

## THE REALITY OF AGRICULTURAL TECHNIQUES USED BY FARMERS TO REDUCE LOSSES IN WHEAT AND BARLEY CROPS IN THE GOVERNORATES OF THE CENTRAL REGION OF IRAQ

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### ABSTRACT

The objective of this research to investigate the agricultural techniques used by farmers in reducing the losses of wheat and barley crops in the governorates of the central of Iraq. To achieve the research objectives, use descriptive approach, which is one of the research methods The eight governorates of the central region of Iraq were selected except of Salah al-Din and Anbar were excluded due to poor security conditions. Random sampleS of 50% were selected from three governorates covered (Najaf, Karbala, Babylon) with 33, agricultural divisions (25%) and 8, agricultural divisions distributed over the governorates were covered by the research. A random sample of 1% of the wheat and barley farmers were selected in the agricultural population covered by the research and 152, farmers. In order to obtain the information, a questionnaire was prepared for this purpose, which included 38, paragraphs distributed over 8, axes. The results revealed a decrease in the level of knowledge among farmers in the quantities of losses before and during the harvest, and the lack of numbers of harvesters and their distribution is incorrect, most of them of the old type, and the low knowledge of farmers the importance of harvesting organizations. It can be recommends the use of modern agricultural techniques and increases the numbers, productable for cultivate areas.

**Keywords:** Agricultural techniques, waste, wheat and barley and agriculture  
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واقع التقانات الزراعية المستخدمة من قبل الزراع لتقليل الفاقد لمحصولي الحنطة والشعير في محافظات المنطقة الوسطى من العراق

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المستخلص

أستهدف البحث تحديد التقانات الزراعية المستخدمة من قبل الزراع في تقليل الفاقد لمحصولي الحنطة والشعير في محافظات عينة البحث والمتمثلة بالاتي: أ- تقانات قبل الحصاد. ب- تقانات اثناء الحصاد. وتحقيقاً لأهداف البحث استخدم المنهج الوصفي الذي يعد أحد مناهج البحث. وتم اختيار محافظات المنطقة الوسطى من العراق والبالغ عددها (8) محافظات وأستبعدت محافظتي صلاح الدين والانبار لسوء الظروف الأمنية وأصبحت (6) محافظات واختيرت عينة عشوائية بنسبة 50% بواقع ثلاث محافظات مشمولة بالبحث هي (النجف الاشرف، كربلاء المقدسة، بابل)، وأختيرت عينة عشوائية من الشعب الزراعية والبالغ عددها (33) شعبة زراعية بنسبة 25% وبواقع (8) شعب زراعية موزعة على المحافظات المشمولة بالبحث، وأختيرت عينة عشوائية بنسبة 1% من زراع الحنطة والشعير في الشعب الزراعية المشمولة بالبحث وبواقع (152) زارعاً. وللحصول على المعلومات اعدت استبانة لهذا الغرض اشتملت على (38) فقرة موزعة على (8) محاور. وقد خلصت نتائج البحث بأنخفاض في مستوى المعرفة لدى الزراع بكميات الفاقد قبل الحصاد وفي اثناء الحصاد، وقلة اعداد الحاصدات وتوزيعها غير الصحيح، فضلاً ان اغلبها من النوع القديم، وأنخفاض معرفة الزراع بأهمية تنظيمات الحاصدات. ويوصي الباحث بوجود استخدام تقانات زراعية حديثة وزيادة اعدادها وكمياتها وتوزيعها بما يتلائم مع المساحات المزروعة.

الكلمات المفتاحية: التقانات الزراعية، الفاقد، الحنطة والشعير، زراع

بحث مستل من رسالة ماجستير للباحث الاوول

## INTRODUCTION

The agricultural sector is one of the main axes in the global economy, which is represented in the agricultural, industrial and commercial sectors and has a major role in the development of societies. This sector consists of two axes: the crop axis and the animal axis. Cereal crops are one of the main pillars of the plant's axis, as well as the basic source of human food, so all countries of the world are interested in the attention of these crops because of the great importance in reducing the food gap and fill the food deficit to self-sufficiency (2). One of the most prominent manifestations of the economic crisis in developing countries, including Iraq, is the problem of food production deficit. This indicates the failure of the economic and developmental policies adopted, so overcoming this problem is the concern of all developing countries (17). Iraq is one of the developing countries targeted in its economic and food security, and should be expanded in the production of wheat and barley crops and its ability to do so because it has the basic elements of the land is valid and irrigation water (4). The issue of a food protect is still related to our lives and stability in view of our reliance on food imports abroad, which has made Iraq a food deficit country (12). But there is a problem of wheat production, which did not covered the demand . There is also a real gap between the supply and demand of the wheat crop, which is equivalent to about 70% of the needs and the rate of sufficiency is only about 30% (10). To achieve the highest goals of self-sufficiency and intensify efforts to narrow the gap between food demand and production. To achieve these goals, the state should help farmers overcome the obstacles facing them and keep pace with developments in the production and marketing process. (3). The most important problems that lead to the reduction of production and productivity is the problem of loss (rumours), and the problem of loss is a global problem, as it has received great attention and became the subject of a global vision, according to studies by the Food and Agriculture Organization (FAO), one-third of the crop is lost and estimated This is equivalent to 1.3 billion tons per year. Given the scope of the loss, this reality cannot be

treated as an opposition, but as an integral part of agricultural systems. Losses are the result of the consequences of the functioning of agricultural systems (18). The importance of the problem of loss was considered in the symposium held at the Egyptian Association for Political Economy in 2011, which is represented in seven axes, the first was to increase agricultural productivity and the second axis to reduce the losses in production (15). Losses effect a major role in the economies of developing countries, as they suffer from a continuing shortage of production as well as difficult production and high costs (16).It is possible to understand the importance and seriousness of the problem of waste if we know that the rate of growth of production in the agricultural sector did not reach 2% at a time when the percentage of loss of grain crops during the harvesting machine to 35% (7). The reduction of losses may have an immediate and significant impact on their livelihoods (3). The reduction of production and productivity losses can be controlled or mitigated using agricultural technologies and raising awareness among farmers about the importance of waste and its economic damage. Therefore, farmers should be assisted to overcome the obstacles facing them in the use of agricultural technologies. Hence, the research problem stems from the following question: What are the agricultural technologies used by wheat and barley farmers in the governorates of the research sample represented by the following:

- A) Pre-harvest technologies.
- B) Technologies during harvest.

## THE AIM

Identification of agricultural technologies used by farmers to reducing the losses of wheat and barley crops in the governorates of the research sample, namely:

- A) Pre-harvest technologies.
- B) Technologies during harvest.

## THE HYPOTHESIS

Decreased use of agricultural technologies by farmers to reduce the losses of wheat and barley crops in the governorates of the central region of Iraq.

**MATERIAL AND METHODS:** For the purpose of data collection, a questionnaire was prepared which included a number of

paragraphs, each of which expresses a problem identified through literature and the views of a group of specialists in agricultural extension and field crops. The number of paragraphs (41) divided by (9) axes and after the completion of the questionnaire, Specialists in agricultural extension and field crops to ascertain the truthfulness and authenticity of the content, and based on their observations have been modified and the formulation of some paragraphs to be appropriate to achieve the objectives of the research. Then, the first test of the pre-test for stability in August 2016 was carried out on a random sample of farmers in the agriculture division of the Taleaa in the governorate of Babylon 1813, farmer by 1% and by 18 farmers. In order to determine the stability and validity of the scale, The Vaccronbach coefficient was used as the stability coefficient of the scale (0.94) which indicates the high stability of the scale. After the completion of the questionnaire in its final

form, the data were collected during the period from 20/9/2016 to 6/1/2017.

#### METHODOLOGY

In order to achieve the goal of the research, use the descriptive approach, because it is one of the best methods of providing a real data a well-considered problem to ensure that it is clearly defined and that appropriate solutions and proposals are developed to address constraints.

#### COMMUNITY AND SAMPLE

The governorates of al-Anbar and Salah al-Din were excluded for poor security conditions and became, 6 governorates. A random sample of 50% was selected. Three governorates were surveyed (Najaf, Karbala, Babel) A random sample of 33 agricultural divisions was distributed by 25% with 8 agricultural divisions. A random sample was selected with 1% of the wheat and barley farmers and 152 farms as shown in Table 1.

**Table 1: Society and Research Sample**

No	The Governora te	The Numbers of the agricultural departments	25%	Numbers of agricultural departments sample research	Number of farmers	1% after the number rounded
1	Babel	16	4	Al-kifl	1620	16
				Al-nayl	2499	25
				Al-hashmy	1369	14
				Al-qasim	1477	15
2	Karbala	8	2	Al-jadwal Al-gharbiu	958	10
				Al-khayrat	493	5
3	Najaf	9	2	Al-eabbasia	4220	42
				Al-mashkhab	2486	25
Total		33	8		15122	152

#### DATA COLLECTION TOOL

For the purpose of data collection, a questionnaire was prepared which included a number of paragraphs, each of which expresses a problem identified through literature and the views of a group of specialists in agricultural extension and field crops. The number of paragraphs (41) divided by (9) axes and after the completion of the questionnaire, Specialists in agricultural extension and field crops to ascertain the truthfulness and authenticity of the content, and based on their observations have been modified and the formulation of some paragraphs to be appropriate to achieve the objectives of the research. Then, the first test of the pre-test for stability in August 2016 was carried out on a random sample of farmers in

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#### TAB AND DATA ANALYSIS

The data tab was manually analysed by the researcher, and then analysed using statistical programs (Spss) and (Excel). The following statistical methods were adopted:

1 - Use of the midterm split coefficient to measure the stability of axes and paragraphs.

2. Use percentage to describe several values for the results obtained by the researcher from the respondents' answers.

**RESULT AND DISCUSSION**

Identification of agricultural technologies used by farmers in reducing the losses of wheat and

barley crops in the governorates of the research sample represented by:

First: Pre-harvest technologies include:

1- Field Preparation: The results showed that 88.82% of the wheat and barley crops were in tillage, and 11.18% did not tillage. As shown in Table 2:

**Table 2. Distribution of respondents according to the axis of formation**

Axis of ground formation	Yes		No	
	Repetition	Percentage	Repetition	Percentage
Plough the ground	135	88.82	17	11.18
Normal adjustment	130	85.53	22	14.47
Laser leveling is used	32	21	120	79

As shown in the Table 2.

1 - The clear maturity of wheat and barley farmers are the process of to prepare the land for agriculture, and this is a good indicator, as the process of management helps to prepare a good seed bed for germination, and this reduces the process of loss resulting from the process of seed, and a small percentage of the farmers did not process the management through the use of overlapping agriculture, and most of the farmers who do not management are the farmers of the crop in the research area, specifically at the province of Najaf, they grow wheat without plowing. Poor management curse varying germination rates and the exposure of seeds to losses resulting from environmental effect, such as, birds, and rodents, which in turn leads to a decrease in the number of seedlings that lead to a decrease in production, so the process of management should be emphasized to reduce waste and increase production.

3. A high proportion of wheat and barley farmers perform the traditional settlement process using the modified grading machine, and a few wheat and barley farmers did not process the settlement. This is a good

indication that the use of the pre-planting adjustment results in the fairly flat soil, thus producing a good distribution of seeds and a good distribution of water, resulting in equal and homogenous germination, all of which significantly affect the harvest process and calibrate the harvester.

2. More than three-quarters of the wheat and barley farmers did not perform the setting process using the laser levelling machine, and less than a quarter of the wheat and barley farm perform the adjustment using the laser levelling machine. This is due to the fact that the laser levelling machine is used only in the wheat and plant development program covered by the program. The expansion can be used by this machine because of its significant impact on reducing the losses in the seed process, the distribution of water, the harvesting process and the calibration of the harvester.

**2- SEED PROCESSING**

The results showed that 80.26% of the wheat and barley farmers had no knowledge of the optimal speed of the seed, and 19.74% of the wheat and barley farmers had knowledge of the ideal speed of the seed. As shown in Table 3.

**Table 3. Distribution of respondents according to the axis of the seed process**

Seed axis	Yes		No	
	Repetition	The Percentage	Repetition	The Percentage
The traditional sowing method is used	106	69.74	46	30.26
The automatic seed method is used	53	34.87	99	65.13
They have an efficient knowledge of the seedlings	38	25	114	75
They have knowledge of the perfect speed of the seed	30	19.74	122	80.26
They have the proper depth knowledge of the seed	31	20.4	121	79.6

As shown in the Table 3.

1. More than two-thirds of the wheat and barley farmers use the traditional seed processing method, and less than a third of the wheat and barley farmers do not use the traditional seed processing method. This indicates that there is a loss in the seed process and the lack of good seed distribution results in germination of unequal and heterogeneous density that greatly affects to the plant population and spiels fettling then to harvesting and thus leads to significant loss of production.

2 - About 65% of the wheat and barley farmers do not use the seedling method in the seed process, and more than a third of the wheat and barley crops are used in the seedling process. This is a negative indicator because the seed is of great importance in the distribution of seeds well and reduce the rate of loss in the seed process. This results in inconsistent and heterogeneous fields that greatly affect the harvesting process and, consequently, production. Three-quarters of the wheat and barley farmers have unknown the difference in the efficiency of the seedlings, and a quarter of the respondents from the wheat and barley farmers have knowledge of the difference in the efficiency of the seeds and their types. This is duets, most farmers use the available fertilizers in the markets and used in the region without

knowing the difference in efficiency of other seedlings. The use of low-quality seeds leads to loss in the seed process and thus affects the germination percent, which has a significant impact on the loss of production (11).

4. Most wheat and barley farmers have unknown of the optimal speed of the seedling process, and a small proportion of wheat and barley farmers have this knowledge of the optimal speed in the seed process. This is a negative indicator because the lack of knowledge of the optimal speed in the seed process leads to the irregular distribution of the seeds, and thus leads to a loss in the seed process, resulting in germination and irregular density, and will affect the harvest process and the production process.)

5 - Most wheat and barley farmers have unknown of the appropriate depth of the seed process using the atom, and that a small proportion has knowledge of the appropriate depth of the seed process, and that lack of knowledge of the appropriate depth of the seed process leads to a loss in the seed process resulting in irregular germination and this, in turn, affects the production process. (11).

### 3- FERTILIZATION PROCESS

The results showed that 93.42% of the wheat and barley farmers did not use the spray fertilization method, and 6.58% of the wheat and barley farmers used the spray fertilization method, as shown in Table 4.

**Table 4. Distribution of respondents according to the axis of fertilization process**

Fertilization method	Yes		No	
	Repetition	The percentage	Repetition	The percentage
Uses traditional fertilization method	100	65.79	52	34.21
Uses automatic fertilization method	61	40.13	91	59.87
Spray spraying is used	10	6.58	142	93.42
They have knowledge of Urea fertilizer	71	46.71	81	53.29
Adds urea doses as recommended	54	35.53	98	64.47
They had knowledge of the compound fertilizer dose	65	42.76	87	57.24
Add compound dose as recommendations	46	30.26	106	69.74

As shown in the Table 4.

1. Nearly two-thirds of the wheat and barley farmers use the traditional method of fertilization (prose), and more than a third of the wheat and barley crops did not use the traditional method of fertilization (prose). The process of fertilization plays a major role in increasing production. In the traditional fertilization method, manure did not wesel distributed, resulting in unequal plants and uneven fields. This greatly affects the loss of

harvesting. Moreover, regularly affects the amount of production.

2. More than half of the wheat and barley farmers do not use the perfect fertilization method, and less than half of the wheat and barley farmers use the fertilized fertilizer method. This is due to the negative indicator, due to the lack of numbers of machines fertilizers and high prices as the process of machines fertilization of great importance in the distribution of fertilizer in equal amounts and predefined quantities, as well as the use of

fertilizers in the process of fertilization investment effort and time, and that the non-use of fertilizer produces plants Unequal growth, greatly affecting harvest and production.

3. The clear majority of wheat and barley farmers did not use the spray fertilization method, and very few wheat and barley farmers use the spray fertilization method. This is due to the fact that the spray fertilization method is used by farmers using fixed and pivotal spray irrigation technologies, and the Ministry of Agriculture prepares the farmers with special fertilizer (micro-components).

4. More than half of wheat and barley farmers have no knowledge of the scientifically recommended dose of urea, and less than half of the wheat and barley farmers have knowledge of the scientifically recommended dose of urea fertilizer. This is due to the absence of agricultural extension activates on the importance of fertilization and appropriate doses. This leads to the use of inappropriate doses that affect the growth of the plant because the fertilizer of urea has a significant impact on the vegetative growth of the plant, resulting in unequal plants and fields heterogeneous and this affects the proportion of loss in harvest and production.

5. Less than two thirds of the wheat and barley farmers did not add urea fertilizer according to scientific recommendations, and more than a third of the wheat and barley crops add urea fertilizer according to scientific recommendations. This is due to the low quota of urea fertilizer from the Ministry of Agriculture in the agricultural plan, as well as high fertilizer prices in the markets. This results in the non-addition of doses of urea fertilizer according to scientific

recommendations causing a significant loss in the total production of wheat and barley, as scientific research has confirmed that the addition of fertilizer urea doses give good plants to grow and development, as well as an increase in the amount of production.

6. More than half of the wheat and barley farmers have no knowledge of the scientifically recommended compound fertilizer for wheat and barley crops, and less than half of the wheat and barley farmers have knowledge of the compound fertilizer recommended scientifically for the crop, and the lack of knowledge of the dose of compost compound and the addition of inadequate amounts and at the appropriate time resulted in unequal plants in germination and fields of heterogeneous, as this affects the proportion of loss in the processes of harvesting and production.

7. More than two thirds of the wheat and barley farmers don't were the compound fertilizer dose according to scientific recommendations, and less than a third of the wheat and barley farmers add the compound fertilizer dose according to the scientific recommendations. This is due to the low share of the compound fertilizer planned by the Ministry of Agriculture in the agricultural plan, as well as the high fertilizer prices in the markets. Which results in a decrease in the dose of compost, and this is a negative indicator because the lack of addition of compound fertilizer in sufficient quantities leads to a decrease in total production.

#### 4- SEED VARIETIES:

A) Use of improved seed varieties: The results showed that 94.73% of wheat and barley crops did not use certified seed varieties, and 5.27% of wheat and barley crops used varieties of certified seeds, as shown in Table 5.=

**Table 5. Distribution of respondents according to their use of seed varieties**

Seed varieties	Yes		No	
	Repetition	The percentage	Repetition	The percentage
They use improved seed varieties	118	77.63	34	22.37
They use seed varieties early in maturity	32	21	120	79
Using varieties of late-ripening seeds	8	5.27	144	94.73
They use new seed varieties	110	72.37	42	27.63
They use easy-to-break seed varieties	39	25.66	113	74.34

As shown in the table above

1. More than three-quarters of the wheat and barley farmers use improved seeds, and less than a quarter of the wheat and barley farmers

do not use improved seed varieties. This is a good indication that the use of improved varieties and certified by the competent authorities reduce the rate of loss, and further

increase productivity. The reason for the lack of use of improved varieties of some farmers is their adherence to the cultivation of a species and their lack of conviction of improved varieties, leading to a loss in the crop.

2. More than three-quarters of the respondents from wheat and barley farmers don't use early seed varieties with maturity, and less than a quarter of the wheat and barley farmers use early seed varieties. The researcher interviewed the farmers during the data collection. The reason for their use of early seed varieties is that they are easy to harvest and that they are afraid of climatic conditions. This is due to the low number of harvesters compared to cultivated areas. In the process of harvesting leads to a significant loss in these varieties, which affects the total production.

3. The clear majority of wheat and barley farmers don't use varieties of late-ripening seeds, and very few use late-ripening seeds. This is a good indicator because it is not

4. Less than three-quarters of the wheat and barley farmers use new seed varieties, and more than a quarter of the wheat and barley farmers do not use new varieties, and the use by farmers of the varieties used and approved is due to their fear of new varieties. This is a good indicator because of the high rate of adoption of new technologies, especially those that have a significant impact on the increase in production.

5. About three-quarters of the respondents of wheat and barley farmers do not use easy-to-get seed varieties, and one-quarter of the wheat and barley farmers use easy-to-get seed varieties. This is a negative indicator because the use of varieties of seeds is easy to break and their dependence on farmers increases the rate of loss, Total production.

**5. Pest control:**

A) Use of pesticides to combat the insects and deceases infection. Search results for all respondents and 100% uses pesticides to fight the bush. As shown in Table 6.

**Table 6. Table of distribution of respondents according to the axis of pest control**

Pest Control	Yes		No	
	Repetition	The percentage	Repetition	The percentage
They use pesticides to fight the bush	152	100	0	0
They use pesticides to fight insects	20	13.16	132	86.84
They use pesticides to fight diseases	11	7.24	141	92.76
Using bird ejection technology	10	6.6	142	93.4
They conduct rodent control	7	4.6	145	95.4

as shown in the Table 6.

1 - All the wheat and barley farmers use pesticides to fight the bush. This is a good indicator of its benefits in reducing losses. Fighting the bush helps to produce well-planted fields, as well as producing a crop free of impurities. This shows the farmers' awareness of the importance of fighting the bush.

2 - Most wheat and barley farmers don't use pesticides to fight insects, and that a small proportion of respondents use pesticides to control insects, and this is a negative indicator, because the control of insects is important in reducing waste and increase production.

3. The clear majority of wheat and barley farmers do not use pesticides to fight diseases, and very few wheat and barley farmers use pesticides to fight diseases. This is due to the lack of awareness among the farmers of the importance of disease control because of its

significant impact in reducing losses as well as improving the quality and quantity of production.

4. The clear majority of the wheat and barley farmers do not use the technology of ejecting birds, and very few of them use the technology of ejecting birds. This is due to the non-proliferation of this technology, and most of the respondents were unaware of its existence.

5 - The clear majority of respondents do not run the process of rodent control, and a small proportion of respondents conducting the process of control rodents. This is due to a lack of awareness of the losses incurred by farmers as a result of non-control of rodent pest.

**6. irrigation process:**

(A) The use of ancient irrigation methods (immersion), or by means of: The results of the study showed that 96% of the wheat and barley farmers had knowledge of the latest date (Raya al- weaning) and that 4% of the

wheat and barley farmers were aware of the date of the last date (Raya al- weaning). As shown in Table 7.

**Table 7: Distribution of respondents according to the axis of the irrigation process**

Irrigation process	Yes		No	
	Repetition	The percentage	Repetition	The percentage
Using ancient irrigation methods (immersion)	144	94.74	8	5.26
Using modern irrigation methods (sprinkler irrigation)	12	7.9	140	92.1
He has knowledge of another date (Raya weaning)	146	96	6	4

As shown in the table above

1. The vast majority of the wheat and barley farmers use irrigation methods (irrigation) or irrigation, and a small proportion do not use old irrigation methods. This is due to the non-proliferation of modern irrigation methods. This old method leads to waste in the water, as well as uneven distribution in the field, resulting in heterogeneous plants in the branches affecting the percentage of loss in the harvest process as well as the total production.
2. The clear majority of wheat and barley farmers do not use modern irrigation methods (sprinkler irrigation). Very few of the wheat and barley farmers use modern irrigation methods (spray irrigation). This is due to the low prevalence of irrigation technologies, which greatly affect the amount of water used, resulting in heterogeneous plants in the fields,

which affects the percentage of losses in the harvest process as well as the total production.

3. The clear majority of the wheat and barley farmers have the knowledge of the latest date (Raya weaning) and a very small percentage have no knowledge of the date of the last date (Raya weaning). This is a good indicator because of the impact of weaning on the moisture content in grains Affect the percentage of loss in the harvest process and this is confirmed by (5).

**Second: Technologies during harvest:**

**1- Harvest date:**

**A) Harvesting before maturity:** The results of the study showed that all respondents of wheat and barley crops did not initiate the harvesting process before the maturity date and by 100%. As shown in Table 8.

**Table 8: Distribution of respondents according to the axis of the date of harvest**

Harvest date	Yes		No	
	Repetition	The percentage	Repetition	The percentage
They conduct harvesting before maturity	0	0	152	100
They conduct the harvesting process at maturity	127	83.55	25	16.45

as shown in the Table 8.

- 1 - All the respondents of wheat and barley farmers do not run the harvest before maturity. This is one of the good indicators that reduce the rate of loss because the process of harvesting before maturity, where the humidity is high, leading to a loss in the harvest during harvest, and this is confirmed by both (2).
2. The clear majority of the wheat and barley farmers conduct the harvesting process at the maturity date, and very few respondents do not initiate the harvesting process at the maturity date. The harvest process at the maturity date gives a more favourable harvest, less damage,

loss, and the delayed date of harvest gives a less favourable harvest, and the highest percentage of damage and loss (6). This is a good indication that harvesting at maturity will reduce the loss.

**2. The method of harvesting:**

**A. Harvesting by the manual method:** The results of the study showed that 88.8% of the wheat and barley farmers conducted the harvesting method mechanically, and 11.2% of the wheat and barley farmers did not perform the harvesting method mechanically. As shown in Table 9.



**Table 9: Distribution of respondents according to the axis of the harvest method**

Harvest method	Yes		No	
	Repetition	The percentage	Repetition	The percentage
They conduct the harvesting process in a manual manner	23	15.13	129	84.87
They conduct the harvesting process mechanically	135	88.8	17	11.2
They use old harvesters in the harvesting process	109	71.71	43	28.29
He has knowledge of the ideal speed of the harvester	15	9.9	137	90.1
They have knowledge of the importance of calibration of harvester	50	32.9	102	67.1

The table above shows:

1 - Most the respondents from the wheat and barley farmers do not carry out the harvest process manually, and a small proportion of the wheat and barley farmers conduct the harvesting process by hand. This is due to the low number of harvesters compared to cultivated areas, as well as the increasing number of farmers with small agricultural holdings, so farmers are carrying out the process of harvesting in a manual way that significantly affects the proportion of loss in the harvest, as well as the effort of the farmers.

2. The majority of the wheat and barley farmers conduct the harvesting process in the mechanical way (the harvester), and a small percentage of the wheat and barley farmers do not carry out the harvesting process in a mechanic manner. The reason for the non-use of the mechanical method (harvesting) in the harvest of some farmers is the lack of agricultural tenure, and the small number of harvesters that lead to delayed harvest date, and topography of the field and this, in turn, leads to increasing the proportion of loss.

3. Nearly three-quarters of the respondents from wheat and barley farmers use old harvesters in the harvesting process, and more than a quarter of the respondents do not use old harvesters in the harvesting process. This is one of the indicators that increase the rate of loss because the old harvesters have a higher percentage of losses than modern harvesters. This result is in line with the findings of Al-Qazzaz (2010), Mirasi and Autres. The reason for the lack of modern harvesters is the low number, high prices and shortening of harvest.

4. The clear majority of wheat and barley farmers have no knowledge of the ideal speed of the harvest, which reduces the loss of

harvest. A small proportion of the wheat and barley farmers have the knowledge of the ideal speed of the harvest which reduces the loss of harvesting. This is a negative indicator because the speed of the harvest has a significant role in reducing the loss in the process of harvesting and this is confirmed by both Qazzaz (Qazaz), Alawan and Aldakhel (5), Rajbo and Alba (6).

5. Two-thirds of the wheat and barley farmers have no knowledge of the importance of calibrating the harvest to reduce the loss of harvesting. One-third of the wheat and barley farmers have the knowledge of the importance of calibrating the harvester to reduce the loss of harvest. This is a negative indicator of the calibration of the harvester of great importance in reducing the loss, and this is confirmed by Alwan and Aldakhel (5).

decreased in the level of knowledge among farmers in the quantities of losses before harvest. the scarcity of private research that considers practices and procedures before harvest and their relationship to the quantity and percentage of loss.

The lack of numbers of harvesters and their distribution, as well as the age limitation of the harvesters, is mainly a factor in increasing the percentage of loss. The farmer is not aware of the importance of the harvester organizations (speed and calibration of the harvester) which have a big role in increasing the percentage of loss. Recommendations: The researcher recommends that it is very important:

1 - The need to adopt the results of the research by the Department of Extension and Agricultural Training in the Ministry of Agriculture.

2 - The use of modern agricultural technologies and increase the numbers,

quantities, and distribution in line with the cultivated areas.

3 - Increase the extension activities that illustrate the importance of agricultural technologies in reducing losses.

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