

The Reality of Sustainable Agricultural Development in Tel Kaif District/Nineveh Governorate

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Abstract

This research aimed to identify the reality of sustainable agricultural development in Tel Kaif district/Nineveh Governorate in general, rank each paragraph of the reality of sustainable agricultural development, and find the correlation between the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate and the following independent variables (age, years of experience, level of education, farm ownership, type of relationship, participation in training courses in sustainable agriculture techniques, sources of information.)

The research population included all farmers in Tel Kaif District, totaling (700) farmers. A simple random sample of (25%) was selected, making the research sample (175) respondents. Data was collected using a questionnaire consisting of two parts: the first part included independent research variables, while the second part included the dependent variable, measured using a four-point scale consisting of (28) items to assess the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate. The questionnaire was reviewed by specialists in the Agricultural Extension Department to ensure its face validity, and its reliability coefficient was calculated using Cronbach's alpha. Data analysis was conducted using the arithmetic mean, Spearman's rank correlation coefficient, and Pearson's simple correlation coefficient.

The results showed that (56%) of respondents practice sustainable agricultural development methods to a low degree. furthermore, a significant correlation was found between sustainable agricultural development and the variables (years of experience, level of education, participation in training courses on sustainable agricultural development, and sources of information). However, no significant correlation was found between sustainable agricultural development and the variables (age, type of ownership, and farm ownership). The research also included several conclusions and recommendations.

Introduction

Modern agriculture requires adapting scientific knowledge to serve agricultural technologies, which are considered one of the most important means of accelerating comprehensive economic development. This has become a crucial part of many countries'

strategies for developing modern agriculture, which can be adopted by small farmers, leading to increased incomes, lower agricultural product prices for consumers, increased economic efficiency, and national economic growth [1], therefore, agricultural

development is among the strategies for improving the social and economic lives of rural residents, providing employment opportunities, housing, health, and appropriate education for the targeted groups, and working to overcome poverty and achieve a decent life for rural inhabitants [2]. The process of agricultural development achieves the desired goal by ensuring the participation of stakeholders in its plans and programs, including residents and specialized agencies. One of these agencies is the Agricultural Extension Service, which provides agricultural activities and educational services to farmers to induce desirable behavioral changes in their knowledge, skills, and attitudes, enabling them to participate in development processes [3], agricultural development is also a systematic planning process aimed at introducing fundamental changes in society by fulfilling more of the human population's living and recreational needs. This is achieved by empowering individuals, enhancing their capabilities to confront challenges rather than simply providing ready-made assistance. Consequently, the development process is a method and means to foster individual growth, increase economic production, and improve living conditions through organized planning that guarantees human rights and provides opportunities for productivity and creativity [4], sustainable agricultural development is the objective of all extension institutions operating in rural areas, as it results from the activities of these institutions. These institutions strive to qualify human resources, improve efficiency, and ensure participation in extension programs. Therefore, there is a relationship between agricultural extension and rural development, as both focus on

human resources, and agricultural extension is considered one of the pillars of development [5], sustainable agricultural development involves the management and maintenance of the natural resource base and directing technological and institutional change in a way that ensures the continuous fulfillment of human needs for present and future generations. It also entails the optimal exploitation of available resources to meet current needs while implementing strategies to minimize resource depletion and ensure their conservation [6], sustainable agricultural development also aims to improve agricultural production in both quantity and quality to achieve food security and reduce dependence on imports. This can be achieved through a technical revolution in production methods and tools, as well as social, cultural, and health changes in rural communities alongside technological advancements. Therefore, sustainable agricultural development means the preservation and production of living resources for both current and future generations [7].

Through the preliminary survey of conducted for this research, it was found that the application of sustainable agricultural development varies across the study area. The role of agricultural extension in this field is crucial for preserving agricultural realities in the region and developing them for the better. Thus, the researcher chose this topic due to the importance of sustainable agricultural enhancing them and the increasing focus on it in recent times. accordingly, the research questions were formulated to reflect the researchers' perspectives in this field:

-1What is the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate in general ?

-2What is the order of the Items on the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate?

-3What is the relationship between the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate and each of the variables studied?

Study Objectives

-1Identifying the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate in general.

-2Arranging the paragraphs of the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate according to relative importance.

-3Finding a correlation between the reality of sustainable agricultural development in Tel Kaif District/Nineveh Governorate and each of the independent variables studied (age, number of years of experience, level of learning, agricultural tenure, type of ownership, participation in training courses in sustainable agriculture techniques, sources of information.)

Research Materials and Methods

The research population included all farmers in Tel Kaif District, totaling (700) farmers. A simple random sample of (25%) was selected, resulting in (175) farmers. To collect research data, a questionnaire was designed based on a review of previous studies.

The questionnaire consisted of two parts:

Part One: Included independent variables such as (age, years of experience, level of

education, farm ownership, type of ownership, participation in training courses on sustainable agriculture techniques, sources of information). The measurement methods for these variables were:

-1Age: Measured in years.

-2Years of experience: Measured by the number of years in agriculture.

-3Level of education: Assigned numerical codes (1) Illiterate, (2) Reads and writes, (3) Primary, (4) Middle school, (5) High school, (6) Bachelor's, (7) Higher degree.

-4Farm ownership: Measured by asking farmers about land ownership in dunums.

-5Type of ownership: Assigned numerical codes (1) Owned, (2) Rented, (3) Partnership, (4) State-owned.

-6Participation in training courses: Measured with (1) Yes, (2) No.

-7Sources of information: Measured using three response options (Always, Sometimes, Never), assigned numerical values (1,2,3.)

Part Two: Included (28) items assessing the reality of sustainable agricultural development in Tel Kaif District, with four response options (Highly Achieved, Moderately Achieved, Slightly Achieved, Not Achieved), assigned numerical values of 1, 2, 3, and 4" for clarity.

Face validity was ensured through expert review, and a pilot test was conducted with (30) farmers (excluded from the final sample). The reliability coefficient was calculated using Cronbach's alpha, with a general reliability of (82) (Al-Abbasi, 2018:308). Data was collected from (1/11/2024) to (1/1/2025), analyzed statistically using arithmetic mean, Spearman's rank correlation coefficient, and Pearson's simple correlation coefficient (Tayba, 2008:123.)

First- Identifying the reality of sustainable agricultural development in the Tel kaif District /Nineveh Governorate in general.

Table (1) reality of sustainable agricultural development in the Tel kaif District /Nineveh Governorate in general.

Categories	Number frequency	Percentage	Average
Little (68 - 81)	98	56%	78.174
Medium (82 - 95)	70	40 %	87.828
Great (96 - 110)	7	4%	103.857
Total	175	% 100	

$$\bar{X}=83$$

$$S.d=7.247$$

Table (1) shows that (56%) of researchers practice small-scale sustainable agricultural development methods, that (40%) of researchers practice moderate sustainable agricultural development methods, and (4%) of researchers practice highly sustainable agricultural development methods. This may be due to the fact that researchers' application of sustainable agricultural development is to a

The Sard reality has been classified into three categories using the range of the lowest value (68) and highest value (110) with an average calculation (83), as shown in the following table.

small extent practiced by farmers in the region.

second– Arrangement the Items of the realities of sustainable agricultural development in the Tel kaif District /Nineveh governorate according to relative importance.

Table (2) Arrangement the Items of the realities of sustainable agricultural development in the Tel kaif District /Nineveh governorate according to relative importance

No	Items	Arithmetic mean	Rank
1	Cultivation of land to the extent of a farmer's physical potential	3.878	1
2	Till the ground light tillage and reduce the number of tillage times	3.7	2
3	Disease-resistant crop growers	3.146	3
4	Diversification of cultivated crops to distribute expenditures to a number of earners	3.123	4
5	Using technology to make work in fields fun and rewarding more	3.1	5

6	Safeguarding the Environment	3.092	6
7	Introduction of improved technology without harming the environment	2.969	7
8	Maintaining the balance between agricultural production, environmental integrity and human health	2.946	8
9	Increased crop servicing operations	2.907	9
10	Know the negative effects of chemical fertilizer on soil and microorganisms	2.869	10
11	Reducing the use of heavy equipment	2.838	11
12	Mechanically harmful bush control rather than the use of chemical pesticides	2.823	12
13	Soil conservation from erosion	2.769	13.5
14	Provide innovative and economically viable opportunity for farmers and workers	2.769	13.5
15	Improved quality of production in terms of taste and qualities	2.753	15.5
16	Use of biological control in pest eradication	2.753	15.5
17	rationalization of water consumption	2.746	17
18	Reduce the risk of environmental conditions to crops	2.738	18
19	Do soil ventilation through the use of organic fertilizer	2.730	19
20	Maximum utilization of the farm's local resources	2.713	20
21	Meeting the needs of the present without destroying the ability of future generations to meet their own needs	2.707	21.5
22	Use modern irrigation methods to rationalize water use	2.707	21.5
23	Good agricultural courses	2.676	23.5
24	Dispense with industrial fertilizer and replace it with plant and animal membership	2.676	23.5
25	Research on sustainable agricultural development	2.653	25
26	Cultivation of several types of plants side by side	2.638	26
27	Reduction of off-farm procured inputs	2.576	27
28	Combating fungal pests without using fungicides	2.515	28

The table above shows the paragraph that occupied the first places is a paragraph (cultivation of land to the extent of the physical potential of farms) with an average calculation of (3.878), followed by a paragraph (tillage of land, light tillage and reduction of tillage) and an average calculation of (3.7), which may be due to the fact that farmers have little understanding of their expertise and therefore the paragraph has been important to them. precedent on the application of sustainable farming techniques in relation to land cultivation to the extent of the farmer's physical potential and knowledge in tilling the land to light tillage and reduce the number of tillage times, while occupying the paragraph (Fungal pest control without the use of fungicides) Last place where average (2.515) This may be due to the fact that

farmers have experience in the control of fungal pests without the use of fungicides, so this paragraph came last.

Third- Establishing a correlation between the reality of sustainable agricultural development in the Tel kaif District /Nineveh governorate and each of the independent variables studied (age, number of years of experience, level of learning, agricultural tenure, type of ownership, participation in training courses in sustainable agriculture techniques, sources of information.)

-1Age: The results of the research showed that the highest age of researchers was (56) years and the lowest age (24) with an average of (53.07) and a standard deviation of (7.22). As in table (3.)

Table (3) Distribution of searchers according to age.

Age	Number frequency	Percentage	r Value	Sig
(24 - 34) years old	23	13.15	0.045	0.952
(35 - 45) years old	105	60		
(46 and over) years old	47	26.85		
Total	175	% 100		

The results, as shown in table 3, showed that the highest proportion of researchers were in the middle age group, with (60%), followed by the high group (26.86%), and in order to find the correlation between age and the reality of sustainable agricultural development, the simple correlation coefficient was used this agree with [10]. This

may be because age is not linked to the reality of the phenomenon studied.

-2Number of years' experience for farmers: The results showed that the highest years of research experience were (30) years, the lowest years of work were (five years) and the researchers were divided into three categories using the actual range, as shown in table (4.)

Table (4) Distribution of respondents according to years of experience of farmers.

Number of years' experience for farmers	Number frequency	Percentage	r Value	Sig
(5 - 12) Little experience	81	46.29	0.088*	0.039
(13 - 20) Medium experience	81	46.29		
(21 and over) Highly experience	13	7.42		
Total	175	% 100		

Table (4) shows that the highest percentage of investigators were in the low- and medium-sized category. (46.29%) each, with a share of (49.23%), followed by a high group of (7.42%). And to find the correlation between the two variables, use the Pearson correlation coefficient and since the (Sig) value was less than (0.05), there was a weak Pearson moral correlation between the two variables. Thus we reject the notion of nowhere that there is a moral correlation between the two variables, and we accept the alternative hypothesis. This

can be attributed to farmers' increasing experience by increasing their working years, as their experience is reflected in a reality of sustainable agricultural development

-3Level of learning: Researchers are classified according to the level of learning to seven levels according to the questionnaire form: (Mom, reads and writes, elementary, intermediate, numerical, bachelor's degree, postgraduate degree), as shown in table (5).

Table (5) Distribution of respondents according to educational level.

Level of learning	Number frequency	Percentage	rs Value	Sig
Ignorant	38	% 21.72	0.38*	0.043
Read and write	51	% 29.15		
Elementary	31	% 17.71		
Middle school	23	% 13.14		
Preparatory school	11	% 6.28		
Bachelor's	12	% 6.85		
Higher certificate	9	% 5.15		
Total	175	% 100		

The table above shows that the highest application of sustainable agriculture techniques was in the category (reads and writes) by (29.15%), followed by a category (illiterate) by (21.72%), and to create a correlation between the level of learning and the reality of sustainable agricultural development, use the grading coefficient The value of (Sig) was less than (0.043) and indicates a moral correlation between the level of learning and the realities of sustainable agricultural development, indicating that farmers without certification are more familiar with the reality of agricultural development.

The reason for this is that low-level farmers are interested in agriculture and the reality of sustainable agricultural development as the main source for them and their families more than those with certificates because of their occupation or other work, thus agriculture is considered secondary for them .

-4Farm tenure: The results showed that the highest farm tenure was (27) dunums and the lowest farm tenure was (3) dunums, as shown in table (6.(

Table (6) Distribution of investigators according to farm tenure.

Farm tenure	Number frequency	Percentage	r Value	Sig
(3 - 10) Low Tenure	94	%53.72	0.031-	0.683
(11 - 18) Medium Tenure	75	%42.86		
(19 and over) Large Tenure	6	%3.42		
Total	175	% 100		

Table (6) shows that (53.72%) of investigators fall into the small category of farm tenure, and that (42.86%) of researchers fall into the middle category, that (3.42%) of investigators fall into the large category, and to create a correlation between agricultural tenure and the realities of sustainable agricultural development, use the Pearson correlation coefficient, and since the (sig) value (0.102) which is greater than (0.05%) This indicates

that there is no moral irrelevance and this may be due to the fact that the greater the farm tenure the greater their knowledge of the realities of sustainable agricultural development this agree with [9.]

-5Property type: The searchers are classified according to the type of ownership into four categories (exchange, rent, participation, State-owned), as shown in table (7.(

Table (7) Distribution of respondents according to Property type.

type of property	Number frequency	Percentage	r Value	Sig
Exclusive possession	32	18.28%	-0.123	0.104
Lease	87	49.72%		
Co-ownership	42	24%		
State-owned	14	4%		
Total	175	% 100		

The table above shows that the highest class of property type was in the category (rent) by 49.72%, followed by (share) by (24%), and to create a correlation between the variable type of ownership and the reality of green farmers' application of sustainable farming techniques, the grading coefficient was used (Spearman) The value of (Sig) (0.104) is noted in the table above and is greater than (0.05), this is agree

with [8]. this indicates an immoral relationship between the two variables .

-6Participation in training courses on sustainable agricultural development: Researchers are classified according to participation in training courses on sustainable agricultural development (participant, non-participant), as shown in table (8.)

Table (8) Distribution of researchers according to participation in training courses on sustainable agricultural development.

Participation in training courses	Number frequency	Percentage	r Value	Sig
Participant	114	%65.14	0.261*	0.038
Nonparticipating	61	%34.86		
Total	175	% 100		

According to the above table, the highest percentage (65.14%) is one of the participants in the training courses in sustainable agricultural development, and the percentage (34.86%) Other than participants in training courses in sustainable agricultural development, the coefficients were used and a moral relationship between the two variables

was found and the (sig) value was smaller than (0.05), owing to the fact that participants in the training courses were familiar with sustainable agricultural development because they had experience from the training courses in which they participated .

-7Sources of information: The results of the research showed that the highest category of information sources for researchers was (21) and the lowest category (13). The researchers

according to the sources of information were divided into three categories using range, as in table (9).

Table (9) Distribution of investigators according to sources of information.

sources of information	Number frequency	Percentage	r Value	Sig
Low (13 - 15)	8	4.57	0.211**	0.007
Average (16 - 18)	88	50.28		
Highly (19 and over)	79	45.15		
Total	175	% 100		

0.01**

The table above shows that the middle category is the most exposed to sources of information where their proportion was (50.28%), followed by the high group (45.15%), and in order to create a correlation between farmers' agricultural information sources and sustainable agricultural development, grading coefficients were used (Pearson) For the morale of the relationship

Conclusions

The results showed that the realities of sustainable agricultural development are low, concluding that farmers' knowledge of the realities of sustainable agricultural development is modest.

-2The results showed a moral correlation between the realities of sustainable agricultural development and the following variables (number of years of agricultural experience, level of learning, participation in

between the two variables, we note the value of (Sig) in the table above, where it reached (0.007) which is less than (0.05), this indicates a strong pecuniary correlation between variables and may be due to the fact that farmers who are exposed to different sources of information are more experienced and knowledgeable in sustainable agricultural development than farmers who are not exposed to different sources of information.

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training courses, sources of information), from which we conclude that these variables are linked to the realities of sustainable agricultural development.

-3The researcher also concluded that some of the paragraphs in the area of sustainable agricultural development were relevant to the realities of sustainable agricultural development.

Recommendations

The Nineveh Department of Agriculture and the Nineveh Agricultural Extension and Training Centre intensify training courses for farmers on the realities of sustainable agricultural development.

-2The researcher recommends that attention be paid to farmers in the study area and that it

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increase the realities of sustainable agricultural development.

-3The researcher recommends studies on the importance of the reality of sustainable agricultural development that were not covered by the research and other variables in the study area .

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