



THE ROLE OF HIGH RANK WHEAT SEED MAXIMIZATION PROGRAM IN DEVELOPING WORKERS ABILITIES IN THE MIDDLE AND SOUTH OF IRAQ

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Abstract

The research aimed to know the roles played by the program of propagation of the High Seeds Order of wheat crop in developing the abilities of workers in the central and southern regions of Iraq, in the following fields and axes: (Seed production, which includes the axes (characterized of cultivars, order maintain, field purification, field inspection, seed purification, seed storage, production sustainability), and to achieve the objectives of the questionnaire was built, which included a five-point measure to measure Roles consist of (50) paragraphs distributed over areas and axes. The central and southern provinces of Iraq were chosen as an area to conduct the research, and a random sample (45%) with a percentage of (4) was selected from the central provinces (2) from the southern provinces (Baghdad, Babylon, Najaf al-Ashraf, Tikrit, Muthanna, Dhi Qar). The search included all Workers in the stations. The results of the research concluded that the weighted weights for the role of the program in the Mentioned above fields are (3.511, 3.614, 3.472, 3.42, 3.494, 3.552, 2.993) degrees, respectively, and they are all higher than the assumed mean of the scale of (2) degree, which confirms that the program has played important and positive roles. The researcher recommends raising the level of representation of the program to an institution for seed production that is at the forefront of food security, and providing province support for the program, confirming the continuation and expansion of applying the decentralized work mechanism in developing plans and implementing them as well as applying them in other programs.

Key words: wheat seed, maximization program, south of Iraq

Introduction

Food security is one of the biggest challenges facing the world in this stage and the coming stages, as sustainable increases in agricultural production must be achieved to meet the growing needs for food. Grain crops are important in a person's life, as most of the world's population depends on their food for them by more than 90% (Sarhan, 2011: 1), and global demand for them is high and of high nutritional value and can be described as life-saving and relatively cheap and appropriate to combat hunger and population explosion. And it is characterized by its ease of manufacturing, the multiplicity of manufacturing products and its ease of preservation (Al-Maeiny and Al-obaidi, 2018: 46-48). At the forefront is the wheat crop, which is the basis of food security (FAO, 2016: 3) and the most important grain crops in the world

from an Economically. It comes in the forefront of the cultivated area and the third at the level of production (Alazawi *et al.*, 2018: 15), as the annual cultivated area in the world is approximately 213 million hectares, and because of its extensive use to meet the daily needs of humans, it was called the king of crops because of its many traits (Ali, 2017: 287). It dominates world trade and can be easily transported and stored (Gioanoli, 2014: 3), and its grains are the main source of food for urban and rural communities, accounting for more than 35% of the world's population (Al-juthery, 2019: 827). It plays a role in the welfare of society, especially in rural areas (FAO, 2018: 1). Global demand for wheat is expected to increase in 2050 by 60% (Tadesse, 2017: S25). Iraq is one of the countries that are famous for wheat cultivation with wide areas, as it reaches 43% of the cultivated areas at the country level amounted to 50.11% of the total area of grains and the main crops in the Iraqi economy (Abdul

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and Ahmed, 2015: 404). The most important grains on which the Iraqi people depend food (Rajab and Jabara, 2016: 1487). Although Iraq is rich in materials and capabilities, it is offset by the lack of food output and is still below the level of self-sufficiency of wheat crop and It is no longer sufficient to the necessary needs (Rasan and Al-Dulaimi, 2016: 126-142) and that Iraq's production of wheat does not enough, The production of wheat from Iraq is not enough for the local need, so it imports large quantities of wheat at exorbitant prices, which hampered its commercial budget (Madhi *et al.*, 2012: 24). The increase in wheat production is through vertical expansion through variables that contribute to increasing productivity per unit area Using advanced technologies and high yield seeds (Zinzel *et al.*, 2017: 260-261). And the production of wheat crop suffers from a shortage of seeds (FAO, 2017: 3), and the lack of a clear policy to support the provision of seeds and a lack of good cultivars, as 27% of the cultivated area with wheat was covered with improved seeds (Maher, 2017: 24), and the level of satisfaction Wheat seed producers are still weak, which gives a negative indication of the processed cultivars (Hameed, 2017: 179), and the seed systems in Iraq are either absent or ineffective and have limited technical and administrative capabilities (FAO, 2016: 96) and Iraq lacks a strategy for seed production that covers the areas Which are cultivated with wheat crop (Al- Hachamee, 582: 2015). The international community is unlikely to meet the need of Iraq for high-quality seeds (Hasan, 2007: 173). The production of seeds in Iraq has become low and can no longer meet the needs of farmers and have lost much of their expertise in the field of seeds (FAO, 2: 2005-1), Most farmers use the informal seed system, relying on storing their seeds or obtaining them from local markets (Jarvis, 2007: 77). The process of producing seeds for improved cultivars containing persistent genetic traits and distributing them to farmers is a very accurate and important work (Hasan, 2015: 44), and seed propagation is necessary because the seeds collected from the improved genetic material usually come from breeding programs in very small quantities, and the seed sector The government is successful in providing improved seeds (Chicarli, 2015: 12), and farmers deliberately rely on seeds approved by the government because they know that they have been disclosed by specialists and give the best crop (FAO, 2019: 1). For farmers to obtain high-quality seeds from improved cultivars requires taking several measures to strengthen the seed system (FAO, 2016: 96), and emphasizing the importance of developing capacities related to the production of higher-grade seeds so as to contribute to meeting the needs of all farmers

(Najm, 2016: 64). Iraq needs the seed program (Al-Qaisi, Hassan, Al-Kubaisi 2019), which works to enhance seed production and increase food security (Paudel and Athre, 2013: 2), and the program is the necessary first step with the importance that it is based on sound foundations and improved seeds cannot be multiplied To the quantities farmers would need in one season (Westerzrukeli, 1987: 17-14), Therefore, the supreme seed propagation program for wheat crop, which has been operating since the agricultural season 2015 in several governorates, aims to ensure the provision of wheat cultivars seeds using discreet scientific methods and make them accessible to farmers in sufficient quantities and time to contribute to local gross production as well as training working staff and building the necessary capacity for seed production Achieving the aims of the program requires continuous monitoring and evaluation of the roles of the program in order to develop it, know the results and make decisions, and on the basis of that the research came to indicate the following question.

1- What is the role of the High Seeds Order propagation program for wheat in the following area: - (Seed production, which includes the axes (characterized of cultivars, order maintain, field purification, field inspection, seed purification, seed storage, production sustainability)?

The aim of research

1- Learn about the role of the High Seeds Order propagation program for wheat in the following area: (Seed production, which includes the axes (characterized of cultivars, order maintain, field purification, field inspection, seed purification, seed storage, production sustainability).

Research hypothesis:

The program of propagation of the High Seeds Order of wheat crop has achieved a positive role in the following field: (Seed production, which includes the axes (characterized of cultivars, order maintain, field purification, field inspection, seed purification, seed storage, production sustainability).

Materials and Methods

The provinces of the central and southern regions, which number (13) provinces were chosen and A random sample was taken at a rate of (45%), and by (4) provinces from the central region (2) two provinces from the southern region, namely (Baghdad, Babylon, Najaf al-Ashraf, Tikrit, Muthanna, Dhi Qar). The research included all workers in the stations and locations entrusted to them implement the activities of the program, who numbered

117 responders. A questionnaire consisting of two parts was prepared, the first includes a number of paragraphs to measure the role of the program and the second to measure the satisfaction of the responders with the program. An approval criterion or threshold has been determined to remaining any proposed scale components in its final form, and the threshold for the scale has amounted to 91%. The pretest was conducted at the end of September on a group consisting of (15) responders excluded from the original sample, they were chosen from Al Diwanayah province and they are all researchers working within the program activity in the aforementioned province. The stability was measured by analyzing the data of the pretest statistically and it was confirmed the stability Paragraphs of the level of the stage using the Fakronbach equation for the role measurements ranged between (0.760-0.842). A score while the stability measure of the measure of satisfaction was 0.903, all of which are a good indicator of the consistency of the scale paragraphs.

Statistical means:

Statistical (spss) program was used to analyze the research data and process it statistically, and the following statistical methods were adopted:

1- Cronbach's alpha equation: used in finding the reliability coefficient for the program role Satisfaction scale

2- Weighted mean: Use the weighted mean to find a rate for each paragraph of the fields paragraphs and to arrange the fields and their paragraphs according to their importance.

3- Percentage weight: used to describe each paragraph and to know their rank and order in relation to the other paragraphs.

4- Assumed mean: It is used to compare with the numerical values of the weighted mean for the paragraphs of each of the program's roles.

Result and Discussion

The aim: - To known the role of the program In the following filed Seed production in the following axes:-

1. Characterized of cultivars:

The results of the research showed that the responders' answers to the paragraphs for characterized of cultivars axis for the role played by the program for propagation the High Seeds Order of wheat crop, which number (8) paragraphs, have obtained a Weighted Mean between (2.83-3.16) degrees, and a percentage weight (70.75-79) degrees, Whereas, the weighted mean for the role in general reached (2.993) degrees, and with a percentage weight of (74.84) degrees, as shown in Table 1.

The above table indicates that all items of the characterized of cultivars axis have obtained a Weighted mean higher than the assumed mean of (2) degrees, which confirms that the program has a role in this axis, as the paragraph (characterized of cultivars according to the width and shape of the Terrace) came in the first rank among the paragraphs, as it got the highest Weighted Mean of (3.16) degrees, and percentage weight of (79%) degrees, The reason for this may be because the shape and width of the Terrace are one of the most prominent characteristics of the wheat cultivar IPA 99, which is cultivated in most stations and the final reports of the program confirm that, since the highest quantity of seeds is for wheat cultivar IPA 99, while a paragraph (characterized of cultivars according to the shape of the Glumes) at least the weighted mean is (2.83) degrees, and with a percentage weight of (70.75%) degrees, This may be due to that the shape of the Glumes is the characterized of cultivars traits of the wheat cultivars, and it needs experienced people with a very high degree, as it is present in most cultivars and depends on the characterized between the cultivars of Durum and soft wheat.

Table 1: Distribution of responders according to their opinions on the role of distinguishing wheat cultivars for the breeding program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
79	3.16	characterized of cultivars according to the width and shape of the Terrace	1	8
77.25	3.09	characterized of cultivars according to the color of the spike	2	1
77	3.08	characterized of cultivars according to the peduncle spike	3	3
75	3.00	characterized of cultivars according to the length of Gwm	4	5
74	2.96	characterized of cultivars according to the fluff on the Glumes	5	4
73.75	2.95	characterized of cultivars according to the divergence degree of awn	6	6
72	2.88	characterized of cultivars according to the spike density	7	2
70.75	2.83	Distinguishing the items according to the Glumes shape	8	7

Table 2: Distribution of responders according to their opinions on the role of the order, seed Maintain for the propagation program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
90	3.60	Spike - line requirements for the production of Breeder Seeds and how to implement them in the field	1	2
89.75	3.59	Method and date for the examination of spike-line plots, and how to deal with strange cultivars, if any	2	3
88.75	3.55	Knowing the stages of seed propagation and who is responsible for them	3	1
86.75	3.47	Cultivation method of breeder seeds to produce the foundation seeds	4	4

2- Maintaining the order Seeds:

The results of the research showed that the responders’ answers to the paragraphs of the Maintaining the order Seeds axis for the role played with the program of propagation of the High Seeds Order of wheat crop which number amounted to (4), have obtained a weighted mean between (3.47-3.60) degrees and a percentage weight (86.75-90).) Degree, while the weighted mean of the role in general reached (3.552) degrees, and the percentage weight reached (88.81) degrees, as shown in Table 2.

The above table indicates that all paragraphs of Maintaining the order Seeds axis have obtained a weighted mean higher than the assumed mean of (2) degrees, which confirms that the program has a role in this axis, as a paragraph (spike - line cultivation requirements for the production of the Breeder Seeds and the method of its implementation in Field), in the first order among the paragraphs, as it got the highest weighted mean amounted to (3.60) degrees and with a percentage weight amounted to(90%) degrees, The reason may be due to this because the spike - line cultivation process - is the first building block of the seed production process and the starting point for obtaining genetically pure seeds and It cultivated manually by Stations workers, Where one spike is cultivated in a line of one meter in length and 1m distance from the rest of the lines and needs supplies Especially like rulers, ropes and other agricultural equipment, while a paragraph (the method of cultivation

Breeder Seeds to produce the Foundation Seeds)At least the weighted mean amounted to (3.47) degrees, and with a percentage weight amounted to(86.75%), The reason for this may be due to the program’s directives for cultivation the Breeder Seeds in Stations with large areas, in addition to the cultivation process similar to the cultivation of wheat fields for the purpose of commercial production with different leaving paths for the purpose of conducting the field purification process and maintaining the characteristics and standards of seeds.

3- Field purification (Genetic Purity)

The results of the research showed that the responders’ answers to the paragraphs of the seed purification axis (physical purity) for the role played by the program of propagation of the High Seeds Order of wheat crop amounted to (5) paragraphs, have obtained a weighted mean between (3.43-3.57) degrees, and a percentage weight (85.75-89.25), while the weighted mean of the role in general was (3.494) degrees and the percentage weight reached (87.35) degrees, as shown in Table 3.

The above table indicates that all the paragraphs of the field purification axis have obtained a weighted mean higher than the assumed mean amounted to (2) degrees, which confirms that the program has a role in this axis, as a paragraph (determining the date of the purification process) came, in the first order among Paragraphs, having obtained the highest weighted mean amounted to (3.57) degrees, and with a percentage weight amounted

Table 3: Distribution of responders according to their opinions on the role of field purification of the propagation program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
89.5	3.57	Determine the date for the purification process	1	1
88.25	3.53	Mastering the purification team leadership	2	4
87.5	3.50	The correct method to get rid of damaged plants during the field purification process	3	5
86	3.44	Determine the method of conducting the purification and the direction of the team’s progress	4	3
85.75	3.43	Determine the number required to perform the purification	5	2

to (89.25%), The reason may be due to that the field purification process is considered one of the important operations for the purpose of preparing fields for the field inspection process, as based on the outputs of the field inspection process, the field is rejected or accepted as well as giving seed order, while a paragraph occurs (specifying the number required for the purification procedure) At least the weighted mean amounted to (3.43) degrees, and with a percentage weight of (85.75%), the reason may be that the number of workers in the team is less than the ideal number in the case that the fields are pure and vice versa.

4- Field inspection

The results of the research showed that the responders' answers to the field inspection paragraphs of the role played by the program of propagation of the High Seeds Order of wheat crop amounted to (11) paragraphs , have obtained a weighted mean between (3.13 - 3.66) degrees and a percentage weight (78.25-91.5) degrees , While the weighted mean of the role in general was (3.42) degrees, and with a percentage weight of (85.5) degrees, as shown in Table 4.

The above table indicates that all paragraphs of the inspection axis have obtained a weighted mean higher than the assumed mean amounted to (2) degrees, which confirms that the program has a role in this field, as a paragraph (determining the isolation distance for seed multiplication fields) came first among the paragraphs , Having obtained the highest weighted mean amounted to (3.66) degrees, and with a percentage weight of (91.5%)

degrees, The reason may be due to that most Stations plant several cultivars and hence the isolation distance is important for the purpose of preventing seed contamination, while a paragraph (determining the lodging rate of the plant in the field.)At least the weighted mean reached (3.13) degrees, and with a percentage weight of (78.25%) degrees, and the reason for this may be that the Iraqi cultivars are short and semi-short cultivars, meaning that the percentage of lodging in them is small, with the exception of the Rashid cultivar.

5- Purification the seeds (physical purity):

The results of the research showed that the responders' answers to the paragraphs of the axis of the role of seed purification (physical purity) Which is implemented by the program of propagation of the High Seeds Order of wheat crop amounted to (5) paragraphs, You have got a weighted mean amounted to(3.32-3.61) degrees, and a percentage weight (83-90.25) degrees, while the weighted mean of the role in general reached (3.472) degrees, and a weighted mean of (86.8) degrees, as shown in Table 5.

The above table indicates that all paragraphs of the seed order axis have obtained a weighted mean higher than the assumed mean of (2) degrees, which confirms that the program has a role in this axis, as a paragraph (cleaning and maintaining the purification factory) came in the first order among the paragraphs, having obtained the highest weighted mean of (3.61) degrees, and with a percentage weight of (90.25%), The reason may be due to this confirmation the program on the process of

Table 4: Distribution of responders according to their opinions on the role of field inspection for the propagation program

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
91.5	3.66	Determine the isolation distance for the seed propagation fields	1	1
90.25	3.61	Determine the homogeneity of plants in the field	2	2
88.5	3.54	Determination of the number units to be examined depending on the area of the field	3	3
88.25	3.53	Set the unit area to be randomly examined	4	5
87	3.48	The permissible limits for the number of foreign cultivars in the field, according to the seed order	5	6
86.5	3.46	Followed the diagram to walk through the field and see all its parts.	6	4
84.75	3.39	The permissible limits for the number of other crops in the field, according to seed order	7	7
84	3.36	The permissible limits for the number of Difficult harmful weeds in the field, according to the seed order	8	8
81.75	3.27	The permissible limits for the number of infected plants in the field according to the seed order	9	9
79.5	3.18	Noting and excluding weak-growing plants that contain atrophic or empty seeds	10	11
78.25	3.13	Determine the lying rate in the field.	11	10

Table 5: Distribution of responders according to their opinions on the role of seed purification for the propagation program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
90.25	3.61	Cleaning and maintenance of the purification plant	1	1
88.5	3.54	Defines the purification plant speed	2	2
86.5	3.46	The maximum allowed level for other crops in the wheat seed is the Foundation Seeds order after purification	3	3
85.75	3.43	The maximum allowed for harmful weeds to wheat seeds is Foundation Seeds order after purification	4	4
83	3.32	The minimum physical purity in wheat seeds is the Foundation Seeds order after purification	5	5

cleaning equipment and maintenance, it in order to maintain the equipment and preventing mixing of seeds and setting up training courses on this topic, while a paragraph (the minimum physical purity in wheat seeds obtained the base level after purification), At least the weighted mean reached (3.32) degrees, and with a percentage weight of (83%) degrees, and the reason for this may be that the purification process of the seeds is conducted to the base, Foundation ,Registered and Certified Seeds order, as they are collected in stations that contain large stores and a factory to purify seeds.

6- Storing seeds:

The results of the research showed that the responders' answers to the paragraphs of the seed storage axis conducted by the program of propagation of the High Seeds Order of wheat crop amounted to (8) paragraphs , have obtained a weighted mean between (3.39 - 3.78) degrees, and a percentage weight (84.75-99.45) degrees. , While the weighted mean of the role in general reached (3.614) degrees, and with a percentage weight of (90.36) degrees, as shown in Table 6.

The above table indicates that all paragraphs of the seed storage axis have obtained a weighted mean higher than the assumed mean of (2) degrees, which confirms

that the program has a role in this axis, as a paragraph (the method of seed dressing with pesticides to prevent fungal and insect infestation) came in the first order among the paragraphs, where having obtained the highest weighted mean amounted to (3.78) degrees, and with a percentage weight amounted to (94.5%), The reason may be due to the stations storing the seeds of the subsequent season to grow their plan in their Stations, so they are interested in the methods of seed dressing to prevent fungal and insect infections, while a paragraph (the method of using phosphotoxin to vaporize the store) At least the weighted mean amounted to (3.39) degrees, and with a percentage weight amounted to (84.75%) degrees, the reason for this may be that there are no special seed stores in all locations and stations.

7- Production sustainability:

The results of the research showed that the responders' answers to the paragraphs of the sustainability axis role of production conducted by the program of propagation of the High Seeds Order of wheat crop amounted to (8), have obtained a weighted mean ranging between (3. 23 - 3.66) degrees, and a percentage weight (80.75- 91.5) degrees, while the weighted mean of the role in general reached (3.511) degrees, and the

Table 6: Distribution of responders according to their opinions on the role of seed storage for the propagation program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
94.5	3.78	The seed dressing method with pesticides to prevent fungal and insect infestation	1	6
94	3.67	Clean and sterilize the store before storage	2	1
92	3.68	Conditions for safe storage of seeds, including cooling and ventilation to reduce the rate of insect reproduction and high humidity.	3	2
91.75	3.67	Leave enough distance and path for ease of movement	4	5
91.5	3.66	Store seeds within safe distances from store walls	5	4
89.75	3.59	The correct method to stratification the seed bags	6	3
88.75	3.55	Signs of fungal and insect infestation of seeds	7	9
86.25	3.45	Familiarity with the information written on the attestation card and Lot number	8	8
84.75	3.39	The method used phosphotoxin to vaporize the store	9	7

Table 7: Distribution of responders according to their opinions on the role of production sustainability for the propagation program.

Percentage weight	Weighted mean	Paragraphs	Sort by importance	Sort by Questionnaire
91.5	3.66	Clean the seed and other equipment from any seeds or plant residue	1	7
90.25	3.61	Mastering the stages of wheat crop growth	2	3
89.5	3.58	Accompany field inspection teams during inspections and abide by required directions	3	6
89.25	3.57	Choose the most suitable ground speed for the combine harvester and the most appropriate height for the harvest of the crop to reduce the quantitative loss of the combine harvester	4	8
88.5	3.54	The familiarity of the nature of the cultivars to propagate (early maturity, sensitivity to excess ... etc)	5	2
86.75	3.47	Not cultivating different cultivars or cultivating the barley crop in the same field	6	1
85.75	3.43	The ability to estimate plant density, the yield and the lost.	7	5
80.75	3.23	Familiarity with the methods of Breeding of Self-pollinated crops	8	4

percentage weight reached (87.78) degrees, as shown in Table 7.

The above table indicates that all paragraphs in the supplies processing field have obtained a weighted mean higher than the assumed mean amounted to (2) degrees, which confirms that the program has a role in this field, as a paragraph (cleaning the seed and other equipment from any seeds or plant remains) In the first order among the paragraphs, where having obtained the highest weighted average of (3.66) degrees, and with a percentage weight of (91.5%), The reason may be due to that more than one cultivar is cultivated in most stations, which leads to the importance of conducting the cleaning process for seeders and agricultural equipment. In some cases, the program transfers the harvesters between stations, so we see that workers emphasize the cleaning process of the equipment. While the paragraph (familiarity with the methods of Breeding of Self-pollinated crops), the lowest weighted mean amounted to (3.23) degrees, and with a percentage weight amounted to (80.75%) degrees, the reason for that may be due to the necessity of integrating the program and emphasizing the importance of breeding, assessing and adopting cultivars.

Based on the above, it accepts the research hypothesis which states that the program for multiplying the seeds of the higher grades of wheat crop has achieved a positive role in the following fields: (Seed production, which includes the axes (characterized of cultivars, order maintain, field purification, field inspection, seed purification, seed storage, production sustainability).

Recommendations:

The researcher recommends the following:-

1- Raising the level of representation of the program to a seed production institution in order to provide the seeds of wheat crop, which is at the forefront of food security, with the required quantities and appropriate times, as well as continuing to provide government support for the program and enabling it to fulfill its roles.

2- The need to continue and expand the application of the decentralized work mechanism for the results achieved in the work of the programs as well as applied in other programs, for example, the barley, rice and corn program.

Working to integrate the program, adding the task of breeding and evaluating varieties and adapting them to its tasks as well as producing seeds.

References

- Ali, Abdullah Salman, Moaz Abd Al-Wahhab Abd Al- Ally and Saleh Ismail Muhammad (2017). The Effect of Animal Residues in Soil with Wheat grains of *Anguina Tritici* in the Criteria for Injury, Growth, and Crop of Wheat Plants, Sham No. 6, *Tikrit Journal of Agricultural Sciences*, **17(1)**:
- Al-Dujaily, Jaafar (2014). The Effect of Price Support Policy on Stimulating Wheat Production in Iraq for the Period 2008-2010, *Journal of Administrative and Economic Sciences*, **22(64)**:
- Al-Hachamee, Issa Sawadi Ayez and Osama Kadhim Jubara Al-Aqeedi (2015). A study of measuring the economic efficiency of wheat crop in irrigated areas of Iraq for the season, 2012-2013. *Journal of Agricultural Sciences*, **4(46)**:
- Alazawi, Hussein Khudair Abbas and Muhsin Ali Ahmad Al-Janabi and Fakhr Al-Din Abdel-Qader Siddiq (2018). The Effect of Different Levels of Nitrogen Fertilizer on grain yield and Its Components for Eight cultivars of Wheat Bread, *Tikrit Journal of Agricultural Sciences*, **18(1)**:

- Al-juthery, Hayyawi (2019). The response of wheat to foliar application of nano-micro nutrients, *Plant Archivrs*, **19(2)**:.
- Al-Maeiny, Ayad Hussain Ali and Mohammd Owaid Ghadeer Al-Ubaidi (2018). Scientific Bases for Management, Production and Improvement of Field Crops, First Edition, Dar Al-Wareth for Printing and Publishing, Iraq.
- Bid, Marwa Najm and Aida Fawzi Ahmed (2015). Measuring the Economic and Total Efficiency of Resources for Wheat Farms in Iraq (Wasit Governorate as a Model), *Iraqi Journal of Agricultural Sciences*, **36(3)**:.
- Chacarly, Salvatore (2015). Plant Breeding with the Participation of Farmers Technical Manual, International Center for Agricultural Research in the Dry Areas, Oman.
- Jarvis, Badush, Cooper (2007). Department of Biodiversity in Agricultural Ecosystems, Columbia University, International Biodiversity Foundation, New York.
- Food and agriculture organization of United Nations (2018). Tajik farmers strengthen skill for producing high quality seeds, available online.
- Food and Agriculture Organization, FAO (2011), Conservation and Expansion. A Policy Maker's Guide to Sustainable Intensification of Smallholder Crop Production, Rome.
- Food and Agriculture Organization, FAO (2016). Scientific Conservation and Expansion, Maize, Rice and Wheat, A Handbook for Sustainable Grain Production, Rome.
- Food and Agriculture Organization of the United Nations, Seeds, available, 7/10/2019.
- Food and Agriculture Organization of United Nations (2017). faostat , data, grop available online.
- Maher, Asaad Hamdi Muhammad (2017). Sustainable Agricultural Development in Iraq - Reality and Challenges, *Journal of the University of Human Development*, **3(4)**:.
- Madhi, Abdullah Ali and Basim Hazem Hamid and Ahmed Mahmoud Fares (2012). Self-sufficiency and food deficit of major grain crops in some Arab countries for the period 2005-2005, *Iraqi Journal of Agricultural Sciences*, **1(43)**:.
- Hamid, Khudair Abbas, Mohammed Radi Hasan and Falih Abdul Jaber (2017). wheat seed producers satisfied with the services provided to them from seed production companies. A case study in Najaf province, *Al-Kufa Journal for Agricultural Sciences*, **2(9)**:.
- Hameed, Khader Abbas (2017). Use of phenotypic characterization to distinguish wheat by accreditation, UPOV index, *Jordanian Journal of Agricultural Sciences*, **13(3)**:.
- Hasan, Mohammd Radhi, Khudair Abbas Hamid (2015). The Effect of Some Rice Sources on Purity and Productivity, *Al-Qadisiyah Journal of Agricultural Sciences*, **5(1)**:.
- Najm, Yaqoub Saadoun (2016). the role of the national program to develop wheat cultivation in Iraq in disseminating agricultural developments and increasing crop productivity in Wasit province , Master Thesis, College of Agriculture, University of Baghdad.
- Paudel and Athre (2013). An overview of different seed production initiatives in Nepal, *Agronomy Journal of Nepal*, **1**: 3.
- Rajab, Marwan Zuhair and Osama Kadhim Jabara (2016). Measuring the effect of the variation in the harvested area of wheat farms in Sulaymaniyah province on the level of economic efficiency and estimating the volume of material achieved for optimum efficiency, *Iraqi Agricultural Science Journal*, **6(47)**:.
- Ressn, Salem Abdul-Hassan and Amir Suhail Abdullah Al-Dulaimi (2016). The Food Deficit of Strategic Grain Crops in Iraq for the period (2000-2012), *Al-Qadisiyah Journal of Administrative and Economic Sciences*, **18(1)**:.
- Sarhan, sabaar Mutlak (2011). Development of strategic crop cultivation (wheat crop) in Iraq, *Journal of the College of Administration and Economics*, **4**:.
- Tadesse W. and Athere (2017). Role sustainable wheat production to ensure food security in the cwana region, *Journal of Experimental Biology and Agricultural Sciences*.
- Westeritzer, Wealthter and Fenwick Kelly (1987). Improved seed production. Guidance on the formulation, implementation and evaluation of seed programs and projects, Food and Agriculture Organization of the United Nations, Rome.3
- Zinzel, Hassan Thamer, Fadel Latif and Yasmine Hatem (2017). Technical, Distribution and Economic Efficiency of Spraying Irrigated Wheat Farms in Al-Dour District for the Productive Season 2012/2013, *Tikrit Journal of Agricultural Sciences, Special Issue of the Sixth Scientific Conference of Agricultural Sciences*, March 28, 29.

Personal interviews:

- Al-Kubaisi, Nizar Mamdouh, 11 December 2019, Agricultural Research Department, Executive Director of the National Program for the Development of Wheat Cultivation in Iraq and a member of the Steering Committee of the High-Level Seeds Propagation Program for Wheat Crop.
- Al-Qaisi, Mahdi Damad, December 2019, December 11, the Ministry's headquarters, the Ministry's advisor and a member of the Steering Committee of the High-Grade Seeds Propagation Program for wheat and former Technical Undersecretary of the Ministry of Agriculture.
- Hassan, Abdul Karim Hamad (2019). December 15, Plant Protection Department, Director General of the Plant Protection Department and a member of the Steering Committee of the program Breeding the seeds of the highest ranks of wheat crop and former Executive Director of the National Program for the development of wheat cultivation in Iraq.