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Article

The Application of Wheat Farmers to Modern Agriculture Technology Related to Improve Crop Production in Thi-Qar

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ABSTRACT

The research aim is to determine the level of application farmers of Modern Agricultural Technology have in improving wheat crop production in Thi-Qar Province. A multistage sample probability proportionates of size (P.P.S.) was used to conduct this study. The sample number was (75 farmers from the Qalat Sukkar district, 105 farmers from the AL-Rifai district, 45 farmers from the AL-Shatrah district, and 29 farmers from the AL-Nasr district) (15% of the total number of farmers) it was 254 farmers. Questionnaire techniques and interviews with the farmers were adopted to collect the data (March to May 2019). The study has revealed that the highest percentage (62.6 %) belonged to the medium category in applying modern agricultural technology to improve wheat crop production. The application level of modern agricultural technology was significant and positive at a 1% probability level under six variables. Multiple regression analyses have been studied with ten variables: social class, age, Education, Occupation, Farm power, Size of land holding, Family type, Family size, social participation, and Source of information utilized. This research has contributed nine independent variables with significant levels of variation to the extent of the application level of modern agricultural technology in improving wheat crop production (R2= 0.759). The importance of farmers using modern agricultural technology with the parts (Soil preparation, Planting and crop service, harvesting processes and marketing) was high according to (72.12, 70.72, and 68.41) respectively. The data were used for analysis: Frequency, percentage, mean, Standard deviation, and multiple regression analysis. According to the result, farmers' application of modern technology in improving wheat crop production was good. Modern agricultural technology will reduce costs, increase productivity, and save soil quality. The importance of farmers with the parts (Soil preparation, planting, crop service, harvesting processes, and marketing) was high according to (72.12, 70.72, and 68.41) respectively. Because of this, it is necessary to improve the cultivation of wheat crops to achieve high productivity and reduce the problems that happen during agricultural production.

Keywords: Technology, Independent variables, Farmers, Harvesting, Size of land holding

INTRODUCTION

Wheat crop is a key staple cereal for many people worldwide. Wheat is expected to increase strongly soon due to global population growth and dietary changes. So, the major challenge of wheat production is increasing this crop. In the threatening global food security, there has been a global decline in wheat yield growth since the mid-1990s[1]. Wheat is grown on more land areas than any other commercial crops. It is the most important grain food source for human consumption[2]. Wheat occupies the largest cultivated area compared with other

food crops, as well as the entry of wheat crops in many trade and economic transactions among the countries in the world. Many countries produce this crop, and many countries import it. Also, many countries are interested in ongoing research to improve the productivity of this crop by improving high-yield genotypes suitable for diverse environmental conditions; some of these countries have become the primary source of this crop, which has a competitive ability to produce it. Iraq ranked 31st by production in 2013, 3.3 million tons, while China, India, United States, and Russia ranked first, second, third, and fourth globally for the same year with 121.7, 93.5, 60, and 52 million tons, respectively[3]. As a staple food for half of the world's population, this plant is very important and, therefore, shall be considered a strategic crop[4] In Iraq, most wheat production relies on irrigation water. It is only 39.7% of the in Iraq, and most wheat production relies on irrigation water. Only 39.7% of the wheat cultivation area is rain-fed.

The areas of rain-fed wheat production have been located in the north of Iraq. Climatic conditions favor such requirements because Iraqi wheat is cultivated during November and harvested on May 5. The introduction of suitable wheat varieties and improved cultivation techniques such as fertilizing, pest control, and harvesting are necessary to fill the role. Furthermore, supplemental irrigation techniques need to be introduced so that the limited water resources can be utilized to maximize crop productivity[6]. New technologies developed by researchers are disseminated among the farmers by the agricultural extension department. In addition, agricultural extension provides farmers with management, decision-making, and organizational skills. It provides feedback and keeps agricultural research abreast of real problems faced by the farmers[7].

Agricultural extension programs have been one of the primary conduits of addressing rural poverty and food insecurity. This is because it has the means to transfer technology, support rural adult learning, assist farmers in problem-solving, and get farmers actively involved in the agricultural knowledge and information system [8] Agricultural extension programs should provide opportunities for agricultural subject matter knowledge and skill development through a variety of methods, including early field experiences[9]. To adopt a new Production technology correctly, the farmers should know how to learn and use these techniques correctly in farming systems. The major job of an effective extension worker is to educate the farmers on how to improve their skills, motivate them to use improved agricultural implements, prepare a cropping plan, and adopt the practices evolved through recent scientific research. To apply a new technology successfully, they must be aware of how to learn to incorporate it into their farming systems[10]. The demand for all foodstuffs grows. At the same time, the supply of natural resources should be expanded or increased gradually. For this result, we are studying the application of modern agricultural technology to improve wheat production to face many problems that may lead to low productivity in the future.

The study is trying to answer these questions:

1. what is the level of application of farmers to modern agricultural technology in improving wheat crop production in Thi-Qar province?
2. what is the relationship between the application farmers' level of Modern Agricultural Technology and the independent variables?
3. What is farmers' satisfaction level about applying modern agricultural technology to improve wheat crop production?

To answer these research questions, a study entitled "The application level of Modern agricultural technology in the improved wheat crop production in Thi-Qar Province" was undertaken with the following objectives:

1. To determine the application level of Modern Agricultural Technology in improving wheat crop Production in Thi-Qar Province.
2. To study the relationship between the application farmers' level of Modern Agricultural Technology with the independent variables in improving wheat crop production.
3. To study farmers' satisfaction level with the application of modern agricultural technology for improving wheat crop production.

MATERIALS AND METHODS

1. Research Methodology:

To achieve the research objectives, the descriptive approach is used, which is one of the methods to obtain adequate and accurate information from social reality and contribute to the analysis of its phenomena.

2. Research area:

The research has been done in Thi-Qar province in southern Iraq. The Thi-Qar province has been selected based on maximum area and production among other provinces in Iraq for wheat production in the national program for wheat development[11].

3. The research population:

The research population included the total number of farmers in the year 2019 was 1692 farmers (**500** farmers in the Qalat Sukkar district,700 farmers in the AL-Rifai district, 300 farmers in the AL-Shatrah district, and 192 farmers in the AL-Nasr district). The respondents' samples of this study for collecting data have been selected based on probability proportionate to size (P.P.S.). (15% of the total number of farmers was 254). Number of respondents samples for the study were (75 farmers in the Qalat Sukkar district, 105 farmers in the AL-Rifai district, 45 farmers in the AL-Shatrah district, and 29 farmers in the AL-Nasr district). A questionnaire was developed, pre-tested, revised, and used to collect necessary information from the farmers. The data were collected through personal interviews and questionnaires (during two months in 2019).

4. Data collection

The data have been collected through the questionnaire method and personal interviews. The number of questions in the test was 20 items to measure the application level of modern agricultural technology in improving wheat crop production. The questionnaire is divided into three parts (soil preparation, planting, crop service and harvesting processes). It is given a weight (1.0). The role of modern agricultural technology was divided into three categories: high, medium, and low, respectively.

5. Statistical analysis:

In this research, descriptive statistical measures (mean, averages, frequency, percentages, standard deviation, and multiple regressions) have been used for analyzing the data were analyzed by using a statistical analysis program (S.P.S.S.).

6. Face validity

The form has been presented to experts in plant production and agricultural extension areas to ensure the appropriateness of the paragraphs; all observations were recorded and reformulated, and adjustments were made according to their suggestions to improve the study. Seven in agricultural extension exports have been recording the apparent validity of the instrument, such as the type of expressions, the style of writing, the

extent of clarity, the accuracy of their measurement, and the way to answer the paragraphs, as some paragraphs were removed from the form according to their suggestion.

7. Reliability

The reliability content means " The degree of representation of the test of the content of the behavior and objectives," the content has validated this name because it relates to the behavior content to be measured[12]. Furthermore, whenever the value approaches (100%), this indicates a degree of stability. The result of the Cronbach alpha test for the study scale was (0.95), so the tool can be described as stable, and the data obtained were suitable for measuring varieties and were within a high degree of reliability. On 3/2/2019, a test was recorded for outside the sample in the research.

RESULTS

1. To determine the level of application farmers of Modern Agricultural Technology to Improve wheat crop Production in Thi-Qar Province.

The application of modern agricultural technology in improving wheat crop production was divided into three categories (low, medium, and high) and standard deviation. The result showed that in Table (2), the majority of respondents (62.6 %) are in the second category (medium), followed by high and low categories (20.86% and 16.54 %), respectively. The findings in Table reveal that most farmers belong to the middle category (62.6%). The farmers in Thi-Qar province had a good level of application of modern agricultural technology to improve wheat production. Modern agricultural technology will reduce costs, increase productivity, and save soil quality.

Furthermore, modern agricultural technology can be used in different aspects of agriculture, like applying herbicides, pesticides, fertilizers, and improved seeds. Technology has proved to be extremely useful in the agricultural sector. Farmers can grow crops in areas where they thought they could not grow. Furthermore, extension services create the platform for the acquisition of relevant information that promotes the adoption of technology. The findings are in tune with the findings of [13,14,15,16].

2. To study the relationship between the application farmers' level of Modern Agricultural Technology with the independent variables.

An effort has been made to analyze the relationship between the application of modern agricultural technology and independent variables to Improve wheat crop production. As shown in Table (3), the nine variables studied are significantly related to the application of Modern Agricultural Technology in improving Wheat Crop Production**.** Table (3) shows that only nine variables are significantly related to the application of modern agricultural technology in improving Wheat Crop Production**.** According to Table 3, the results showed that younger farmers were likely to use modern agricultural technology more than older ones. Some operations need to increase education levels and independent variables that influence the adoption of modern agricultural technology to improve wheat crop production.

Multiple regressions:

The technique of multiple regression was used to predict critical, independent variables. The technique has been used to determine the impact of the independent variables on the dependent variable, namely the application level of modern agricultural technology in improving wheat crop production. Only nine independent variables have been fitted with the farmers' application in the multiple regression equation. The findings have been combined in Table 4.

Table (4) showed that nine variables explained the variation in application to the extent of 0.759 percent of the use of modern agricultural technology. The respective "F" value (significant at 0.01 percent) at (13.80) degrees of freedom given in parenthesis was 6.77. Therefore, the results showed that only nine independent variables would account for highly significant variation in farmers' application levels. From the coefficients of regression (b-value), nine variables are significant with the application level of farmers. Therefore, these variables have a definite role in affecting the application of modern agricultural technology in improving Wheat Crop Production. The finding is in line with findings[17 18,]

To study farmers' satisfaction level with the application of modern agricultural technology to improve wheat crop production.

An effort has been made to determine respondents' satisfaction with the application level of improved wheat crop production. The result is presented in Table 4.

The above Table (5) depicts that (30.71 percent), of the respondents were fully satisfied with Land leveling in the soil preparation. The farmers think this process is very important in order to create good conditions for plants. (28.74 percent) of the respondents were having just satisfied with the fertilization process in the planting and crop service. Because so many farmers think this is a very important process to save the plant from other conditions. (27.95 percent) of the respondents were not satisfied with harvesting processes in the harvesting processes and marketing.

Arranging the study aspects according to importance for the respondents

It was divided into three main aspects, in descending order, according to the level of importance that each aspect obtained.

Table 6 depicts (72.12%) of the high percentage with soil preparation axis because they think this process is very important to prepare the field for wheat crop planting and for solving many problems facing the crop during the first growth stages. The planting and crop service was taking (70.72%) because they thought this was a process to help them control the production conditions.

DISCUSSION

According to the result, farmers' level of application of modern technology in improving wheat crop production was found to be good. Most of them think that using modern agricultural technology will reduce costs, increase productivity, and save soil quality. The importance of farmers with the parts (Soil preparation, planting, crop service, harvesting processes, and marketing) was high according to (72.12, 70.72, and 68.41) respectively. Because of this, it is very necessary to improve the cultivation of wheat crops to achieve high productivity and reduce the problems that may happen during agricultural production. The agricultural extension is the basis for the development of the agricultural sector, and with agricultural extension, it has benefited from modern agricultural techniques and information. Agricultural Extension is responsible for the transfer of agricultural technologies to farmers. According to this result, the level of application of modern agricultural technology in improving wheat crop production is that most farmers belong to the middle category (62.6%). The farmers in Thi-Qar province had a good level of application of modern agricultural technology to improve wheat production.

CONCLUSIONS

Accordingly, the researcher recommended that the competent authorities (directorates of agriculture in the Thi-Qar province, the Department of Agricultural Extension and Training) should adopt the proposal of the

requirements of developing the farmer's capacities in the field of application of modern technology in the improvement of wheat crop Production. Supporting the farmers in getting modern agricultural technology

No.	District	No. of farmers	P.P.S.
1	Qalat Sukkar	500	75
2	Al.Rifai	700	105
3	Al.Shatrah	300	45
4	Nasr	192	29
		1692	254

Table 1: The studied physicochemical parameters.

NO.	Classes	Freq.	%	Mean	S.D.
1	Low (less than (Mean – S.D.)	42	16.54	12.88	3.15
2	Middle boundary = Mean + S.D	159	62.6		
3	High above the minimum middle = class Mean + S.D.	53	20.86		
		254	100		

Table 2: Distribution of respondents as per their level of applying technology in improving wheat crop production (N= 254).

SI.NO	Variables	r -value	t -value
X1	Ages	0.1559*	2.665
X2	Social classes	0.3872**	4.786
X3	Occupation	0.488**	4.377
X4	Education	0.2785**	3,487
X5	Size of land holding	0.2855*	2.966
X6	Farm power	0.386**	4.467
X7	Family size	0.297*	2.775
X8	Family type	0.384**	3.758
X9	Social participation	-0.083 Ns	-0.776
X10	Source of information utilized	0.287**	2.789

*Means significant at a 5% probability level ** means significant at a 1% probability Ns= means non-significant.

Table 3: Relationship between the application level of respondents and the selected socio-personal.

SI.NO	Variables	“b” value	Std.	“ t”
X1	Ages	0.02574	0.0976	0.2733ns
X2	Social classes	0.36885	0.0198	25.566**
X3	Occupation	0.084976	0.0144	6.5654**
X4	Education	0.37625	0.0152	22.64**
X5	Size of land holding	0.35608	0.0157	31.460**
X6	Farm power	0.90163	0.0757	12.710**
X7	Family size	0.3674	0.427	25.199**
X8	Family type	1.48148	0.0737	30.370**
X9	Social participation	0.08917	0.0708	7.2540**
X10	Sources of information utilized	0.089285	0.0224	6.2034**

*significant at 5% level of probability ** significant at 1% level of probability Ns=non-significant R^2= 0.759 F value=6.77 ** d.f (13, 80) Intercept constant (a)=25.22

Table 4: Distribution of multiple regression analysis is independent variables with application level of Modern Agricultural Technology in the Improve of Wheat Crop Production.

	Statements of satisfaction		**Fully satisfied**		**Just satisfied**		**Satisfied only to some extent**		**Not Satisfied**		**Total**
	parts	Process	f	%	F	%	f	%	f	%	
1	Soil preparation soil preparation	Tilling	76	29.92	58	22.83	70	27.55	50	19.68	254
		Land leveling	78	30.71	63	24.80	60	23.62	53	20.87	254
2	Planting and crop service	Planting process	58	22.83	70	27.55	66	25.98	60	23.62	254
		Fertilization process	59	23.23	73	28.74	55	21.65	67	26.37	254
		Control process	57	22.44	62	25.98	69	27.16	66	25.98	254
3	Harvesting processes and marketing	Harvesting processes	67	26.37	61	24.01	55	21.65	71	27.95	254

Table 5: Distribution of respondents according to satisfactory application of improved wheat production technology.

No.	**Aspects**	**%**
1	Soil preparation	72.12
2	Planting and crop service	70.72
3	Harvesting processes and marketing	68.41

Table 6: arrangement of aspects according to importance of farmers.

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