertilizers not saving time.

For saving effort it was given to the study samples, three degrees in the case of his answer function that the studied bio fertilizers is saving effort, two degrees in the case of his answer function that there is no difference, one degree in the case of his answer function that the studied bio fertilizers not saving effort. For cost-saving it was given to the study samples, three degrees in the case of his answer function that the studied bio fertilizers is cost-saving, two degrees in the case of his answer function that there is no difference, one degree in the case of his answer function that the studied bio fertilizers not cost-saving.

2- Identify the sources of farmer's samples information:

That by asking farmers samples about their sources which complete from it their information's, and that through using Scale consists of yes (2) and NO (1) reflects the extent of their exposure to the following sources: Agricultural extension workers, agricultural programs on TV, agricultural programs on radio, agricultural newspapers articles, agricultural magazines, neighbors and parents experienced, fertilizers and pesticides traders, and manual guidelines. To find the average for each source we multiplying the number of the study samples in each category in the degree given to them and collected and dividing the collected total by the total of study samples. It is arranged according to the percentage of the average, and to get a percentage of each source has been Multiplied the average in (100) and dividing by the maximum score.

3 - Bio fertilizers Adoption Barriers from the standpoint of farmer's samples:

The bio fertilizers adoption barriers from the standpoint of farmer's samples limited in nine different barriers, the study simple given two degrees in existence of the barrier, and one degree in absence of the barrier. To find the average of each barrier it has been multiplying the number of study simples in each category in the degree given to them and collected and dividing by the total of study simples. It is arranged according to the

percentage of the average, and to get a percentage of each barrier has been Multiplied the average in (100) and dividing by the maximum score.

Second - The dependent variable:

And this research relied on measuring the adoption process to comprehensive Imagine for adoption process and seen as Decision Process which was presented by Rogers (1995, PP:181-160) in study seen that make decision which related to novelty is a process passed through it the Pearson starting from first novelty knowledge, passing through his deepens and discussed according to his conditions, this phase called Lobbying or novelty induction, then make decision by adoption or rejection, then new idea implementation or implementation, and installation of this decision.

From the above we can measure the farmer's adoption for bio fertilizers through five stages as follows: Knowledge, Lobbying, Make decision, Implementation (implementation), installation (confirmation) in seven bio fertilizers: Blogin (6 Items), Microbein (6 Items), Vosforan (7 Items), Cyrialin (4 Items), Ntorpan (2 Items) decades (3 Items), Aschorin (3 Items), the study samples were asked for each of the previous items:

- **Novelty first knowledge stage:** It measuring by asking the study samples about bio fertilizers knowing through scale created from who know (2), unknown (1).
- **Persuasion stage:** It measuring by asking the study samples about bio fertilizers full concern through scale created from who concern (2), non-concern (1).
- **Decision stage:** It measuring by asking the study samples about makes decision by Implementation bio fertilizers, or don't make a decision by implementation bio fertilizers through scale created from make a decision (2), don't make a decision (1).
- **Implementation stage:** It measuring by asking the study samples about bio fertilizers Implementation through scale created from implementation (2), not implementation (1).
- **Confirmation stage:** It measuring by asking the study samples about Continuation Implementation bio fertilizers for 3 years and more non-stopped through scale created from continue (2), don't continue (1).

Adoption:

The mental reaction Person path throws it since he heard about the new experience until it become apart from his mental, emotional, and executive behavior. (Omar, 1992, P: 405).

Bio fertilizers adoption by Farmer's:

It is a process which study samples through since he heard (knowledge) for bio fertilizers until make a decision by implementation bio fertilizers, implementation, and to continue with the implementation.

Statistical hypotheses:

- There is no relationship between the adoption of bio fertilizers and each of the following independent variables: Age, the degree of study samples education, Specialty Education, number of family members, the number of family members work in farming, agricultural holding space, number of experienced years in farm work, degree of social participation, the degree of opinion leadership, innovative degree, degree of life satisfaction in the region, degree of Cosmopolitan, and the degree of the trend to use novel technology.
- There is no relationship between the level of adoption of bio fertilizers and some Innovations attributes (bio fertilizer) the following: The complexity induced to use, the degree of harmony with past practice, the relative advantage of bio fertilizers (save time, and save effort, and save costs, the trialability, the ability to move from person to another).

Statistical analysis:

Data has been analysis by using SPSS program, arithmetic mean, standard deviation, simple correlation coefficient, and K^2 .

Results and Discussion:

First- Description of the study sample:

It became clear from the data presented in Table (2) that more than half of the respondents (53.9%) fall in the middle-age group which is between (40-55 years) and (50.81%) of them have a qualification average and 65.7% specialization in non-agricultural education and that about two-thirds of study samples, 63.8% have less than six members, and has been the number of growers who have the space (5 acres) 288 study samples by 93.3%, the majority of farmers samples (87.8%) had experienced high in agricultural work and rate of 52.8% fall in the medium participation category and 50% fall in the medium leadership category, it was 62.8% of those with medium innovative, more than three-quarters of study samples, 76.1% have a medium degree of satisfaction and the high life in the region, and 62.8% of farmers samples with low openness, 78% fall in the category of the neutral trend towards the use of novel technology.

Table 2: The distribution farmer's samples according to their characteristics

Characteristics	Quantity	%	Characteristics	Quantity	%
1- Age			8- degree of social participation		
Young people less than 40 years-	72	32.2	- low sharing from (10-13) degree	39	12.2
Medium age from 40-55 years -	168	53.9	- medium sharing from (14-17) degree	163	52.8
- Elderly more than 55 years	68	13.9	- high sharing from (18-20) degree	108	35
2- Degree of Education			9-Degree of opinion Leadership		
- illiterate	88	28.48	- low Leadership (less than 11 degree)	151	48.8
Reads and writes -	21	6.8	- medium Leadership (11-15 degree)	154	50
- Qualified average	157	50.81	- high Leadership (more than 15 degree)	4	1.2
- bachelor's degree	43	13.91			
3- Specialty Education			10-degree of regenerative		
Non- Agricultural -	203	65.7	- low (less than 10 degree)	67	21.7
Agricultural-	106	34.3	- medium (from 10 to less than 13 degree)	194	62.8
			- high (from 13 degree and more)	48	15.5
4 - Family size			11-degree of satisfaction with life in the region		
- less than 3 members	18	5.8	- low (less than 15 degree)	74	23.9
- from 3 to less than 6 members	197	63.8	- medium (15-19 degree)	148	47.8
- from 6 members and more	94	30.4	- high (more than 19 degree)	87	28.3
5- family size work in agricultural			12-Degree of Cosmopolitan		
Only one -	7	2.3	- low (less than 11 degree)	194	62.8
- tow	162	52.4	- medium (from 11 to less than 16 degree)	86	27.7
- three	125	40.5	- high (from 16 degree and more)	29	9.5
- four	15	4.8			
6- Agricultural holding			13-Degree of attitudes towards technology		
- 5 feedan	288	93.3	-Negative trend (Less than 15 degree)	55	17.8
- 2.5 feedan	21	6.7	-neutral trend (15 to less than 21 degree)	241	78
			-Positive trend (more than 21 degree)	13	4.2
7-Years of farm work					
- low experience (less than 18 years)	7	2.2			
- medium experience (18-24 years)	31	10			
- high experience (more than 24 years)	271	87.8			

Source: Collected and calculate from questionnaire forms.

2- Induced characteristics: The results in Table (3) show the following:

- 1- **Complexity degree induced to use:** The Complexity degree induced to use Confined between 31 degrees minimum and 93 degrees maximum, by extent of 62 degrees, the study samples were divided according to Complexity degree induced to use to three categories are: Hard use (less than 51 degree), medium use (from 51 to less than 71 degree), easy use (from 71 degree and more), 10% from farmers samples said that bio fertilizers is difficult use, while 22.7% from them said that bio fertilizers is medium use, while 67.3% said that bio fertilizers is easy use.
- 2- **Compatibility with previously introduced ideas:** compatibility with previously introduced ideas Confined between 31 degrees minimum and 93 degrees maximum, by extent of 62 degrees, the study samples were divided according to The Degree of harmony with practices to three categories are: need completely different experience (less than 51 degree), need different experience to some extent (from 51 to less than 71 degree), don't need any experience (from 71 degree and more), 12.3% from farmers samples said that bio fertilizers need completely different experience, while 50.7% from them said that bio fertilizers need different experience to some extent, while 37% said that bio fertilizers don't need any experience.
- 3- **The trial ability:** it's Confined between 31 degrees minimum and 93 degrees maximum, by extent of 62 degrees, the study samples were divided according to trial ability to three categories are: Need large space to experimentation (less than 51 degree), experimentation in medium space (from 51 to less than 71 degree), experimentation in any space (from 71 degree and more), 7.2% from farmers samples said that bio fertilizers need large space to experimentation, while 14.8% from them said that bio fertilizers need medium space to experimentation, while 78% said that bio fertilizers can experimentation in any space.
- 4- **Portability degree to transfer from person to another:** it's Confined between 31 degrees minimum and 93 degrees maximum, by extent of 62 degrees, the study samples were divided according to portability degree to transfer from person to another to three categories are: difficult transfer to others (less than 51 degree), transfer Easy medium (from 51 degree to less than 71 degree), easy transfer to others (from 71 degree and more), 2.9% from farmers samples said that bio fertilizers is difficult transfer to others, while 13.7% from them said that bio fertilizers is transfer Easy medium, while 83.4% said that bio fertilizers is easy transfer to others.
- 5- **The relative advantage for bio fertilizers:** It was measured by three sub-features are: Save time, save effort and cost-saving the degree for each Confined between 31 degrees minimum and 93 degrees maximum, by extent of 62 degrees, the study samples were divided to three categories are: Don't saving (less than 51 degree), There is no difference (from 51 to less than 71 degree), saving (from 71 degree and more), by using average It was obtained the relative advantage for bio fertilizers and they were collect all of saving time, saving effort, cost-saving and divided by 3, the result in table (4) shows the following:
 - **The relative advantage:** 10% from farmer's samples said that the relative advantage isn't available in bio fertilizers, while 48.9% from them said that there is no deferent in the relative advantage for bio fertilizers, while 41.18% said that the relative advantage is available in bio fertilizers.
 - **Saving time:** 5.7% from farmers samples said that bio fertilizers don't save time, while 49.3% from them said that is no different in time for bio fertilizers, while 45% said that bio fertilizers is saving time.
 - **Saving effort:** 11.6% from farmers samples said that bio fertilizers don't save effort, while 48.9% from them said that is no different in effort for bio fertilizers, while 39.5% said that bio fertilizers is saving effort
 - **.Cost-saving:** 13% from farmers samples said that bio fertilizer snot cost – saving , while 48.2% from them said that is no different in casting for bio fertilizers, while 38.8% said that bio fertilizers is cost – saving.

3- Sources of agricultural information, which farmers derived their information's about the technical recommendations concerning bio fertilizers:

The results showed a significant decrease in the degree average of government information sources (indicative), while we observed that average degree of secular and private information's sources is increasing as explain in table (5). The neighbors and parents experienced occupied the first place as a source of information for farmers by 90%, the fertilizer and pesticide traders occupied second place by 80%,the Published guidance came in third place by 49%, while agricultural articles newspapers occupied fourth place by 45%, and agricultural magazines occupied fifth place by 44%, While agricultural programs on TV occupied sixth place by 35%,while agricultural programs on radio occupied seventh place by 25%, while agricultural Extension Agents occupies last place as a source of farmers information about bio fertilizers by 25%.

Table 3: Distribution of farmers samples according to categories degree of newly created properties (Bio fertilizer)

-1	Complexity degree induced to use Categories	Quantity	%	2-	Compatibility with previously introduced ideas categories	Quantity	%
	- (less than 51 degree) Difficult use	31	10		- Need completely different experience (less than 51 degree)	31	10
-Medium use (from 51 to less than 71 degree)	70	22.7	-Need different experience To some extent (from 51 to less than 71 degree)	70	22.7		
-Easy use (from 71 degree and more)	208	67.3	-Don't need any experience (from 71 degree and more)	208	67.3		
Total		309	100	Total		309	100
3-	The trial ability Categories	Quantity	%	4-	The categories of portability degree to transfer from person to another	Quantity	%
	- Need large space to experimentation (less than 51 degree)	22	7.2		- Difficult transfer to others (less than 51 degree)	9	2.9
- Experimentation in medium space (from 51 to less than 71 degree)	46	14.8	- Transfer Easy medium (from 51 degree to less than 71 degree)	42	13.7		
- Experimentation in any space (from 71 degree and more)	241	78	-Easy transfer to others (from 71 degree and more)	258	83.4		
Total		309	100	Total		309	100

Source: collected and calculate from questionnaire forms.

Table 4: Distribution of farmer's samples according to the categories of the degree of the relative advantage of bio fertilizers

The relative advantage for bio fertilizers Categories	Saving time		Saving effort		Cost-saving		The relative advantage	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Don't save (less than 51 degree)	18	5.7	36	11.6	40	13	31	10
There is no different (from 51 to less than 71 degree)	152	49.3	151	48.9	149	48.2	151	48.9
Saving (from 71 degree and more)	139	45	122	39.5	120	38.8	127	41.1
Total	309	100	309	100	309	100	309	100

Source: Collected and calculate from questionnaire forms.

Table 5: Distribution of farmers samples according to exposure of agricultural information sources softly

Arrangement	%	Average	Source	Sequence
8	25	0.5	Agricultural Extension Agents	1
6	35	0.7	Agricultural programs on TV	2
7	25	0.5	Agricultural programs on radio	3
4	45	0.9	Agricultural articles newspapers	4
5	44	0.88	Agricultural magazines	5
1	90	1.8	Neighbors and parents experienced	6
2	80	1.6	Fertilizer and pesticide traders	7
3	49	0.98	Published guidance	8

Source: Collected and calculate from questionnaire forms.

4-Bio fertilizers Adoption Barriers from the standpoint of farmer's samples:

Data in Table (6) indicate that: The main obstacles of bio fertilizers adoption is non-available of information about the bio fertilizers types and that occupies first place with 96%, and absence of guidance part in spreading and awareness farmers by importance of the bio fertilizers use occupies second place by 95%, non-exposure to scientific explanations about using bio fertilizers occupied in third place by 90%, while belief in the feasibility of using chemical fertilizers instead of bio fertilizers occupied in fourth place by 80%, farmers non knowledge about sell places occupied in fifth place by 70%, non-availability of bio fertilizers especially in agricultural time occupied the sixth place by 55%, while farmers belief that their lands doesn't need bio fertilizer occupied the seventh place by 49%, and increase in production cost due to rising in bio fertilizers price used occupied the eighth place by 45%, while farmers belief that the bio fertilizers benefits limited on bean crop only occupied on last place by 44%.

Table 6: Distribution of study samples according to bio fertilizers adoption barriers

Sequence	Barriers	Average	%	Arrangement
1	non-available of information about the bio fertilizers types and their way of use	1.92	96	1
2	non-availability of bio fertilizers especially in agriculture time	1.1	55	6
3	increase in production cost due to rising in bio fertilizers price used	0.9	45	8
4	belief in the feasibility of using chemical fertilizers instead of bio fertilizers	1.6	80	4
5	absence of guidance part in spreading and awareness farmers by importance of the bio fertilizers use	1.9	95	2
6	non-exposure to scientific explanations about using bio fertilizers	1.8	90	3
7	farmers non knowledge about sell places	1.4	70	5
8	farmers belief that their lands doesn't need bio fertilizers	0.98	49	7
9	farmers belief that the bio fertilizers benefits limited on bean crop only	0.88	44	9

Source: Collected and calculate from questionnaire forms.

Second- The dependent variable: The level of farmer's adoption for bio fertilizer:

The farmer's adoption for bio fertilizer was Measured throw five stages as follows: Knowledge stage, Persuasion stage, decision stage, Implementation stage, the confirmation stage In seven bio fertilizer, The maximum reached (62 degrees), the minimum (31 degrees), extent (31 degrees), farmers has been divided into three categories: Low (less than 42 degrees) - Medium (from 42 to less than 52 degrees) - High (from 52 degrees and more) in all of them , in addition to no category (31 degrees). The results in table (7) show that:

1-The first stage of bio fertilizers knowledge: 58.25% from study samples didn't know the bio fertilizers, while 58.9% from study samples know the bio fertilizers, and 25.24% from them are low knowing, while 24.92% from them are medium knowing, while 8.09% from farmer's samples are high knowing.

2- Persuasion stage: 67.3% from study samples not interested in bio fertilizers, while 32.7% from farmer's samples are interested in bio fertilizers, and 16.2% from them are low interested, while 11% from them was medium interested, while 5.5% from study samples are high interested.

3-DecisionStage: 74.4% from study samples didn't make a decision with implementation bio fertilizers (implementation), while 25.6% from farmer's samples was make a decision with implementation bio fertilizers (implementation), and 13.6% from them are low, while 6.8% from them was middle, while 5.2% from farmer's samples are high.

4-Implementation stage: 77.7% from study samples didn't implementation bio fertilizers, while 22.3% from farmer's samples implementation bio fertilizers and 12.6% from them are low implementation, while 5.2% from them are medium implementation, while 4.5% from farmer's samples are high Implementation.

5-Confirmation stage: 85.8% from study samples didn't continue in implementation of bio fertilizers, while 14.2% from farmer's samples continue in implementation of bio fertilizers, 7.8% from them are low continuing, while 3.5% from them was medium continuing, while 2.9% from farmer's samples are high continuing.

Farmer's adoption for bio fertilizers:

The results on table (8) show that 44 study sample adopt bio fertilizers representing only 14.2% of the total samples, on another side we find 265 study samples with 85.8% Refused adoption which indicates a decrease in the rate of adopters, also show that 54.4% from adopters belong to the low adoption categories, and 25% from adopters belong to the medium adoption categories, and about only 20.5% from adopters belong to the high adoption categories. This command would decrease farmers adapted for bio fertilizers in the new lands on sugar beet area.

Table 7: Distribution of study samples according to the stages of the farmer's adoption process of bio fertilizers

Adoption Stages Categories	Knowledge stage			Lobbying stage			Stage of Make a decision by adoption			Implementation stage (implementation)			continue in implementation installation stage (confirmation)		
	Quantity	Total %	%	Quantity	Total %	%	Quantity	Total %	%	Quantity	Total %	%	Quantity	Total %	%
Low (less than 42 degree)	78	25.24	43.3	50	16.2	49.5	42	13.6	53.2	39	12.6	56.5	24	7.8	54.5
Middle (42 to less than 52 degree)	77	24.92	42.7	34	11	33.7	21	6.8	26.6	16	5.2	23.2	11	3.5	25
High (from 52 degree and more)	25	8.09	14	17	5.5	16.8	16	5.2	20.2	14	4.5	20.3	9	2.9	20.5
Total	180	58.25	100	101	32.7	100	79	25.6	100	69	22.3	100	4.4	14.2	100
NO	129	41.75		208	67.3		230	74.4		240	77.7		265	85.8	
Total summation	309	100		309	100		309	100		309	100		309	100	

Source: Collected and calculate from questionnaire forms.

Table 8: Distribution of study samples according to adoptions categories

Adoptions Categories	Repetition	Percentage	
		From Total	From adopters Total
Low (less than 42 degree)	24	7.8	54.5
Middle(from 42 to less than 52 degree)	11	3.5	25
High (52 degree and more)	9	2.9	20.5
Total	44	14.2	100
Refuse adoption	265	85.8	
Total summation	309	100	

Source: Collected and calculate from questionnaire forms.

Third: The relationship between the independent variable and dependent variables:

1-The relationship between the bio fertilizers adoption and all of the farmer's independent variables: Results in table (9) show that:

1-1- There were significant negative relationships between the ages, years of farm work, and between farmers adoption for bio fertilizers, and it is bigger than its values, which reach the simple correlation coefficient values between them (-0.159*), (-0.129*) on respectively spread sheet at Significant at 0.05.

1-2- There were significant positive relationships between unofficial society sharing degree, Opinion Leadership, and between farmers adoption for bio fertilizers, which reach the simple correlation coefficient values between them (0.141*), (0.154*) on respectively, and it is bigger than its spreadsheet values at Significant at 0.05.

1-3- and there were significant positive relationships between the degree of study samples education, Specialty Education, the degree of innovative, degree of Cosmopolitan, the degree of the trend to use novel technology, and between farmers adoption for bio fertilizers, which reach the simple correlation coefficient values between them (0.332**), (0.308**), (0.313**), (0.264**), (0.439**) on respectively, and it is bigger than its spreadsheet values at Significant at 0.01.

1-4-While statistical incorporeal not proven between family size, family size work in agricultural, and the degree of satisfaction with life in the region, and between farmers adoption for bio fertilizers.

According to this results we can rejected the first statistical hypothesis which states that " there is no relationship between Specialty Education, degree of innovative, degree of Cosmopolitan, degree of the trend to use novel technology, an between degree of social sharing, Degree of opinion Leadership, ages, years of farm work, and between farmers adoption for bio fertilizers, while we can't refuse it according to the number of family size, family size worked in agricultural, and the degree of satisfaction with life in the region.

Table 9: Values of simple correlation coefficient between some of the variables studied and between bio fertilizers adoption

Sequence	Independent variable	Correlation	Sequence	Independent variable	Correlation
1	Age	-0.159*	8	Unofficial society sharing degree	0.141*
2	Degree of study samples education	0.332**	9	Opinion Leadership degree	0.154*
3	Specialty Education	0.308**	10	Degree of innovative	0.313**
4	Number of family members	0.048 ^{NI}	11	Degree of satisfaction with life in the region	0.037 ^{NI}
5	Number of family members worked on agricultural	0.094 ^{NI}	12	Degree of Cosmopolitan	0.264**
6	Agricultural holding	0.033 ^{NI}	13	Degree of the trend to use novel technology	0.439**
7	Experienced years on agricultural work	-0.129*			

**Significant at 0.01 * Significant at 0.05 NI Non Significant Source: Collected and calculate from questionnaire forms.

2- The relationship between the level of bio fertilizers adoption and some Innovations attributes (bio fertilizers):

The results on table (10) show that there were incorporeal positive relationship between level of bio fertilizers adoption and between The degree of complexity of the newly created for use, and the compatibility with previously introduced ideas, and the trial ability, and portability degree to transfer from person to another, and the values of K^2 calculated on respectively are: (13.55**), (16.9**), (14.13**), (14.98**) and all of them are bigger than its spreadsheet values at Significant at 0.01.

Table 10: Values of K^2 between some of (bio fertilizers) properties and bio fertilizers adoption

Sequence	Innovations attributes (bio fertilizers)	Correlation (K^2)
1	Degree of complexity of the newly created for use	13.55**
2	Compatibility with previously introduced ideas	16.9**
3	Trialability	14.13**
4	Ability to transfer from person to another	14.98**

**Significant at 0.01.

Source: Collected and calculate from questionnaire forms.

2-1-The relative advantage of bio fertilizers:

The result in table (11) Shows that there were incorporeal positive relationships between the level of bio fertilizers adoption and between (the relative advantage of bio fertilizers) saving time, saving effort, cost-saving, and the values of K^2 calculated on respectively are: (13.7**), (13.4**), (13.55**), (14.14**) and all of them are bigger than its spreadsheet values at Significant at 0.01.

Table 11: Values of K^2 between the relative advantages of bio fertilizers and bio fertilizers adoption

Sequence	The relative advantage of bio fertilizers	Correlation (K^2)
3	The relative advantage of bio fertilizers	13.7**
1-3-	Saving time	13.4**
2-3-	Saving effort	13.55**
3-3-	Cost- saving	14.14**

**Significant at 0.01.

Source: Collected and calculate from questionnaire forms.

According to these results we can reject the second statistical hypothesis which states that there is no relationship between the levels of bio fertilizers adoption and some of the following bio fertilizers properties: The degree of complexity of the newly created for use, and the compatibility with previously introduced ideas, and the trial ability, and portability degree to transfer from person to another, the relative advantage of bio fertilizers, the advantage are: saving time, and saving effort, and cost- saving.

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