ANALYSIS OF AGRICULTURAL PRACTICES USED BY CEREAL FARMERS TO ADOPT TO PHENOMENON OF CLIMATR VARIATION IN THE GOVERNORATES OF THE CENTRAL REGION OF IRAQ

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ABSTRACT

This study was aimed to identify the obstacles that facing cereal farmers that applying the agricultural practices to decrease the effects of climate variation phenomenon in the central region of Iraq. This research was conducted on cereal farmers at Baghdad, Najaf, Babil, and Wasit which were the most cultivated governorates of cereal crops (wheat, rice, and yellow corn). A randomized sample of (227) farmers was taken, that represents 0.25% of the total cereal farmers in the four governorates (90,584 farmers). In order to achieve the research goal, a questionnaire was prepared to collect data related to the research topic, for which a four-way scale was designed (33) paragraphs, and this field included three axes (1. Obstacles related to the farmers), (2. Obstacles related to the extension aspect), (3. Obstacles related to government institutions). The research concluded that the cereal farmers had a lack of knowledge about the effects of the climate variations phenomenon on their crops in the central region of Iraq, they also facing many obstacles that need to be solved, which led to their failure to use the correct agricultural practices.The research recommends the necessity of training farmers about scientific practices, research also recommends the necessity of holding training courses by the Agricultural Extension Organization for cereal farmers in order to increase their knowledge and develop their expertise in dealing with the climate variation phenomenon to advance the agricultural reality.

Keywords: **Agricultural processes, adaptation, biodiversity, greenhouse gases, climate variation.**
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تحليل الممارسات الزراعية المستخدمة من قبل مزارعي الحبوب للتكيف مع ظاهرة التغيرات المناخية في محافظات المنطقة الوسطى من العراق

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المستخلص

هدف البحث التعرف على المعوقات امام زراع الحبوب لاستخدام الممارسات الزراعية التي تحد من اثار ظاهرة التغيرات المناخية في محافظات المنطقة الوسطى من العراق.أجري البحث على زراع الحبوب في المحافظات (بغداد، والنجف الاشرف، وبابل، وواسط) كونها من المحافظات التي تختص بزراعة محاصيل الحبوب(الحنطة والرز والذرة الصفراء). اذ أختيرت عينة عشوائية قوامها (227) زارع تمثل ما نسبته (0.25%) من مجموع زراع الحبوب في المحافظات الاربع والبالغ عددهم (90584) مزارعا. وتحقيقاً لهدف البحث أعد الباحث استبانة لغرض جمع البيانات المتعلقة بموضوع البحث، صمم لها مقياس رباعي للتعرف على المعوقات التي تواجه زراع الحبوب في استخدام الممارسات الزراعية التي تحد من اثار ظاهرة التغيرات المناخية والمتضمنة (33) فقرة ، وضم هذا المجال ثلاث محاور (1.المعوقات الذاتية المتعلقة بالزراع)(2.المعوقات المتعلقة بالجانب الارشادي)(3.المعوقات المتعلقة بالمؤسسات الحكومية). أظهرت النتائج حصول هذا المجال على أوساط مرجحة تقع بين (1.766–2.85) درجة أكبر من الوسط الفرضي لدرجات المقياس المستخدم في البحث والبالغ (1.5) درجة، وقد خلص البحث الى انه يوجد ضعف في معارف زراع الحبوب بآثار ظاهرة التغيرات المناخية على محاصيلهم لمحافظات المنطقة الوسطى من العراق ، وكذلك تواجد معوقات كثيرة امام زراع الحبوب تحتاج الى تذليل أدت الى دون استخدامهم للممارسات الزراعية الصحيحة في التكيف مع ظاهرة التغيرات المناخية ،يوصي الباحث بضرورة توعية الزراع للممارسات العلمية كاستخدام تقانات الري الحديثة والتسوية الليزرية واستخدام الأسمدة العضوية والحيوية والمكافحة المتكاملة التي تكفل زيادة الإنتاج وحفظ الموارد الطبيعية ،كما يوصي ضرورة أقامة دورات تدريبية من قبل المنظمة الارشادية الزراعية لزراع الحبوب كي تزيد من معارفهم وتطور خبراتهم في التعامل مع ظاهرة التغيرات المناخية للنهوض بالواقع الزراعي.

الكلمات المفتاحية: العمليات الزراعية، التكيف، التنوع البيولوجي، غازات الاحتباس الحراري، تغير المناخ.
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INTRODUCTION

The most important challenge facing humanity is climate variation. This change translates into more severe and extreme climatic phenomena, and its effects are no longer mere studies and predictions, but rather become clear and measurable, especially on the agricultural sector .Given the seriousness of the risks related to climate variation and its effects, it has become necessary to implement a set of agricultural practices that allow the sustainability of agricultural production.(8) However, accelerating climate variation is a major and growing threat to global food security, and the projected impacts of climate variation - rising temperatures, increased frequency of extreme weather events, water shortages, sea level rise, ocean acidification, less rain, land degradation, ecosystem disruption, biodiversity loss, and others - may be jeopardized. The ability of agriculture to secure food for the most vulnerable groups is a serious issue, which hinders progress towards eradicating hunger, malnutrition, and poverty. (16).The problems facing cereal farmers can be better understood if the impact of climate variation on weather or precipitation is studied because temperature, sunlight and humidity are the main factors behind agricultural production. Climate variation can alter these factors, causing a serious threat to water availability, a reduction in agricultural productivity, the spread of pest-borne diseases to new areas, increased floods due to rising sea levels and also due to heavy rainfall and snowmelt at the frozen poles, as a new study revealed that nuclear weapons tests during The Cold War of the early 1960s may have contributed to increased global warming and snowmelt as it experimented in the polar regions and by distributing radioactivity widely even thousands of miles away from the sites of explosions, thus changing precipitation patterns. (4)According to the World Bank report on the expected negative impact of climate variation on the production of agricultural crops in a study prepared by African countries, the Republic of Kenya, for example, that by the year 2030, nine major crops out of ten will witness a decrease in the growth rate, while the average prices will rise as a result of that and as in Table (1):

Table 1. The expected impacts of climate variation on major crops by 2030

Yield	the rate of decrease in the growth rate	the rate of increase in prices
corn	**12%**	**90%**
rice	**23%**	**89%**
Wheat	**13%**	**75%**
Other crops	**8%**	**83%**

World Bank; CIAT. Climate-smart agriculture in Kenya. CSA Country Profiles for Africa, Asia, 2015

This is underlined by the United Nations report "Climate variation and Earth: a special report from the Intergovernmental Panel on Climate variation (IPCC) on climate variation, desertification, land degradation, sustainable land management, food security and greenhouse gas fluxes in terrestrial ecosystems." Food will increase to 80% by 2050 and food shortages are likely to occur. Some climate variation specialists have indicated that food shortages are likely to affect the poorest parts of the world. Accordingly, from this standpoint ... the challenge that casts shadows lies in reducing these emissions while working at the same time to meet the unprecedented demand for food. The agricultural sectors can contribute significantly to balancing the global carbon cycle. Likewise in the forest sector, avoiding deforestation, increasing the area covered by forests, and adopting higher-yield management of timber production can stabilize large amounts of carbon dioxide in the atmosphere. Soils play a pivotal role in regulating emissions of carbon dioxide and other greenhouse gases. Appropriate land use and soil management also improve soil quality and fertility and can help mitigate the impact of rising carbon dioxide in the atmosphere.Agriculture has always been the link between natural resources and human activity. Today, it holds the key to raising two of the greatest challenges facing humanity: eradicating poverty and maintaining a stable climate corridor in which civilization can thrive. (7) In this sense... sustainable and economically viable agricultural practices are available, but the barriers and obstacles that

hinder their adoption must be overcome. They can achieve significant improvements in food security, as well as in terms of resilience to climate variation by introducing sustainable agricultural practices. The adoption of practices such as the use of nitrogen-efficient and heat-tolerant crop varieties, zero-tillage and integrated soil fertility management would stimulate productivity and farmers' incomes and help lower food prices. By one estimate, the number of people at risk of undernourishment in developing countries in 2050 could be reduced by more than 120 million by the widespread use of only nitrogen-efficient crop varieties. Despite this potential, the adoption of improved practices by farmers is still very limited. Often, adoption of these practices is hampered by policies such as material subsidies, which perpetuate unsustainable production practices rather than those that promote resource efficiency, soil conservation, and the reduction of greenhouse gas emissions intensity from agriculture per se. In light of the foregoing, the phenomenon of climate variation portends a change in the global agricultural demographic map, as agricultural patterns and systems will change for countries famous for producing certain agricultural crops and ceding them to other countries that had little or no production of these crops as a result of climate variations and all this in the absence of plans and programs And agricultural practices that treat or limit the effects of this phenomenon in the producing countries. In light of climate change, urban micro-climates, the urban heat island effect and other urban geophysical phenomena and processes, there is a new urgency to better study, understand, and characterize urban environments. Revolutionary and innovative ideas are being considered to transform the study of the urban landscape. Fundamental changes are taking place in geophysics and in engineering to aid in the adaptation and mitigation of the environmental challenges to which cities must respond. (17) All Arab countries, without exception, face catastrophic consequences of climate variation, but some countries have begun to develop strategic plans to confront the effects of climate variation according to the degrees of their impact. Precipitation, sea level rise, etc. (11) It became clear that in 2010, 19 countries recorded new national levels of temperature rise, five of which were Arab countries, including Kuwait, which recorded a record high of 52.6 degrees Celsius in 2010, followed by 53.5 degrees Celsius in 2011. (18) The "Washington Post" newspaper also published a report, translated by "Arabi 21", about the record high temperature in Baghdad, considering that this level of temperature indicates global climate variation. Just as the "Placerville" station in California, America, published a table with the highest temperatures, and the city of Baghdad ranked first in the world with the highest temperature, with a temperature of 51 degrees Celsius, and the city of Karbala ranked second and in the same degree. It is not hidden from the Iraqis how many extreme phenomena have occurred in Iraq, such as earthquakes, aftershocks, the variation in rainfall between scarce and many, and in the off-season, and the conflict in temperatures. And the central and southern governorates, snow fell, in a rare phenomenon that citizens have not known for 12 years, according to the local meteorological authority. Since the morning hours, many governorates were covered by snow including Baghdad, Babil, Karbala, Najaf and Diwaniyah after the snow fell at dawn. The temperatures were recorded Significant decline to below zero in Baghdad and some provinces. Meanwhile, the temperature of the city of Baghdad rose on July 28 to 51.7 degrees Celsius, breaking a previous record of 51 degrees Celsius, which was recorded five years ago, and more than 48.8 degrees Celsius that lasted for four consecutive days. Since the group of agricultural products, including cereal crops, which occupies the first ranks in the global ranking of strategic crops such as (wheat, corn, rice) are among the most important pillars and components of the national economy (9), being one of the main components of food that leads to raising the level of human health, as It contains several compounds, the most important of which are (proteins, fats, vitamins, minerals...etc) (13). As most developing countries, including Iraq, face a food deficit in the production of the main cereal crops (wheat, rice, corn ... etc.) in the face of the increasing and accelerating

consumption, which leads to an increase in imports, which affects the general budget of the state and leads to a reduction in some other paragraphs of spending and from Investment, as well as this food deficit may be used as a pressure card against the developing peoples to influence the political decision (2). The results showed the continued decline in the productivity of the wheat crop, and this was due to the superiority of changes in area over changes in production, which are considered among the most important factors in determining productivity, as well as other factors that surround them and that should be noted. As well as the need to follow vertical intensification in agriculture, which has proven its effectiveness in affecting the productivity of the unit area, as well as the need for vertical condensation to be compatible with the provision of other factors, namely, the provision of improved seeds, high-efficiency fertilizers and the necessary pesticides. In addition to the need for all of the above to be compatible with the quality and efficiency of management, this plays an effective role in raising productivity. (3) And accordingly, the need to direct sufficient care and attention to the rice crop, as it is a strategic crop by the relevant authorities, by making use of its waste and eliminating pollution The environment that occurs as a result of burning these wastes. (5) It is necessary to address the agricultural sector, which suffers from major problems caused by the neglect that occurred from the eighties until now, to advance the reality of agricultural development and agricultural production through the optimal and rational use of natural resources and the use of modern methods in agriculture to confront the food problem. The food problem is expected to intensify in the future in the economic trends and international efforts to liberalize world trade and globalization of food, which in turn will lead to a rise in global food prices, and thus necessitate reaching satisfactory levels of food security (14). It is necessary for the Iraqi government, the Ministry of Agriculture and research centers to take their role to reduce the effects of these changes by taking the necessary measures, following scientific methods, intensifying studies in this field, and taking agricultural extension its role in spreading the concepts of the problem of climate variation and its great impact on the productivity of cereal crops and urging farmers to use the best agricultural practices to reduce the effects of climate variation Achieving a high production of food security. In addition to the fact that the foodstuffs of flour, rice and edible oil are among the basics of the ration card for the Iraqi individual, so this study came to show the most important agricultural practices used by cereal farmers to confront climate variations in the governorates of the central region of Iraq, and answer the following question:

- What are the obstacles for cereal farmers to use agricultural practices that limit the effects of climate variation?

Research objective:

- Identifying the obstacles facing cereal farmers to use agricultural practices that limit the effects of climate variation

Research hypothesis:

- High obstacles that impede cereal farmers from using agricultural practices that limit the effects of climate variation.

Procedural definition:

1- Agricultural operations:

It is the sum of agricultural activities, events or practices such as plowing or primary soil stirring and crop service operations carried out by cereal farmers in the governorates of the central region of Iraq in the fields or agricultural lands belonging to them to create the appropriate conditions for the cultivation and production of various cereal crops (wheat, rice, and corn).

2- Adaptation:

It is the ability of the social and environmental system to absorb disturbances while maintaining the same infrastructure and methods, in addition to its own ability to organize and adapt to any pressure or change

3. Biological diversity:

It is the abundance and abundance of the components of the ecosystem in order to be able to maintain its function and ensure its continuity even in the event of the deterioration of part of its components.

4. Greenhouse gases:=

It is a group of gases (carbon dioxide, methane, nitrous oxide..) that are responsible for global warming and climate variations as

they work as greenhouses (greenhouses and glass houses) by blocking the reflection of heat energy from the earth to the outside of the atmosphere, which causes high temperatures, and mostly produces From the excessive human uses after the industrial revolution of fossil fuels and others

5. Climate variation:

It is a disturbance in the Earth's climate with a rise in the temperature of the planet, and a great change in the nature of natural phenomena with a tendency to extremism and fluctuation, and a continuous deterioration of vegetation cover and environmental diversity.

MATERIALS AND METHODS

Research methodology.

The descriptive approach that is concerned with describing the phenomenon in an accurate description and expressing it qualitatively or quantitatively (1), is used as the descriptive survey method is a way to study the types of research that require the selection of an entire study population, or a study sample that represents the majority of the population, and the aim is to describe the nature of the phenomenon .(15)

Research population

The central region's (8) governorates are (Baghdad, Diyala, Salah al-Din, Anbar, Babil, Wasit, Karbala and Najaf al-Ashraf) because they contain a large majority of those who grow cereals, according to the data of the Iraqi Ministry of Agriculture and specialists in the cultivation of cereal crops specifically {Wheat, rye (rice) and yellow corn} and supplied to the local and international market, as in Table 2.

Table 2. Number of cereal farmers in the governorates of the central region of Iraq

SN	Governorate	rice	wheat	corn
1	Baghdad / Karsh	-	4877	3027
2	Baghdad / Resaca	-	1638	730
3	Babylon	507	14433	11803
4	Najaf	13157	14,667	138
5	Holy Karbala	-	1201	224
6	Waist	1286	20888	3433
7	Salah Uddin	-	17819	3529
8	Anbar	-	11012	2042
9	Diyala	277	-	-
	the total	15227	86535	24926

Source: Ministry of Agriculture, Department of Plant Production 2020 (unpublished data).

1. Cereal farmers belonging to the agricultural divisions in the governorates of the central region covered by the research and whose number is estimated (126,688) are farmers.

Data collection.

1. A stratified proportional random sample was drawn from the research community consisting of the governorates of the central region and my agencies:

2. A stratified proportional random sample was drawn from the governorates of the central region of the country, consisting of eight governorates (53%) and four governorates (Baghdad, Babil, Najaf and Wasit).

3. A stratified random sample was drawn from cereal farmers with a percentage of (0.25%) and a total of (227) respondents distributed over the governorates of Baghdad, Babil, Najaf and Wasit, as shown in Table 3:

Table3. Distribution of the number of cereal farmers in the governorates covered by the research and their percentages

SN	Governorate	Number of Farmers and agricultural directorates	number of Farmers	0.25% of the cereal farmer	after rounding	%
1	Baghdad (Karkh and Rasafa)	19	10272	25.68	26	11.33
2	Babylon	15th	26743	66.85	67	29.52
3	Najaf	10	27962	69.9	70	30.86
4	Wasit	17	25607	64.01	64	28.26
the total		61	90584	226.44	227	100

4. A stratified proportional random sample was drawn for the people and agricultural directorates of the governorates covered by the research at different rates, as each of the

governorates of Baghdad took a percentage of (0.1) and the governorate of Babylon a percentage of (28%) * and the governorate of Najaf al-Ashraf by a percentage (43%) and the province of Wasit by a percentage (25%) and as In Table 4:-

Table 4. Distribution of the research sample according to the districts and sub-districts of the research governorates

Governorate	Number of Farmers and agricultural directorates	Percentage of Farmers for each governorate and approximation of their ratios	Farmers covered by the research	farm sample
Baghdad (Karkh and Rasafa)	19	1.90 ~ 2	.1Abu Ghraib	12
			.2Mahmudiyah	14
Babylon	15th	4.20 ~4	.1Nile	19
			.2Project	20
			.3Alexandria	13
			.4Al Mahaweel	15th
Najaf	10	4.30 ~ 4	.1Kufa	17
			.2Al Mashkhab	23
			.3Haidaria	14
			.4Perplexity	16
Wasit	17	4.25 ~4	.1Fossil	20
			.2Badra	15th
			.3Sheikh Saad	13
			.4Zubaidiyeh	16
the Total	60	~14	14	227

***The heaviest weight of the cereal farmers (rice, wheat, yellow sorghum) are in the three governorates**

The research tool and its design stage

The researcher used the questionnaire as a tool in collecting data related to the subject of the research for the purpose of achieving the goal of the research and its consistency with the research method followed. The data collection process has gone through several stages.

The first stage

Prepare the questionnaire in its initial form (and axes and paragraphs) through the following:

1. Review to studies, research, literature, and Arab and foreign scientific sources related to the field of study
2. Seeking the assistance of specialized experts and consulting the relevant research centers in the field of study
3. Field visits and personal interviews
4. Viewing the scientific websites of some institutions and organizations such as the FAO, the US Intergovernmental Organization on Climate variation (IPCC), NASA for Space Research and others through websites (the Internet).

Second stage: In the light of the above-mentioned sources... The questionnaire that dealt with the field of research was formed as follows:

Obstacles that hinder cereal farmers from using agricultural practices that limit the effects of the phenomenon of climate variation. This field was classified into three axes, as the axes of the research field included (37) paragraphs distributed as in Table 5 as follow

Table 5. Distribution of axes and number of items for the research field

The field Bh w	SN	Axles	number of paragraphs
Obstacles that hinder cereal farmers from using agricultural practices that limit the effects of climate variation	1	Self-obstacles related to agriculture	16
	2	Obstacles related to the extension aspect	14
	3	Obstacles related to government institutions	7
the Total			37

Third stage

The stage of developing the questionnaire (presenting the fields, themes and paragraphs to the specialized experts.)

The contents of the questionnaire were presented fields, axes and paragraphs in its initial form to the specialized experts and professors, each according to his specialization and field of work, and they were (10) experts, using their scientific and practical experience to indicate the level of their approval of it and the requirements of the amendment, if any, to produce it in the final version. And the adoption of a scale of approval consisting of three levels (agree, agree with the amendment procedure, and disagree).

Fourth stage

Depending on the opinions and scientific recommendations of the experts, some modifications, changes and additions were made in some paragraphs of the axes of the research field, and they were as follows:

1. Paragraph No. (3) specifically deleted the first axis (self-obstacles) due to the similarity of the meaning and idea with the previous paragraph and with identical connotations of credibility

2. As for the third axis (obstacles related to government institutions), paragraphs (3 and 2) have been omitted due to the difficulty of understanding them by farmers and the fact that they are the domain of the higher competent authorities, and as in the following table 6:

Table 6. Distribution of axes and number of paragraphs for the research field in its final form

second field	SN	axles	number of paragraphs
Obstacles that hinder cereal farmers from using agricultural practices that limit the effects of climate variation	1	Self-obstacles related to agriculture	15th
	2	Obstacles related to the extension aspect	14
	3	Obstacles related to government institutions	5
the Total			33

Fifth stage :

At this stage, the researcher calculated the average degrees of approval for the experts' answers on the items of the questionnaire. Estimated values and weights were given for each statement in the experts' approval scale on the domain, axes and items mentioned in the second level and in the following formula: zero for the level of disagreement, and one degree for the level of agreement with the amendment , and two degrees for an agreeing level, and accordingly, the degree of the scale is between (0-2) degrees, and the averages of the degree of approval were calculated by summing the scores obtained for each paragraph divided by the number of experts

The Sixth stage: checking the validity and reliability of the questionnaire

A- Validity Test means the validity of the tool to measure what it was designed to measure and its validity in measuring the attribute or features that the researcher wants to measure (6). The term apparent validity (Face validity) refers to the degree to which the test measures what an assumed measurement is, and it is a preliminary procedure for selecting the scale (17).

In order to verify the face validity, the questionnaire was presented to a number of specialists in the field of agricultural extension by (4) experts

content validity means that the items or paragraphs of the scale or test express the phenomenon, feature, or topic that is intended to be measured accurately, and that the tool itself belongs to the topic to be examined and is suitable for measurement (6) To verify the validity of the content, the scale was displayed on a number of From specialists in the fields of field crops, plant breeding and improvement, plant physiology, desertification, and so on, amounting to (6) experts.

B- Reliability Test: reliability is defined as consistency in the results. (10)

To measure reliability, a pre-test was conducted in December of the year 2020 on a sample of (30) respondents from cereal farmers in Al-Rashidiyah district, Al-Taji district and Nahrawan district from Baghdad governorate

The reliability sample (the exploratory sample) was excluded later when collecting the final data, and the Facronbach equation was used to measure the stability of the scale in question, and the reliability coefficient of the questionnaire was (0.84) .

Statistical analysis

After performing the process of collecting, unpacking and tabulating the data, these data were analyzed using the SPSS statistical analysis program, in addition to the use of manual analysis, and the use of Microsoft (Word, Excel and PowerPoint) and accordingly, a set of statistical means was used for the purpose of the research, which is replicate used to describe numbers The respondents, the Facrombach equation, the weighted average, the weight percentage, the hypothetical mean and the percentages

RESULTS AND DISCUSSION

The first axis: the self-obstacles related to agriculture

The results of the research showed that the weighted averages for this axis (self-obstacles related to farmers) ranged between (1.938-2.66) degrees, and percentage weights between (64.6-88.66)%, and the weighted mean in general was (2.41) degrees and the weight percent was (80.54)%, as It is shown in Table 7:

Table 7. Distribution of farmers according to their answers in the field of identifying the obstacles facing cereal farmers in using agricultural practices that reduce the effects of climate variation (self-obstacles related to farmers) in the governorates of the central region of Iraq

sequence Paragraphs according to resolution	sequence Paragraphs according to Importance	Paragraphs	weighted mean for every a paragraph	weight percentile for every a paragraph	weighted mean general	weight percentile general
-10	1.	The lack of use of modern agricultural technologies in agriculture by farmers to mitigate the impact of climate variation	2,660	88.66	2.41	80.54
-5	2.	Lack of farmers' participation in training courses related to the phenomenon of climate variation.	2,643	88.1		
-6	3.	difficulty Understanding Terminology artistic related to phenomenon the changes climatic.	2,634	87.8		
-2	4.	lack acquaintances the farmer b raised phenomenon the changes climatic on their agricultural practices	2.585	86.16		
-1	5.	Lack of farmers' interest in the effects of climate variation	2.577	85.9		
-7	6.	Scientific and technical recommendations B phenomenon of nutritional j Rat climatic not clear and change understandable for farming	2.537	84.56		
-3	7.	Farmers focus and attention on agricultural practices away from the phenomenon of climate variation	2.493	83.1		
-4	8.	Cultivators adhere to wrong and traditional practices, as well as the difficulty of changing them	2.449	81.63		
-11	9.	Poor management of farmers in the disposal of packages, chemical waste, dead animals and others	2.440	81.33		
-8	10.	Poor communication between farmers and agricultural extension departments	2.352	78.4		
-14	11.	Less use of agricultural rotations to improve farming systems by farmers	2.334	77.8		
-15	12.	Poor management of farmers for the irrigation process	2.308	76.93		
-12	13.	Burning of crop residues by farmers	2.273	75.76		
-13	14.	Lack of awareness of farmers in the use of fertilizer and chemical control	2.022	67.4		
-9	15.	Lack of confidence of farmers in agricultural extension workers in solving their problems	1.938	64.6		

The table above indicates that the circles weighted weights and percentages were fairly close, however, shows that the sector' s Z Values digital Got t p' s guardia n paragraph) low use of modern agricultural technologies in agriculture by farmers to alleviate the phenomenon of climate variation (as important as the highest value in the axis of self - constraints Balzraa, central and reached a weighted (2.66)degree and weight Celsius(88.66 , (%and this may be attributed to several reasons, the most important of which are:

1- The classic of the agricultural extension organization in Iraq and its adoption of traditional plans, methods and means in developing, disseminating and transferring modern agricultural technologies, compared to

the countries of the region, and not benefiting from the experiences of the countries of the world, (as the traditional extension approach is one of the weaknesses of agricultural extension in Iraq).

2- The relatively high cost of modern agricultural technologies that limit the effects of the phenomenon of climate variation, especially for smallholder cereal farmers

3- The lack of financial allocations needed to provide, equip and support some agricultural technologies by the Ministry of Agriculture and the Agricultural Equipment Department to cereal farmers .

As for the two paragraphs (the lack of participation of farmers in training courses related to the phenomenon of climate variation (and)

difficulty Understanding Terminology artistic r elatedto phenomenon thechanges Climatic) the y came in the second and third place, respectively, according to the importance and priority by the cereal farmers, with a weighted average of(2,643)degree f(2,634) degree and weight Celsius (88.1 %)f(87.8 ,%and this may be attributed to the lack of knowledge of farmers about the seriousness of the phenomenon of climate variation and its effects on their crops and the importance of participating in agricultural courses related to this matter to avoid its negative effects, as well as their lack of understanding of the technical terms of this phenomenon due to its modernity compared to other phenomena.

As for the paragraphs (from 4 up to 14 (Few acquaintances thefarmer b raised phenomenon the changes climatic on their agricultural practices (...) the farmers' lack of awareness in the use of fertilizers and chemical control (the numerical values of the weighted means were higher than the hypothetical mean of1.5This may be attributed to the lack of bulletins and extension seminars on the phenomenon of climate variation, which led to the lack of interest of cereal farmers in the effects of this phenomenon and the difficulty of understanding the recommendations and scientific and technical terms due to their lack of sufficient knowledge and their focus on traditional agricultural practices and their adherence to them (prevailing agricultural and social customs and traditions) as mismanagement. Disposal of containers, chemical waste, dead animals, burning of the residues of the previous crop, and the lack of use of agricultural rotations that improve farming systems by cereal farmers, as a result of poor communication between them and agricultural extension departments, especially in the field of identifying the harmful effects of the phenomenon of climate variation . while showed consequences search through the table 7 that the digital values guardian paragraph (lack of confidence in the farmers ' mentors Alzerain solve their problems and a weighted central of (1.938) degree and weight Celsius(64.6 %)which is higher than the hypothetical mean(1.5) degree, as more than stressed(146)Respondents from the research sample that they have little confidence in agricultural extension workers in solving their problems and this is due to several things, the most important of which are the following:

1- Lack of knowledge and experience of agricultural extension agents in determining the most important correct practices for cereal farmers to reduce the phenomenon of climate variation

2- shortening in the performance of agricultural extension agents and relying on the theoretical side, if any, without going down to the reality of the cereal farmers and their actual needs

3- Weakness in meeting the demands of cereal farmers at the right time and place, which led to farmers resorting to private consulting offices often .

The second axis: Obstacles related to the extension aspect

The results of the research showed that the weighted averages for this axis (obstacles related to the indicative aspect) on the weighted averages ranged between) 1.766-2.74)degrees, and weights Celsius between (58.86-91.33 %) and the weighted mean in general was (2.432) degree and weight percentile was(81.06%) , as shown in the Table8

Table 8 Distribution of farmers according to their answers identifying the obstacles that face cereal farmers in the use of practices agricultural that limit the effects of changes of climate (side constraints IPF) in the central region of Iraq 's provinces

Sort of paragraphs according to the questionnaire	Sort the paragraphs in order of importance	paragraphs	Weighted mean of paragraphs	Weight percent for each paragraph	general weighted mean	general weight percent
-1	1.	Lack of seminars and advisory meetings that show the effects of the phenomenon of climate variation on the cultivation of cereals	2,740	91.33	2.432	81.06
-5	2.	weakness Advertising on seminars and meetings Indicative Which having food phenomenon the changes climatic.	2,651	88.36		
-6	3.	Lack of indicative plans and programs that address the impact of climate variation on cereal cultivation	2,638	87.93		
-8	4.	non regularity Dates Broadcasting Software the radio audible and visible which eat phenomenon the changes climatic.	2.603	86.76		
-7	5.	Lack of publications and bulletins related to the phenomenon of climate variation and its effects on the cultivation of cereals	2.590	86.33		
-2	6.	difficulty toimplement Some Buil decent Indicative relatothe clai ation Effects phenomenon the changes climatic as illustratior work ed.	2.572	85.73		
-11	7.	The lack of sufficient information sources for farmers by the agricultural extension system related to the effects of the phenomenon of climate variation	2.484	82.8		
-4	8.	lack Software theradio audible and visible on phenomenon Nutritional j Rat climatic.	2.475	82.5		
-3	9.	weakness coordination between Extension agricultural and search scientific Through relevant researcl recommendations b phenomenon the changes climatic.	2.449	81.63		
-9	10.	weakness to share Extension in take decisions related to the phenomenon Nutritional j Rat climatic.	2.440	81.33		
-10	11.	non Existence Policy indicative clear To face Nutritional j Rat climatic.	2.374	79.13		
-14	12.	It is difficult for farmers to adopt modern technologies that reduce the effects of climate variation	2.268	75.6		
-12	13.	Recommendations artistic related to B nutritional j Rat climatic characterized hardly Implement ation by the Agricultural Extension Agency.	2	66.66		
-13	14.	Recommendations Technical by the advisory body with changes climatic not Relevance Of the application when the farmer	1.766	58.86		

The above table indicates that the weighted means and the percentage weights were somewhat close, however it was found that the highest numerical value obtained by the paragraph (lack of seminars and indicative meetings that show the effects of the phenomenon of climate variation on the cultivation of cereals) according to the importance as the highest value in the axis of obstacles related to the indicative aspect And with a weighted mean of (2.74) degrees and a weight percentile of (91.33)%, which is greater than the hypothetical mean (1.5) degrees, and this may be attributed to several things, the most important of which are:

1. The sources of information and the local scientific material are almost few, which in the light of which raises the issues related to the agricultural practices used by the cereal farmers in limiting the phenomenon of climate variation in the governorates of the central region of Iraq

2. The lack of financial allocations necessary to create the necessary supplies and means of hospitality and others

As for the paragraphs (from 2 to 12) (weak announcement of seminars and indicative meetings dealing with the phenomenon of climate variation)... (the difficulty of farmers adopting modern technologies that reduce the effects of the phenomenon of climate variation), the numerical values of the weighted averages were higher than the hypothetical mean of (1.5) degree, and this may be attributed to several reasons, the most important of which areLack of real awareness on the part of the concerned authorities of the importance of food security, as the phenomenon of climate variation is one of the dangerous phenomena that must be taken into consideration, its effects addressed, and the necessary measures taken.

1. Follow the traditional extension approach
2. Most indicative programs are devoid of public indicative means (television and radio) related to the phenomenon of climate variation
3. Lack of financial allocations for these seminars and advisory meetings
4. Lack of provision of modern technologies involved in adapting to the phenomenon of climate variation
5. The authorities concerned with providing modern technologies (the Ministry of Agriculture, colleges of agriculture and research centers) have little tendency towards devising modern technologies that keep pace with climate variation
6. Lack of specialized and trained cadres on technologies, if any
7. Lack of benefit from the experiences of developed and neighboring countries in this field and the possibility of applying them in the country

All of the above-mentioned reasons led to the non-application, dissemination and spread of those technologies concerned with adapting to climatic changes, and consequently their failure to reach the cereal farmers in the governorates of the central region of the country

While the results of the research showed through Table 8 that the lowest numerical value obtained by the two paragraphs (technical recommendations related to climate variation are characterized by the difficulty of implementation by the agricultural extension body) and (technical recommendations by the extension body on climate variations are inappropriate for application by farmers) and with a weighted average of (2) degrees and (1.766) degrees and weight percentiles (66.66) and (58.86) percent, respectively, by cereal farmers, which is greater than the hypothetical mean (1.5) degrees, and this may be attributed to the lack of realistic awareness by the extension system of what is possible Application in farming systems on the ground for cereal farmers in the governorates of the central region of Iraq in the field of limiting the effects of the phenomenon of climate variation, and the absence of a clear agricultural policy by the higher authorities in drawing and supporting the organization's indicative priorities in this regard.

The third axis: Obstacles related to government institutions

The results of the research showed that the weighted averages for this axis (obstacles related to government institutions) on weighted averages ranged between (2.44-2.845) degrees, and percentage weights ranged between (81.33-94.83)%, and the weighted mean in general was (2.669) degrees and the weight percent was (88.964). %), as shown in Table 9:

Table 9. Distribution of farmers according to their answers in the field of identifying the obstacles facing cereal farmers in using agricultural practices that reduce the effects of climate variation (obstacles related to government institutions) in the governorates of the central region of Iraq

Sort of paragraphs according to the questionnaire	Sort the paragraphs according to the importance	paragraphs	weighted mean for each paragraph	weight percent for each paragraph	general weighted mean	General weight percent
-2	1.	Lack of government support for agricultural institutions and organizations in the field of limiting the effects of climate variation	2.845	94.83	2,669	88.964
-3	2.	Weakness of the government's approach to addressing the effects of climate variation	2.779	92.63		
-1	3.	The weak role of agricultural supply departments in improving agricultural practices to reduce the phenomenon of climate variation	2,665	88.83		
-5	4.	Lack of early warning stations for extreme and sudden climatic phenomena for farmers	2.616	87.2		
-4	5.	weakness perception importantly Role Extension agricultural in face effects phenomenon Changes the Rat climatic.	2.44	81.33		

The above table indicates that there is a clear convergence between the weighted means and the percentage weights to some extent and all the numerical values for this axis are greater than the hypothetical mean (1.5) degrees. In the field of reducing the effects of climate variation) according to importance as the highest value in the axis of obstacles related to government institutions, with a weighted average of (2.845) degrees and a weight percentage of (94.83)%, and this may be attributed to several reasons, the most important of which are:

1. Lack of awareness by the higher authorities of the importance of the agricultural sector in the country, as it represents one of the pillars of the local economy
2. Lack of awareness by the concerned authorities of the danger of the phenomenon of climate variation on cereal crops and all other crops, and their effects on the general environment
3. The dependence of the higher authorities on the revenues of the oil sector mainly in drawing up state budgets, with the lack of consideration for the agricultural sector and its importance

As for the paragraphs (from 2 to 4) of Table 9 (weakness of the government's approach to address the effects of the phenomenon of climate variation), (the weak role of agricultural equipment departments in improving agricultural practices to reduce the phenomenon of climate variation) and (the lack of early warning stations for extreme and sudden weather phenomena for farmers) were The numerical values of the weighted means are higher than the hypothetical mean of (1.5) degrees, and this may be attributed to several reasons, the most important of which are the following:

1. Lack of real awareness on the part of the concerned authorities of the importance of food security, as the phenomenon of climate variation is one of the dangerous phenomena that must be taken into consideration, its effects addressed, and the necessary measures taken
2. The decline in government support for the agricultural sector, such as the provision of sufficient fuel or electricity for agricultural

pumps and machines, the decline in the volume of financial loans for cereal farmers, and the lack of support for the prices of seeds, fertilizers and pesticides

3. The lack of support provided by the Agricultural Equipment Department to cereal farmers, such as providing modern agricultural machinery and mechanization or sustainable environmentally friendly fertilizers, and so on

4. The presence of agricultural weather stations affiliated to the Ministry of Agriculture and distributed well among the other governorates, but there is no coordination between them and the advisory body for each governorate and informing them of the expected climatic fluctuations and changes in order to warn cereal farmers to take the necessary measures

The results of the research showed through Table 9 that the lowest numerical value obtained by the paragraph (weak awareness of the importance of the role of agricultural extension in facing the effects of the phenomenon of climate variation) and with a weighted average of (2.44) degrees and weight percentage (81.33)%, and this may be attributed to reducing the importance of extension. The agricultural sector by the concerned authorities, and the formulation of immediate, short-term policies and programs without referring to the specialists in agricultural extension. The results of the research showed that the weighted averages for this axis (obstacles related to the economic aspect) on the weighted averages ranged between (2.643-2.801) degrees, and the percentage weights ranged between (88.1-93.36)%, and the weighted mean in general was (2.736) degrees and the percentage weight was (91.22) %), as shown in Table 10

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