

## The level of applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers in Al-mahaweel cultivation department / Babylon Province

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### ABSTRACT

The study aims to identify the level of applying scientific recommendations for using of improved wheat seeds and chemical fertilizers in Al-mahaweel cultivation department / Babylon Province for cultivation season 2016-2017. In order to achieve the goal of the research, a 12-point Scale was prepared and distributed on two axes. The data were collected from a random sample of 90 farms in Al-mahaweel cultivation department by means of a questionnaire in the interview method. The research found that 77.78% of interviewees described their level of applying for scientific recommendations for the use of improved wheat seeds by medium, 75.56% of interviewees described their level of applying of scientific recommendations for the use of chemical fertilizers by medium, and 85.56% of interviewees described their level of applying scientific recommendations for the use of improved wheat seeds and chemical fertilizers by medium. The study reached to conclusions such as: insufficient quantities and varieties providing from improved wheat seeds technology and chemical fertilizer for farmers, it is considered a major factor in the low level of dissemination and applying of the scientific recommendations of these technologies. The researcher recommended several recommendations, including: The importance of meeting the requirements of farmers such as provided the improved wheat seeds and chemical fertilizers technologies in either quantity or quality and timing by the processing and extension government institutions guide them to the proper use of these technologies, follow up their application and with the continuous evaluation of these activities.

**Keywords:** Improved wheat seeds, Chemical fertilizers, Applying recommendations, Using.

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مستوى تطبيق التوصيات العلمية لاستخدام بذور الحنطة المحسنة والأسمدة الكيماوية في شعبة زراعة  
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### المخلص

هدف البحث إلى التعرف على مستوى تطبيق التوصيات العلمية لاستخدام بذور الحنطة المحسنة والأسمدة الكيماوية في شعبة زراعة المحاصيل/محافظة بابل للموسم الزراعي 2016 2017. وتحقيقاً لهدف البحث أعد مقياس تكون من 12 فقرة موزعة على محورين. وجمعت البيانات من عينة عشوائية مقدارها 90 زارعاً في شعبة زراعة المحاصيل بوساطة استبانة بطريقة المقابلة. وقد خلص البحث إلى أن 77.78% من المبحوثين يوصف مستوى تطبيقهم التوصيات العلمية لاستخدام بذور الحنطة المحسنة بالمتوسط. وأن 75.56% من المبحوثين يوصف مستوى تطبيقهم التوصيات العلمية لاستخدام الأسمدة الكيماوية بالمتوسط أيضاً، وأن 85.56% من المبحوثين يوصف مستوى تطبيقهم التوصيات العلمية لاستخدام بذور الحنطة المحسنة والأسمدة الكيماوية بالمتوسط كذلك. وتوصل البحث إلى استنتاجات منها: إن عدم كفاية الكميات والنوعيات المجهزة من تقانات بذور الحنطة المحسنة والأسمدة الكيماوية للزراع، يعد عاملاً أساسياً في تواضع مستوى انتشار وتطبيق التوصيات العلمية لتلك التقانات. وأوصى الباحث بتوصيات عدة منها: أهمية قيام المؤسسات الحكومية التجهيزية والإرشادية بتلبية حاجات الزراع من تقانات بذور الحنطة المحسنة والأسمدة الكيماوية كمياً ونوعاً وتوقيتاً، وإرشادهم إلى حسن استخدام تلك التقانات مع متابعة تطبيقهم لها والتقييم المستمر لتلك النشاطات.

**الكلمات المفتاحية:** بذور الحنطة المحسنة، الأسمدة الكيماوية، تطبيق التوصيات، استخدام.

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## 1. INTRODUCTION

The increasing production, sustaining natural resources, improving farmers' living conditions, achieving food security and reducing poverty are among the most pressing challenges facing the world in the third millennium. As a result, the world is turning to addressing these challenges, including the deployment of modern technologies aimed at improving and sustaining natural materials (earth and water) and increasing their outputs [4]. The dissemination of agricultural technologies is an increasing activity and service in the agricultural sector in most countries, especially developing ones, because it relates to meeting the requirements of farmers for agricultural technologies, addressing the problems of their agricultural activities, increasing productivity and agricultural production, improving its quality, increasing its economic returns and achieving food security. The green revolution that took place after the 1960s in many countries, particularly Asia, It was the result of the development and dissemination of high-productivity agricultural technologies in farmers' fields. It is estimated that in 2020 year, the world needs almost 20 billion tons of wheat to meet its needs, compared to the current production of only 690 million tons, which requires intensifying efforts to increase production, vertically and horizontally. This is a challenge because of the negative effects associated with any increase in agricultural production from the natural resource base of agriculture which has very serious impacts, including land degradation, salinization of irrigated areas, using excessive water, increasing pest resistance and erosion of biodiversity [14]. The United Nations Environment Program (UNEP) has estimated that unsustainable land use practices result in global net losses in productivity of crop land with an average of 2% annually [17]. Here highlights the work of sustainable intensification of crop production and is defined as producing more in the same land area while minimizing adverse environmental impacts, increasing contributions to natural capital and the flow of environmental services. It Summarizes by term (Conservation and

expansion), which means productive cultivation that preserves and enhance natural resources. The new model aims to achieve a sustainable green revolution that continuously enhances productive capacity without damaging the environment. Studies in developing countries have shown that conservation practices have increased productivity and improved environmental services, and 57 low-income countries have achieved increases of up to 80% in yields [16]. Wheat is the first strategic crop in Iraq [11]. The area cultivated with wheat reached 3595000 hectare for agricultural seasons 2016/2017 [1]. However, Iraq, especially for more than three decades, has faced a major crop deficit, which is forced annually to import many millions of tons to meet the deficit in crop production, which costs millions of dollars annually. This deficit is attributed to several reasons, foremost of which is the continuous low crop productivity. The Ministry of Agriculture has promised to reduce agricultural productivity as one of the most important challenges facing the agriculture sector in Iraq. The average production of wheat in Iraq is 787 kg / dunum [1]. In Egypt, the average production is 2447 kg / dunum, in Saudi Arabia it is 1874 kg / dunum, and in Morocco 2016 kg / dunum [8]. Therefore, increasing the productivity of the wheat crop in Iraq at the present stage requires focusing on the priority of vertical expansion. The Ministry of Agriculture in its plan for the years (2011-2014) emphasized the priority of vertical expansion in increasing the agricultural production of most crops and products, foremost of which is wheat [12]. Agricultural productivity in general and crop productivity are affected by various factors (technical, human, regulatory, environmental, material, administrative, investment, etc.) [13], these include modern technologies, improved seeds and the use of chemical fertilizers. FAO estimates that 50% of the productivity of agricultural crops in the past decades is mainly due to genetically improved seed cultivars [15]. Research indicates the role of nitrogen fertilizer when added in sufficient quantities and in three batches to increase the average of growth, which is reflected in the increase of

leaves area, the dry weight of the spike in the flowering stage, then increase the number of spikes and get the highest percentage of wheat grain [6]. Al-mahaweel cultivation department is one of the agricultural departments characterized by its widely cultivation area, reaching of (106 996) dunum, it forms 7% of the agricultural area of the province of Babylon, wheat is the first strategic crop in it, the average wheat yield in the department is 844 kg / dunum [20]. It is a good productivity when compared to Iraq's productivity, but it is low productivity when compared to the productivity of Arab countries such as Egypt, Saudi Arabia, Morocco and others. Therefore, the low productivity of the wheat crop in Al-mahaweel cultivation department raises the following question: What is the level of applying of the scientific recommendations for using of improved wheat seeds and chemical fertilizers in wheat crop cultivation in Al-mahaweel cultivation department? Therefore, the research aims to identify the level of applying of scientific recommendations for the using of improved wheat seeds and chemical

fertilizers in wheat cultivation in Al-mahaweel cultivation department.

## 2. MATERIALS AND METHODS

The descriptive approach was used in conducting the research. The research community included all wheat farmers in Al-mahaweel cultivation department, their number is 2755 farmers [22]. They are divided into five sectors: Al-Fayhaa, Babylon, Al-thayir Al-araby, Al-nasr, and Al-jhad. A sample of them was randomly selected in several stages, the 60% of the sectors were chosen randomly, which is Al-Fayhaa, Al-Thaeer Al-Arab, and Al-Nassir, the 50% of the provincial, which it number is 20, were randomly selected following to the selected sectors. The total number of districts was 10, which is Hisn Jafar, Basateen Hisn Jafar, Khanafara, Bata, Al-Badea Al-Kabeer, Al-shaytia, Al-Saidiya, Al-Taheriyah, Al-Azzawi and Al-Musayyib. A control sample with ratio of 7% was selected from the total of 1,886 farmers in each of the 10 selected provincial as shown in Table (1).

**Table 1:** Numbers of Wheat Farmers in Al- Mahaweel cultivation Department

<b>Agricultural sector</b>	<b>Number of farmers in selected provincial</b>	<b>Sample amount</b>	<b>Percentage (%)</b>
<b>Al-fayhaa</b>	472	33	36.66
<b>Al-Nassir</b>	428	30	33.34
<b>Al-Thaeer Al-Arab</b>	386	27	30
<b>Total</b>	1286	90	100

### **Preparing the Scale of applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers**

The process of preparation and development of the Scale of applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers has consisted of three stages, which included several steps.

#### **First stage / Preparing of the Scale in its preliminary form**

Preparing of the Scale in its preliminary form for following:

1. Specialized guidelines for wheat yield.
2. Opinions of a group of specialized experts. Publications and experts are an important source in making Scales [9].

The Scale may be in its initial form of 12 paragraphs distributed on two axes.

#### **Second stage / Scale Development. This stage included several steps.**

1. Introducing the scale in its preliminary form to 20 agricultural experts, including 4 agricultural extension experts, 8 field crop experts and 8 soil fertility experts, to show their degree of agreement on the axes and scales of the scale using the questionnaire of Expert approval by answering the Graduated approval terms in front of each paragraph Or axis are: approval, approval with the amendment (mention the proposed amendment), is not approval. The purpose is to know the

validity of the scale, and that the scale actually measures what has been prepared to measure. Where it is first measured the face validity, and means the extent to which the scale achieves the objective for which it was designed. Second, measuring the validity of the content or the logical validity means the extent of the representation of the scale of the fields represented by the measured trait, the extent of coverage of the objectives set [10].

2. Determine the weights for the expert approval terms on each axis and paragraph. Which identified as following (0, 2, 3 degree) for the terms (approval, approval with modification, not approval), respectively.
3. An 80% peremptory threshold is set for approval to keep the axis or paragraph in the scale as final.
4. Calculates the average score of experts' approval on each axis or paragraph, the average approval score on the axes was 3 degrees, the average approval score on the paragraphs ranged between (2.8-3 degrees).
5. The proportion of the average score of the experts approval on each axis or paragraph and its comparison with the Peremptory threshold. The paragraph or axis that achieved the degree of pieces or more remained in the scale, According to the opinion of the measuring experts; the tool would be true if it obtained an agreement of 75% or more [5].

### **Third stage / Preparation of the scale in its final form**

All the axes and paragraphs in the scale in its initial form achieved the peremptory threshold and more, so all of them remained in the scale in its final form. (100%), and after the comprehensive review of the answers of the specialized experts, minor modifications were to be made in some paragraphs of the scale and the order of their formulation, as shown in Table (2).

### **Preliminary test of the questionnaire Test-Pre**

A preliminary test of the questionnaire was conducted after it was completed to verify its appropriateness in collecting the data by applying it to a random sample of 20 farmers for the wheat crop outside the research area (project area). The test lasted 8 days. After a comprehensive review of the respondents' answers, in some questions of the questionnaire and the order of its paragraphs.

### **Measurement of stability and validity**

The stability of the questionnaire (which indicates the degree of consistency and compatibility in the measurement when its repeated) was measured by the Split- Half Method using Person equation, where reaching 0.88, then it corrected by the Spearman Brown equation to reach the coefficient of stability of 0.94. The high coefficient of stability and validity of the paragraphs of the questionnaire indicates the stability and validity of paragraphs, The stability coefficient is acceptable if its value was 0.80, it is more acceptable as if its value close to 1 [10]. The questionnaire is therefore ready for implementation and achievement of research objectives.

### **Data collection**

The data were collected from the respondents through a personal interview during the period (1/9/2017- 30/9/2017).

### **Statistical methods used**

Percentages, arithmetic averages, and repetitive distributions were used to display and analyze results.

### **Tabulation and data analysis**

#### **First: Determine the level of applying of recommendations for using of improved wheat seeds and chemical fertilizers**

1. Determine the level of applying of scientific recommendations for using of improved wheat seeds through 4 paragraphs, the highest numerical value was 11 and the lowest numerical value 4 and distributed at three levels, weak, medium and high, as shown in Table (3).
2. Determine the level of applying of scientific recommendations for using of chemical fertilizers, through 8 paragraphs, the highest numerical

value was 24 and the lowest numeric value 8 and distributed at three levels, weak, medium and high, as shown in Table (3).

3. Determine the level of applying of scientific recommendations for using of improved wheat seeds and chemical

fertilizers, through 12 paragraphs, the highest numerical value was 35 and the lowest numeric value 12 and distributed at three levels, weak, medium and high. As shown in Table (3).

**Table 2:** Scale for applying of Scientific Recommendations for Using Improved Wheat Seeds and Chemical Fertilizers

Axis	Sequence	Paragraphs
<b>applying of Scientific Recommendations for Using Improved Wheat Seeds</b>	1.	Seeds Type
	2.	Seeds Quantity
	3.	Cultivation date
	4.	Cultivation methods
<b>applying of Scientific Recommendations for Using Chemical Fertilizers</b>	<b>First batch</b>	
	1.	Fertilizer type
	2.	Quantity for each type
	3.	Fertilizer date
	4.	Fertilizer method
	<b>Second batch</b>	
	1.	Fertilizer type
	2.	Quantity for each type
	3.	Fertilizer date
	4.	Fertilizer method

**Table 3:** Ranges of numerical values for the applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers

Topic	Number of Paragraphs	Range values	The applying levels
<b>Applying of scientific recommendations for using of improved wheat seeds</b>	4	4 – 11	Low 4 – 6 Medium 7 – 9 High 10 – 11
<b>Applying of scientific recommendations for using of chemical fertilizers</b>	8	8 – 24	Low 8 – 13 Medium 14- 19 High 20-24
<b>Applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers</b>	12	12 – 35	Low 12 – 19 Medium 20 – 27 Low 28 – 35

## **Second: Measuring the variables of applying recommendations of improved wheat seed and chemical fertilizers**

### **1. The level of application of the scientific recommendations in the cultivation of improved wheat seeds**

The level of applying of the scientific recommendations for using of improved wheat seeds was determined by four paragraphs: seed

quantity, seed type, cultivation date, cultivation method. Three alternatives to the seeds quantity were used, 4045 kg / dunum, less than 40 kg / dunum, 45 kg / dunum and more. Three alternatives for seed type, high production, medium production, low production. Three alternatives to the cultivation date, the recommended date 1/12-30/12, after the recommended date 1/1-15/1,

before the recommended date 15/11-30/11. Two Alternatives to cultivation method, the seedling is used, or the manual seed is used [21]. The weights were set 1, 2, and 3, respectively for each alternative in paragraphs.

## **2. The applying of the scientific recommendations for using of chemical fertilizers**

The level of applying of scientific recommendations for using of chemical fertilizers were determined for eight paragraphs and in two batches each batch four paragraphs: Fertilizer type, Quantity of fertilizer, fertilization date, fertilization method. Three alternatives were used for fertilizer type, urea, dap, urea and dap. Three alternatives to the quantity of fertilizer, the recommended quantity 65 kg / dunum urea and 50 kg / dunum, increase 10 kg / dunum and more than the recommended amount for each fertilizer type , decrease 10 kg / dunum and less than the recommended amount for each fertilizer type. Three alternatives to the date of fertilization, the date recommended for Dap before the cultivating with tillage operations, specifically during the smoothing process for soil and urea in two batches at the beginning of the branches stage and at the beginning of Booting Stage, Dap was added before the cultivation stage and urea two batches before the branches stage and before

the Booting Stage. After the recommended date, Dap was added after the cultivation stage and urea two batches after the branches stage and after the Booting Stage. Three alternatives to the fertilization method were used, the mechanical sowing was used to fertilize the dap and irrigation by spraying for the urea, the mechanical sowing for fertilization with dap and the manual sowing of urea, the manual sowing for the dap and urea [21], and The weights were determined 1, 2, 3, respectively for each alternative in paragraphs.

## **3. RESULTS AND DISCUSSION**

**The first axis: Applying scientific recommendations for using of improved wheat seeds**

**First: The level of applying of the scientific recommendations for using of improved wheat seeds**

The highest numerical value of applying the scientific recommendations for using of improved wheat seeds was 10 degrees, the lowest numerical value was 6 degrees, and the average was 7.92 degrees, on a scale consisting of 4 paragraphs, the numerical values ranged from 4 to 11 degrees, 77.78% of the respondents, The level of application of scientific recommendations for the use of improved wheat seed was described as average, and the average of their value were 7.9 degrees as shown in Table (4).

**Table 4:** Level of applying scientific recommendations by respondents to Using Improved Wheat Seeds

Categories	Range Values	Average Values	Number	Percentage (%)
<b>Low</b>	4 — 6	6	10	11.11
<b>Medium</b>	7 — 9	7.9	70	77.78
<b>High</b>	10 — 11	10	10	11.11
<b>Total</b>	4 — 11	7.92	90	100

Table (4) shows the level of applying of scientific recommendations for using of improved wheat seeds in the farms of respondents in Al-mahaweel region, it is described as medium and this negatively affects the productivity, production and economic returns of the respondents. For reasons including, insufficient quantity and quality of improved wheat seeds, decrease quality and grade of those seeds and the weakness of extension activity.

**Second: Describe Applying Level of Scientific Recommendations by Respondents for Using Improved Wheat Seeds**

1. It was found that the improved wheat seeds processed for cultivated the department in the winter season 2016/2017 of Mesopotamian state Company for Seeds Production belongs (IPA 99 cultivar) certified 1, 2. It is one of the recommended cultivars

of agricultural research and extension services in the country [20].

2. The quantities of improved wheat seeds

- a. It was found that all respondents did not receive the required quantity of wheat seeds recommended and recommended by government sources for the winter season 2016/2017. This is because the quantity of seeds fitted to the farmer 30 kg / dunum, while the scientific recommendation of wheat seeds 40 45 kg / dunum [21]. Moreover, the quantities of wheat seeds provided for agriculture are enough to grow 50% of the total area of the department, this means, and cultivation of 6120 dunums of the total area of 12240 dunums. It concludes the following: most of the respondents did

c.

not receive enough wheat seeds from their official sources, forcing them to buy wheat seeds from local markets or using existing seeds in their own farms or purchasing from other farmers in the area to complete the requirements of agriculture. This exposes the seeds to mixing, causing negative results on productivity and on the quality of seeds that are provided by the farmers for the next season. As well as the high costs of cultivation of these seeds, causing the lack of economic returns to the farmers.

- b. It was found that 66.67% of the respondents use 50 kg / dunum and above, and 33.33% of the respondents use the recommended quantity of seeds (4045 kg / dunum). As shown in Table (5).

**Table 5:** Respondents distribution according to quantity of Wheat Seeds used

Quantity of Wheat Seeds Used	Number	Percentage (%)
Not using recommended seeds quantity	60	66.67
Using recommended seeds quantity	30	33.33
<b>Total</b>	<b>90</b>	<b>100</b>

Table (5) shows the majority of the respondents use a quantity of wheat seeds more than the recommended quantity because of their reliance on manual seeding. The low fertility of agricultural land due to its continued cultivation and the failure to follow the agricultural cycle system, So farmers should use more seeds than recommended to get high plant density, Leading to failure to produce a high percentage of seeds and economic loss for farmers because of increased costs, obtaining a low plant density for the unit area, which results in problems

experienced by plants with the stages of growth (Lodging, competition between plants and bush on water and light and nutrients, etc.). In the end, developing plants are very weak, resulting in low productivity and poor quality of Product yield.

### 3. Method of cultivated improved wheat seeds

It was found that 13.33% of the respondents use recommended mechanical sowing technology in the winter season of 2016/2017, and 86.67 of the respondents use manual sowing as shown in Table (6).

**Table 6:** Respondents distribution according to method of cultivated improved wheat seeds

Method of cultivated improved wheat seeds	Number	Percentage (%)
Manual sowing	78	86.67
Mechanical sowing	12	13.33
<b>Total</b>	<b>90</b>	<b>100</b>

Table (6) shows that most of the respondents use the method of manual sowing because they not own mechanical seeder, in addition to the lack of cultivation land for them

(possession), they are small farmers (Who own a cultivation area of 50 dunums or less) [19].

**4. Cultivation date of improved wheat seeds**

It was found that 23.33% of the respondents are cultivating wheat at the recommended

cultivating date in the winter season 2017/2016 as shown in Table (7).

**Table 7:** Respondents distribution according to cultivation date of improved wheat seeds

Cultivation date of improved wheat seeds	Number	Percentage (%)
Early before recommended cultivation date	69	76.67
At the recommended cultivation date	21	23.33
<b>Total</b>	90	100

Table (7) shows that most of the respondents cultivate wheat seeds Early before the duration of recommended cultivating date, with beginning of irrigating germination period prescribed by the Directorate of Water Resources in the governorate to address the problem of water scarcity. The delay in the cultivation of wheat leads to non-cultivation because of the difficulty of got of irrigation water after that date.

**Second axis: Applying of scientific recommendations for using of chemical fertilizers in wheat cultivating**

**First: The Applying of the scientific recommendations for using of chemical fertilizers**

The highest numerical value for applying the recommended scientific recommendations for using of the recommended chemical fertilizers was 24° and the lowest numerical value was 14°, with an average of 17.20°, on a scale consisting of 8 paragraphs. The numerical values ranged from 8° to 24°, where 75.56% of the respondents were the level of their applying of scientific recommendations for using of chemical fertilizers recommended described as a medium, an average of its value 20.90° as shown in Table (8).

**Table 8:** Level of applying scientific recommendations by respondents to using of chemical fertilizers

Categories	Range Values	Average Values	Number	Percentage (%)
<b>Low</b>	8 —13	0	0	0
<b>Medium</b>	14 —19	16	68	75.56
<b>High</b>	20 —24	20.90	22	24.44
<b>Total</b>	8 — 24	17.20	90	100

Table (8) shows that the level of applying of scientific recommendations for using of chemical fertilizers recommended in the respondents farms in Al-mahaweel region, it is described as medium, this negatively affects the productivity, production and economic returns of the farmers. This due to several reasons, such inadequate quantities and quality of provided chemical fertilizers and weak indicative activity.

**Second: Describe the Level of applying scientific recommendations by respondents to using of chemical fertilizers**

1. The types of chemical fertilizers processed for the department's cultivation in the cultivation season 2016/2017 of the Agricultural Equipment Company / Babylon are (urea and dap), which are recommended types of agricultural research and extension cultivation in the country [20].
2. The using recommended amounts of chemical fertilizers

It was found that 25.56% of the respondents use recommended urea and 16.67% use recommended dap as shown in Table (9).



**Table 9:** Respondents Distribution according to the amount of fertilizer used

Fertilizer Type	Using Recommended Fertilizers Quantity		Not Using Recommended Quantity Fertilizers	
	Number	Percentage (%)	Number	Percentage (%)
Urea	23	25.56	67	74.44
Dap	15	16.67	75	83.33

Table (9) concludes:

- Most of the respondents do not use the recommended quantities of chemical fertilizers of urea and dap in the cultivation of wheat crop and this affects the productivity of the crop and the quality of the product. The achievement of the required productivity depends to a large extent on the good use of inputs of production and the most important use of quantities of chemical fertilizers according to scientific recommendations.
- The non-using of the recommended quantities of fertilizers is due to several reasons, including: The low amount of fertilizers supplied to the farmer. The amount of urea fertilizer that provided was 50 kg / dunum and the fertilizer of the dap 30 kg / dunum, while the scientific recommendation of urea fertilizer 65 kg / dunum and dap fertilizer were 50 kg / dunum [19], Most farmers resorted to cultivating agricultural lands outside the cultivation plan and hence their need
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for fertilizers. In addition to the cultivated land under the plan, the increase in the prices of commercial fertilizers compared to government prices has made it difficult to compensate for the lack of fertilizer for farmers because most of them are poor [11], most of them do not Obtain the financial dues from the state to the wheat marketer yield by them and for two years, Most farmers do not know the quantities of urea and dap fertilizer to be used according to the scientific recommendation because of the weakness of the extension activity provided to them.

#### **Method of adding recommended chemical fertilizer**

- All respondents were using the method of adding recommended urea fertilizer, which is the manual sowing in winter season 2017/2016.
- It was found that 10% of the respondents use the method of adding recommended dap fertilizer, which is the fertilized fertilizer in winter season 2017/2016 as shown in Table (10).

**Table 10:** Respondents distribution according to the method of adding dap fertilizer

Method of adding dap fertilizer	Number	Percentage (%)
Recommended addition method	9	10
Not recommended addition method	81	90
Total	90	100

Table (10) that Most of the respondents using manual sowing method for dap fertilizer (traditional method), which is one of the important factors in the low level of applying of scientific recommendations for dap fertilizer, which negatively affect the productivity achieved.

#### **4. Date of addition of recommended chemical fertilizers**

It was found that all respondents use urea and dap fertilizer in the form of batches in the winter season 2016/2017 and according to the scientific recommendations at the stages of growth of the crop, dab before cultivating with the tillage and specifically with the smoothing, to mixing the fertilizer well with the soil, and urea on the first two stages at the beginning of the branches stage and the second at the beginning of the Booting Stage [19].

**Third axis: The level of applying of the scientific recommendations for using of improved wheat seeds and chemical fertilizers recommended in the work region of Al-mahaweel cultivation department.**

The highest numerical value for the applying of scientific recommendations for using of improved wheat seeds and recommended chemical fertilizers was 34° and the lowest

numerical value was 22°, with an average of 25.12°, on a scale consisting of 12 paragraphs. Its numerical values ranged from 12-35°, where 85.56% of the respondents were the level of their applying of scientific recommendations for using of improved wheat seeds and recommended chemical fertilizers is described as medium, an average of its value 24.22° as shown in Table (11).

**Table 11:** Level of applying scientific recommendations by respondents to Using Improved Wheat Seeds and Chemical Fertilizers

Categories	Range Values	Average Values	Number	Percentage (%)
Low	12 – 19	0	0	0
Medium	20 – 27	24.22	77	85.56
High	28 – 35	30.46	13	14.44
Total	12 – 35	25.12	90	100

Table (11) shows that the level of applying of scientific recommendations for using of improved wheat seeds and chemical fertilizers recommended in the farms of the respondents in Al-mahaweel region is described as medium, this negatively affects the productivity, production and economic returns of the farmers. This due to several reasons, such inadequate quantities and quality of provided chemical fertilizers and weak indicative activity.

## CONCLUSIONS

1. Insufficient quantity and quality of provided wheat seeds and chemical fertilizer for cultivation is a major factor in the low level of dissemination and applying of the scientific recommendations of these technologies.
2. The limited level of applying of scientific recommendations for using of improved wheat seeds and chemical fertilizer for cultivation is one of the main factors affecting the low productivity of wheat.
3. The weakness of the extension activity provided to farmers in the using of improved wheat seed technology and chemical fertilizers in quantity, quality and timing is a major reason for the weak implementation of the scientific

recommendations of these technologies.

## RECOMMENDATIONS

1. The importance of meeting the requirements of farmers such as provided the improved wheat seeds and chemical fertilizers technologies in either quantity or quality and timing by the processing and extension government institutions guide them to the proper use of these technologies, follow up their application and with the continuous evaluation of these activities.
2. Intensifying the extension activities by the extension agencies in the governorate to encourage wheat farmers to using the improved wheat seeds and chemical fertilizers technology in quantity, quality and timing and to apply the correct scientific recommendations to them.

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