Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/akha0472

PRACTICES OF VEGETABLE FARMERS TO FACE CLIMATE CHANGE IN IRAQ / CASE STUDY IN BAGHDAD AND BABYLON PROVINCES

Mahdi Najm Rakhit[1], Ahmed Hamdan Lafta*[2]

[1]Ministry of Agriculture

[2]Department of Agricultural Extension and Technology Transfer, College of Agricultural Engineering Sciences, University of Baghdad, Baghdad, Iraq

ABSTRACT

The study was aimed to identify the reality of vegetable farmers practices to face climate change in Iraq in general and in each field of research. To achieve the objectives, a questionnaire consisting of (75) items distribute over (3) areas are designed, after completing its design procedures in terms of validity and reliability, it is presented to a stratified random sample of (128) vegetable farmers in the reality of (82) farms from Baghdad province and (46) farms from Babylon province, the data are collected and then analyze using the social statistical analysis program (SPSS), The research results have shown the practices of vegetable farmers to face climate change were of medium importance, as all areas of planting vegetables to face climate changes in a weighted range of (1.93-1.68), which is lower than the hypothetical average of (2) degrees, With a percentage weight between (64.33 - 56%), the research recommended the need to intensify extension and preparation efforts to enable vegetable farmers to face climate change.

Key words: **agricultural extension; climate changes; practices; vegetable growing.**

Received: 11/8/2023, Accepted: 24/12/2023, Published: 30/4/2026

INTRODUCTION

The agricultural sector in Iraq is one of the important economic sectors as it is responsible for food security and an important source of income and the provision of raw materials that enter into many industries (Adnan, 2022), and vegetable crops occupy high importance, because they form an important part of the human diet and nutrition, and are grown in all governorates of Iraq and agriculture in Iraq in general faces major challenges, foremost of which is the need to achieve sustainable increases in production and productivity, as it is expected that Iraq will need (5918,000) tons of vegetables by 2025, due to the number of the population, its high standard of living and the spread of Health and food awareness. The impact of climate change is one of the biggest challenges faced by the cultivation of vegetable crops in Iraq, due to the scarcity of irrigation water and the high temperatures, and the failure of vegetable farmers to follow the agricultural practices necessary to meet these challenges, as this leads to a decrease in production and productivity of vegetable crops, which requires that it be heavily dependent on import, and this is an economic problem that reflects its effects on Iraqi society (Al-Khalidi, 2022). Agricultural extension has a great role in confronting climate change through educational and agricultural extension programs and activities, which seek to achieve food security by working to bridge the food gap through cooperation with scientific research centers and universities in developing the knowledge and skills of vegetable farmers of all categories to adopt the correct agricultural practices. Effective agricultural extension is one of the requirements for increasing production and agricultural income, protecting natural resources and their sustainability, and preserving the environment and the lack of government extension activities directed to vegetable farmers by agricultural extension departments and the lack of a clear mechanism for coordination and cooperation

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/akha0472

between extension and research organizations in the field of spreading awareness to follow new agricultural practices leads to a noticeable decrease in their following the correct agricultural practices to face climate change in Iraq. To face the negative effects of climate change on agriculture and achieve the green paper in Iraq, an integrated approach must be adopted to manage agricultural systems that seeks to adapt agricultural practices as much as possible to increase agricultural productivity of vegetable crops. Agricultural practices are defined as the set of principles that are used in agriculture to facilitate the work of agriculture, such as plowing the soil for the first time, Irrigation and fertilization methods, and others (Al-Taie, 2015). Therefore, the current stage of agricultural extension requires improving the practices carried out by vegetable farmers in their fields or agricultural lands to provide appropriate conditions for growing and producing various crops, thereby facilitating their access to sources of information, practices and modern technologies and facilitating their access to enable them to face climate changes. On this basis, the current research came to answer the following question: What is the reality of the practices of vegetable farmers in the provinces of Baghdad and Babylon to face climate change .Identify the reality of vegetable growing practices to face climate change in general. Identify the reality of the practices of vegetable farmers to face climate changes for each axis of vegetable cultivation.

MATERIALS AND METHODS

The descriptive method is one of the forms of accurate scientific analysis and interpretation to describe a specific phenomenon or problem in a quantitative or qualitative way and in a specific period of time, through which data is collected, tabulated and analyzed in depth in order to reach new facts and generalizations that contribute to the extension and progress of human knowledge.

Search area: The research included the governorates of Baghdad and Babylon due to the presence of large agricultural areas in these two governorates with a clear diversity of crops grown, and that these two governorates are significantly affected by climate changes, especially with regard to high temperatures and water scarcity, and the number of vegetable farmers registered with all agricultural divisions in these two governorates amounted to about (38000) thousand farmers.

Community and sample research: A random proportional sample was selected by (20%) of the agricultural divisions belonging to the Baghdad governorate, of which there are (17) agricultural divisions after excluding the latifiya agriculture division as an exploratory sample, and by (3) agricultural divisions, which included (mahmudiya Agriculture Division, Tangerine agriculture division and Abu Ghraib agriculture division), and for the same, a random sample was drawn from the divisions belonging to the Babylon Agriculture Directorate, of (15) agricultural divisions and by (3) agricultural divisions, which included (Vanguard agriculture division, Center agriculture division, crops cultivation division) to be the size of total sample (6) agricultural division, The total number of vegetable farmers in the agricultural divisions covered by the research procedures affiliated to Baghdad governorate reached (2750) farmers, from whom a random stratified proportional sample was selected by (3%), the volume reached (82) researches, and the total number of vegetable farmers in the agricultural divisions covered by the research procedures affiliated to Babylon governorate reached (1616) farmers, from whom a random stratified proportional sample was selected by (3%), the volume reached (46) researches, thus the total research sample became (128) researches.

Search Tool: A questionnaire was prepared and adopted in data collection as a research tool, as the questionnaire is a common and important means of collecting data and obtaining information and facts related to the research topic, and the questionnaire was prepared by reviewing scientific sources, studies and research related to the subject and consulting specialists on the subject from researchers and university professors, a scale was prepared to know the practices of

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/akha0472

vegetable farmers to face climate change, which included (76) paragraphs distributed over (16) axes and (3) areas, namely (agricultural operations, communication practices with information sources, regulatory and credit practices), and presented to the researchers through a three-tiered scale consisting of three levels according to importance, which are (always, sometimes, there is no) and I gave him weights (1, 2, 3) respectively, data and information were collected from the 128 respondents, and then these data were analyzed using manual analysis and statistical SPSS program.

RESULTS AND DISCUSSION

First objective: To identify the reality of vegetable farmers practices to face climate change in general The results of the study showed that according to the respondents ' answers, the ranking of the fields of vegetable farmers practices to face climate changes obtained weighted circles located between (1.90-1.71) degrees, which are lower than the hypothetical average of (2) degrees, and with a percentage weight located between (64.33 - 57%), this indicates that the importance of these practices is average, As shown in the Table 1:

Table 1. Ranking the areas of practice of vegetable farmers to face climate change according to their weighted environments

Field of Research	Rank	Median Weight	Percentage Weighted
1. Agricultural operations	1	**1.90**	63.33
2. Communication practices with information sources	**2**	1.75	58.33
3. Regulatory and credit practices	**3**	1.71	57

Maximum score = 3

Table 1 indicates the that the researchers stressed the importance of the field of agricultural operations to face climate changes, and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it received a weighted average of (1.90) degrees and a percentage weight of (63.33%). the reason may be attributed to the awareness of farmers of the danger of climate change on their crops and the need to adopt agricultural practices that enable them to, This finding is consistent with the findings of a study (Joost, 2019). While the field of regulatory and credit practices received the last place in terms of importance or approval by the respondents, as it received a weighted average of (1.71) degrees and a percentage weight of (57%). The reason for this may be attributed to the weak role of the government and guidance in the process of regulating agriculture and obtaining loans.

Second objective: To identify the reality of the practices of vegetable farmers to face climate change for each axis of vegetable cultivation.

First area: Agricultural operations

Axis of land preparation and planting date: The results of the study showed that the practices of the researchers in the axis of land numbers and the date of planting to face climate changes, the number of (7) paragraphs received weighted averages ranging between (2.34-1.56) with a percentage weight between (78 -55%), and that two paragraphs recorded a weighted average slightly more than the hypothetical average of (2) degree and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the importance of these practices is average, as shown in **Table 2**:

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/akha0472

Table 2. The order of the paragraphs of the axis of Practices the land and the date of planting according to its weighted media

	Practices	Rank	Median Weighted	Percentage Weight
1.	Adopt the appropriate depth for planting seeds, by size, variety, type of planting and irrigation method	1	2.34	78.00
2.	I make the planting date early or delayed according to weather conditions information (depending on weather forecasting techniques)	2	2.24	74.67
3.	I do the Rapture before plowing	3	1.92	64.00
4.	Follow the (agricultural cycle) rotation of different vegetable crops on one plot	4	1.90	63.33
5.	Choose the right planting date for the purpose of synchronizing the stages of growth and formation of crop organs according to scientific recommendations	5	1.85	61.67
6.	Perform laser leveling after plowing	6	1.78	59.33
7.	Use a rotary hoe or disc Combs for soil smoothing	7	1.65	55.00

Table 2 indicates the researchers confirmed the practice (the appropriate depth of planting seeds was adopted, depending on the size, variety, type of cultivation and irrigation method), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.34) degrees and a percentage weight of (78%), this may be due to the fact that these agricultural practices were inherited by vegetable farmers from long periods of time in which they, This finding is consistent with the findings of a study (Kour, 2020). While the practice of (using the rotary hoe or disc Combs for the soil softening process) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.65) degrees and a percentage weight of (55%), and this is due to the weak guiding role in convincing the vegetable grower to use the rotary hoe or disc Combs, and the farmer adhered to traditional practices

Axis of fertilization

The results of the study showed that the practices of the researchers in the composting axis to face climate changes, the number of (6) paragraphs received weighted averages ranging between (2.36-1.59) with a percentage weight between (78.67- 53%), and that two paragraphs recorded a weighted average slightly more than the hypothetical average of (2) degree, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the importance of these practices is average, as shown in the following Table 3:

Table 3. Arrange the Practices of the composting axis according to their weighted mediums

	Practices	Rank	Median Weighted	Percentage Weight
1.	Use organic (bio) fertilizers as an alternative to chemical fertilizers	1	2.36	78.67
2.	Used for foliar fertilizers under changing environmental conditions (low or high temperatures lead to delayed growth stages, foliar fertilizers are quickly absorbed and lead to the completion of plant growth stages).	2	2.28	76.00
3.	I do not rely mainly on the use of chemical fertilizers for fertilizing vegetable crops	3.5	1.98	66.00
4.	I apply integrated soil fertility management (adding organic and inorganic fertilizers or growing legumes)	3.5	1.98	66.00
5.	I carry out the process of fertilizing vegetables on the date and quantity recommended by the competent authorities	5	1.83	61.00
6.	Use plant residues as organic fertilizer	6	1.59	53.00

Table 3 indicates the researchers stressed the practice of (using organic fertilizers {bio} as an alternative to chemical fertilizers), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

average of (2.36) degrees and a percentage weight of (78.67%), this may be due to the availability of organic fertilizers among farmers, ease of Use and low price compared to chemical fertilizers and the knowledge of the farmer of the benefits achieved from them. While the practice of (using plant residues as organic fertilizer) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.59) degrees and a percentage weight of (53%), due to the weak guiding role in educating farmers to follow this practice, and the spread of the phenomenon of burning plant residues. This finding is consistent with the findings of a study**.**

Focus of preventive measures

The results of the study showed that the practices of the researchers in the axis of preventive measures to face climate changes, which number (4) paragraphs, received weighted averages ranging from (2.52 - 2.01) with a percentage weight between (84-67%), and that all practices recorded weighted averages higher than the hypothetical average of (2) degree, and this indicates that the importance of farming practices is high, as shown in the following Table (4):

Table 4. The order of the Practices of the axis of preventive measures according to their weighted mediums

Practices	Rank	Median Weighted	Percentage Weight
1. I plant trees as windbreaks	1	2.52	84
2. Use the biodynamic farming method (intensive farming, increasing biodiversity using organic matter, crop rotation, animal grazing)	2	2.21	73.67
3. I don't burn plant residues outdoors	3	2.14	71.33
4. Use pheromones (chemical or natural insect attractants) in the control of agricultural pests	4	2.01	67

Table 4 indicates that the researchers confirmed that the practice of (I plant trees as windbreaks) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.52) degrees and a percentage weight of (84%), this may be due to the awareness of vegetable farmers of the importance of taking preventive measures to face strong winds and dust storms by planting trees, and the role of agricultural guidance in This finding is consistent with the findings of a study. While the practice of (using pheromones {chemical or natural attractive substances for insects} in the control of agricultural pests) came in last place in terms of importance or approval of the respondents, as it achieved a weighted average of (2.01) degrees and a percentage weight of (67%), due to the poor knowledge of many farmers about pheromones and the method of use, importance and high prices.

Axis of seed varieties

The results of the study showed that the practices of the researchers in the axis of seed varieties to face climate changes, the number of (6) paragraphs received weighted averages ranging from (2.01-1.67) with a percentage weight between (67 -55.67%), and that one paragraph recorded a weighted average slightly more than the hypothetical average of (2) degrees, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the importance of farming practices is average, as shown in the following **Table 5**:

Table 5. The order of the Practices of the axis of the seed varieties according to their weighted mediums

Practices	Rank	Median Weighted	Percentage Weight
1. I grow drought-tolerant and salinity-tolerant varieties	1	2.01	67
2. I grow early and high-yielding varieties	2	1.96	65.33
3. Rely on the cultivation of seeds certified and approved by the recommended research and official bodies	3	1.95	65
4. I grow varieties resistant to agricultural pests	4	1.91	63.67
5. I grow varieties with low water needs	5	1.82	60.67
6. I grow varieties with high marketing value and non-traditional	6	1.67	55.67

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

Table 5 indicates that the researchers confirmed that the practice of (I cultivate drought-tolerant and salinity-tolerant varieties) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.01) degrees and a percentage weight of (67.00%), and this may be due to the awareness of vegetable farmers of the ability of drought-tolerant varieties to face climate change, and the role of agricultural guidance in raising awareness and providing them with guidance bulletins. While the practice of (I cultivate varieties with high marketing value and non-traditional) came in last place in terms of importance or approval of the respondents, as it achieved a weighted average of (1.67) degrees and a percentage weight of (55.67%), and this is due to the lack of awareness of farmers of the importance of vegetable varieties with high marketing value, and the weak role of agricultural scientific research in, This finding is consistent with the findings of a study.

Axis irrigation technologies

The results of the study showed that the practices of the researchers in the field of irrigation technologies to cope with climate changes, the number of (6) paragraphs received weighted averages ranging from (2.27 -1.41) with a percentage weight between (75.67 - 47%), and that one paragraph recorded a weighted average slightly more than the hypothetical average of (2) degrees, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the importance of agricultural practices is average, As shown in **Table 6**:

Table 6. Arrange the practices of pivot irrigation techniques according to their weighted mediums

Practices	Rank	Median Weighted	Percentage Weight
1. I use drip irrigation techniques	1	2.27	75.67
2. I make use of rainwater by collecting it (harvesting water)	2	1.89	63
3. I use trocar water and sewage when necessary after treatment	3	1.78	59.33
4. I create ponds or basins to store water during periods of Water Abundance	4	1.76	58.67
5. I follow the irrigation schedule (recommendations for the amount of water needed by the plant and when to irrigate the field) and according to the recommendations of the scientific authorities	5	1.65	55
6. I use fixed or axial spray irrigation techniques	6	1.41	47

Table 6 indicates that the researchers confirmed the practice of (I use drip irrigation techniques), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.27) degrees and a percentage weight of (75.67%), and this may be due to the awareness of vegetable farmers of the importance of drip irrigation techniques in rationing water, fertilizers and pesticides and its high efficiency, in addition to its moderate prices and availability in local markets and ease of installation and operation, This finding is consistent with the findings of a study**.** While the practice of (I use fixed or axial sprinkler irrigation techniques) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.41) degrees, with a percentage weight of (47%), and this is due to its high prices, the lack of government support in this area and that the cultivation of vegetables is grown by drip irrigation, This finding is consistent with the findings of a study (Sahab, 2022).

Focus of pest control: The results of the study showed that the practices of the researchers in the pest control axis to cope with climate changes, the number of (5) paragraphs received weighted averages ranging between (2.29 - 1.50) with a percentage weight between (76.33-50%), and that two paragraphs recorded a weighted average slightly more than the hypothetical average of (2) degrees,

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the level of agricultural practices is average, as shown in the following Table 7:

Table 7. Arrange the practices of the irrigation pest control axis according to their weighted mediums

Practices	Rank	Median Weighted	Percentage Weight
1. Use mechanical and manual methods in pest control	1	2.29	76.33
2. Use electoral chemical pesticides	2	2.25	75
3. I carry out control of agricultural pests in the soil before planting	3	1.80	60
4. Use non-chemical biocidal pesticides (natural enemies of insect pests such as predators) that are environmentally friendly	4	1.54	51.33
5. Follow the methods of pest control according to the recommendations of the competent authorities for the Prevention of plantings	5	1.50	50

Table (7) indicates that the researchers confirmed the practice of (using mechanical and manual methods in pest control), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.29) degrees and a percentage weight of (76.33%), this may be due to the ease of conducting mechanical and manual control and its low cost and the awareness of vegetable farmers of the feasibility of electoral pesticides to get rid of pests without causing harm to the environment and vegetable crops While the practice of (follow the pest control methods according to the recommendations of the competent authorities for the Prevention of plants) came in last place in terms of importance or approval of the respondents, as it achieved a weighted average of (1.50) degrees and a percentage weight of (50%) and the reason for this is due to the lack of awareness of vegetable farmers of the importance of modern pest control methods as a result of the weak guiding role in this area and government agencies specialized in the Prevention of plants.

Axis of harvesting and marketing: The results of the study showed that the practices of the researchers in the axis of harvesting and marketing to confront climate changes, the number of (7) paragraphs received weighted averages ranging between (2.40 -1.41) with a percentage weight between (80-47%), and that two paragraphs recorded a weighted average slightly more than the hypothetical average of (2) degrees, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that the importance of farming practices is average, as shown in the following Table 8:

Table 8. Ranking of harvesting and marketing axis practices by weighted mean and percentile weight

Practices	Rank	Median Weighted	Percentage Weight
1. products, frozen transport equipment and suitable packing	1	2.40	80
2. Availability of refrigerators for storage at the last point of sale and suitable cans, packages and boxes	2	2	66.67
3. Use modern equipment in harvesting, grading and packing of vegetable crops (potatoes, tomatoes ...etc)	3	1.92	64
4. Use environmentally friendly packaging tools using recyclable organic materials (cartons)	4	1.76	58.67
5. Retailers have refrigerators or transport refrigerators suitable for preserving crops (cans and packages)	5	1.67	55.67
6. Use refrigerated transport for vegetable crops	6	1.57	52.33
7. Availability of technical skills related to the hygiene, transportation, staging and marketing of vegetable crops	7	1.41	47

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

Table 8 indicates that the respondents confirmed that the practice of (availability of refrigerated warehouses for storing agricultural products, frozen transport equipment and suitable packaging materials) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.40) degrees and a percentage weight of (80%), and this may be due to the awareness of the farmer that vegetable crops are damaged when not stored in refrigerated places, as well as the availability of these warehouses for a small fee. While the practice of (providing technical skills related to hygiene, transportation, staging and marketing of vegetable crops) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.41) degrees and a percentage weight of (47%), due to the lack of awareness of farmers of the importance of technical skills and their benefits in the marketing process and raising the value of agricultural crops, as a result of the weak role of training guidance in this field.

Axis of smart agriculture curricula

The results of the study showed that the practices of the researchers in the axis of smart agriculture approaches to face climate changes, which number (3) paragraphs received weighted circles ranging from (1.87 - 1.07) with a percentage weight between (62.33 - 35.67%), and that all paragraphs of this field recorded a weighted average less than the hypothetical average of (2) degrees, and this indicates that the importance of agricultural practices is average, as shown in the Table 9

Table 9. Ranking the Practices of the axis of smart agriculture curricula according to their weighted mediums

Practices	Rank	Median Weighted	Percentage Weight
1. Adopted the climate smart agriculture approach (to withstand climate change and follow specific scientific smart practices that mitigate the effects of climate change)	**1**	**1.87**	**62.33**
2. Adopted the agro ecological approach (application of Ecology in agriculture to cope with climate change)	**2**	**1.50**	**50**
3. Adopt the approach of conservation agriculture-without tilling the soil and conserving the natural resources	**3**	**1.07**	**35.67**

Table 9 indicates that the researchers confirmed that the practice of (adopting the climate smart agriculture approach {to withstand climate changes and follow specific scientific smart practices that mitigate the effects of climate changes} and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.87) degrees and a percentage weight of (62.33%), and this may be due to the awareness of farmers of the importance of climate smart agriculture in the face of climate changes , Many of the practices carried out by vegetable farmers in the target areas comply with the management package of climate-smart agriculture approaches, such as the use of drip irrigation systems, greenhouses, organic agriculture, conservation and others. While the practice of (adopting the method of conservation agriculture - without plowing the soil to preserve the natural resources of the soil) came in the last place in terms of importance or approval of the respondents, as it achieved a weighted average of (1.07) degrees and a percentage weight of (35.67%) and this is due to not leaving the remnants of the previous crop and burning, and the weakness of the guiding role in educating farmers and guiding them about this method, This finding is consistent with as study**.**

Second area: communication practices with information sources**.**

Axis of communication with agricultural extension: The results of the study showed that the practices of the respondents in the axis of communication with agricultural extension to cope with climate changes, the number of (6) paragraphs received weighted circles ranging between (2.35-1.56) with a percentage weight between (78.33-52%), and that one practice recorded a weighted average slightly

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

more than the hypothetical average of (2) degrees and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that agricultural practices are of medium importance in this axis, as shown in the **Table 10**:

Table 10. Ranking the practices of the agricultural extension communications hub according to weighted mean and percentage weight

Practices	Rank	Median Weighted	Percentage Weight
1. Follow TV and radio programs	1	2.35	78.33
2. Check the extension centers and farms if necessary	2	1.85	61.67
3. Attend all extension activities	3	1.79	59.67
4. Contact the competent agricultural guide if necessary	4	1.72	57.33
5. Follow agricultural Extension websites	5	1.63	54.33
6. Get periodicals and brochures	6	1.56	52

Table 10 indicates that the respondents confirmed the practice of (following TV and radio programs), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.35) degrees and a percentage weight of (78.33%), this may be due to the possession of most farmers to television and radio, and that agricultural programs are broadcast at an appropriate time to, This finding is consistent with the findings of a study**.** While the practice of (get periodicals and brochures) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.56) degrees and a percentage weight of (52%), and this is due to the lack of provision and distribution of brochures before agricultural guidance, and that the brochures are moving away from the simplified colloquial language of farmers, in addition to the fact that a large number of farmers are not good at Reading and writing, This finding is consistent with the findings of a study (Salman, 2020).

Axis of communication with research stations: The results of the study showed that the practices of the researchers in the axis of communication with the research stations to confront climate change, the number of (4) paragraphs received weighted circles ranging from (2.20 -1.75) with a percentage weight between (73.33 - 58.33%), and that one practice recorded a weighted average slightly more than the hypothetical average of (2) degrees and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that farming practices are of medium importance in this axis, as shown in the Table 11:

Table 11. Ranking of the practices of the axis of communication with research stations by weighted mean and percentage weight

Practices	Rank	Median Weighted	Percentage Weight
1. I provide researchers with field information on the problems facing us in the field of vegetable farmers to develop appropriate solutions to them	1	2.20	73.33
2. I cooperate with researchers and have a willingness	2	1.82	60.67
3. I seek to identify the latest innovative technologies	3	1.79	59.67
4. Work with recommendations and agricultural scientific consultations by researchers	4	1.75	58.33

Table 11 indicates that the researchers confirmed that the practice of (I provide researchers with field information about the problems facing us in the field of vegetable cultivation to develop appropriate solutions to them) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.20) degrees and a percentage weight of (73.33%), and this may be due to the innate spirit of cooperation characterized by farmers and providing researchers with information to help solve agricultural problems in general. While the practice of

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

(working with recommendations and agricultural scientific consultations by researchers) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.75) degrees and a percentage weight of (58.33%), due to the adherence of farmers to the agricultural practices to which they are accustomed, and the lack of efforts by researchers in this field.

Axis weather stations: The results of the study showed that the practices of the respondents in the axis of communication with meteorological stations to face climate changes, the number of (4) paragraphs received weighted averages ranging from (2 - 1.41) with a percentage weight between (66.67 - 47%), and that one practice recorded a weighted average slightly more than the hypothetical average of (2) degrees, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that agricultural practices are of medium importance in this axis, as shown in the **Table 12**:

Table 12. Ranking of Axis practices by meteorological stations according to weighted mean and percentile weight

Practices	Rank	Median Weighted	Percentage Weight
1. I am trying to find out when and how much it rains	**1**	**2**	**66.67**
2. I seek to learn about current and future climate changes	**2.5**	**1.92**	**64**
3. I am trying to find out when the wind and dust storms will blow and their speed	**2.5**	**1.92**	**64**
4. Work with recommendations and agricultural scientific consultations by researchers	**4**	**1.75**	**58.33**

Table 12 indicates that the respondents confirmed that the practice of (I seek to identify the date of rainfall and its quantities) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2) degrees and a percentage weight of (66.67%), and this may be due to the interest of vegetable farmers to follow up the date of rainfall as it fills the shortage of water scarcity and irrigate their agricultural crops, and take the necessary preventive measures to reduce the damage to their crops. While the practice of (I take care of the weather information I get from meteorological stations and take the necessary measures to avoid its danger) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.41) degrees and a percentage weight of (47%) and this is due to the lack of awareness of farmers about the importance of weather information, and the obvious weakness of agricultural guidance in advising farmers about the severity of expected climate changes farmers to take preventive measures.

Axis internet connection

The results of the study showed that the practices of the researchers in the axis of internet connectivity to confront climate change, which number (4) paragraphs received weighted circles ranging from (1.75-1.22) with a percentage weight between (58.33 -40.67%), and that all practices recorded a weighted average less than the hypothetical average of (2) degrees, and this indicates that the practices of agriculture are of medium importance in this axis, as shown in the **Table 13**:

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

Table 13. Ranking of internet connectivity hub practices according to weighted mean and percentile weight

Practices	Rank	Median Weighted	Percentage Weight
1. Taking advantage of the internet and social networking sites to learn about the latest technological developments	1	1.75	58.33
2. Take advantage of the internet and social networking sites	2	1.50	50
3. Taking advantage of the internet and communication	3	1.33	44.33
4. Taking advantage of the internet and communication sites in the process of marketing products and according to the value chain	4	1.22	40.67

Table 13 indicates that the researchers confirmed that the practice of (taking advantage of the internet and social networking sites in identifying the latest technological developments in the agricultural field) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.75) degrees and a percentage weight of (58.33%), and this may be due to the awareness of some vegetable farmers of the importance of connecting to the internet to identify the latest technological developments in the agricultural field and agricultural guidelines on how to climate changes, This finding is consistent with the findings of a study**.** While the practice of (taking advantage of the internet and communication sites in the process of marketing products according to the value chain) came in last place in terms of importance or approval of the respondents, as it achieved a weighted average of (1.22) degrees and a percentage weight of (40.67%), due to the lack of awareness of farmers about the importance of marketing their agricultural products according to the value chain, and many of them do not have internet networks because of their lack of knowledge of their use or high cost and weakness in rural areas.

Third area: regulatory and credit practices

Axis of the organization of cooperative work : The results of the study showed that the practices of the respondents in the axis of organizing cooperative work to confront climate change, the number of (4) paragraphs received weighted circles ranging from (2.04 - 1.44) with a percentage weight between (68-48%), and that one practice recorded a weighted average slightly more than the hypothetical average of (2) degrees, and the rest of the practices recorded weighted averages less than the hypothetical average, and this indicates that agricultural practices are of medium importance in axis, as **Table 14**:

Table 14. Ranking of the practices of the axis of the organization of cooperative work according to the average weight and percentage

Practices	Rank	Median Weighted	Percentage Weight
1. cooperate and exchange experiences with other vegetable farmers to be able to cope with climate change	1	2.04	68
2. joining specialized agricultural cooperatives	2	1.87	62.33
3. I seek to join and collaborate with civil society organizations	3	1.73	57.67
4. join Water Users Associations	4	1.44	48

Table 14 indicates that the researchers confirmed that the practice of (cooperating and exchanging experiences with other vegetable farmers to be able to cope with climate changes) is enhanced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (2.04) degrees and a percentage weight of (68.00%), and this may be due to the adherence of farmers to Arab values and traditions that provide for cooperation and assistance to some and the exchange of experiences.While the practice of (joining water users associations) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.44) degrees and a percentage weight of (48.00%), due to the weakness of government efforts in general in encouraging farmers and organizing them in water users associations

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

and the novelty of their formation in Iraq., This finding is consistent with the findings of a study**.**

Axis of family agricultural innovation

The results of the study showed that the practices of the researchers in the axis of family agricultural innovation to cope with climate changes, which number (4) paragraphs received weighted circles ranging from (1.95-1.42) with a percentage weight between (65-47.33%), and that all practices recorded a weighted average less than the hypothetical average of (2) degrees, and this indicates that agricultural practices are of medium importance in this axis, as shown in **Table 15**:

Table 15. Ranking the practices of the family agricultural innovation hub according to weighted mean and percentage weight

Practices	Rank	Median Weighted	Percentage Weight
1. promote, develop and apply local and family innovations	**1**	**1.95**	**65**
2. I seek to obtain modern innovations that enable vegetable farmers to face the risks of climate change and apply them from various	**2**	**1.90**	**63.33**
3. I seek to make use of local resources on the farm in the development of family innovation in agricultural work to cope with climate	**3**	**1.45**	**48.33**
4. Joint Cooperation and coordination between vegetable farmers	**4**	**1.42**	**47.33**

Table 15 indicates that the respondents emphasized the practice of (I encourage, develop and apply local and family innovations), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.95) degrees and a percentage weight of (65%). This may be due to the farmers' awareness of the importance of family agricultural innovation and the great need for it as a result of the lack of government support in the field of processing agricultural innovations in general. This finding is consistent with the findings of a study. While the practice of (cooperation and joint coordination between vegetable farmers and other actors in order to confront climate change) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.44) degrees and a percentage weight of (48%), and this is due to the weak role of actors (government and others) in enabling farmers to face climate change in all indicative and preparatory aspects .

Axis of lending and financing

The results of the study showed that the practices of the researchers in the axis of lending and financing to confront climate change, the number of (4) paragraphs received weighted circles ranging from (1.78-1.57) with a percentage weight between (59.33-52.33%), and that all practices recorded a weighted average less than the hypothetical average of (2) degrees, and this indicates that agricultural practices are of medium importance in this axis, as the Table 16:

Table 16. Ranking of the lending and financing center's practices according to the weighted average and percentage weight

Practices	Rank	Median Weighted	Percentage Weight
1. Take advantage of soft loans to obtain high-cost agricultural innovations to cope with climate change	**1**	**1.78**	**59.33**
2. Seek to benefit from high-quality concessional agricultural finance and lending services with the lowest bank benefits to face climate change	**2**	**1.75**	**58.33**
3. Use soft loans to create packaging, staging, packaging and refrigeration projects for agricultural products that reduce the effects of climate change	**3**	**1.60**	**53.33**
4. Use soft loans to establish vegetable nurseries projects, drill and equip artesian wells and purchase the necessary technologies to cope with climate	**4**	**1.57**	**52.33**

Table 16 indicates that the respondents confirmed the practice of (I seek to take advantage of soft loans to obtain high-cost agricultural innovations to cope with climate

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

change), and this is reinforced by its obtaining the first place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.78) degrees and a percentage weight of (59.33%), this may be due to the fact that soft loans are granted to farmers to implement agricultural projects and works with little or no profits often. While the practice of (using soft loans to establish vegetable nursery projects, drilling and equipping artesian wells, and purchasing the necessary technologies to cope with climate changes) came in last place in terms of importance or approval by the respondents, as it achieved a weighted average of (1.57) degrees with a percentage weight of (53.33%), due to the fact that vegetable growers, most of whom are smallholders, the difficulty of administrative procedures to obtain loans, the risks of market volatility and withdrawal of soft loans in the target areas .

CONCLUSION

There is a need to strengthen and intensify the efforts of agricultural extension and scientific research and work to establish a real partnership that takes upon itself the subject of coordination and harmony between them and the rest of the relevant institutions to activate their roles in facing climate change, work to improve agricultural practices, and develop long- term guidance and research strategic plans in the field of climate change by decision makers.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the College of Agricultural Engineering Sciences for providing the necessary support to conduct this study

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR/S DECLARATION

We confirm that all Figures and Tables in the manuscript are original to us. Additionally, any Figures and images that do not belong to us have been incorporated with the required permissions for re-publication, which are included with the manuscript.

Author/s signature on Ethical Approval Statement.

Ethical Clearance and Animal welfare

Funds: No funds have been received for this research.

AUTHOR'S CONTRIBUTION STATEMENT

Mahdi Najm Rakhit and Ahmed Hamdan Lafta were responsible for designing the research.

REFERENCES

Adnan, S., Ahmad and A. H. lafta, (2022), Obstacles to extension service in the process of rationalizing irrigation water and treatment methods from the view point of farmers in Baghdad governorate, Neuro Quantology, June 2022, Volume 20, Issue 6, Page 7324-7334. http://dx.doi.org/10.14704/nq.2022.20.6.NQ22735

Al-jadri, A. H. (2018), Mentor In The Preparation And Writing Of Theses And Dissertations, Al-Warraq Publishing And Distribution Foundation, First Edition, Jordan. https://petra.gov.jo/Include/InnerPage.jsp?ID

Al-Khalidi, A.Y. Jihad and B. A. J.Reda. (2022), The requirements for improving the capabilities of potato farmers in the production of healthy seeds, a field study in al-yusufiya sub-district, Baghdad governorate, Neuro Quantology, June2022, Volume 20, Issue 6, Page 603-616. https://doi:10.14704/nq.2022.20.6.NQ22056

Al- Khafaji, N.J.M. & Lafta, A. H. (2022). Problems encountered by beekeepers in the field of breeding imported bees in iraq. International Journal of Agricultural and Statistical Sciences, 18(1), 2269- 2274. https://connectjournals.com/03899.2022.18.2269

Al-Taie, H. K. and S.J. Jassim, (2015), The role of non-governmental agricultural companies in spreading the agriculture system in greenhouses in Karbala Governorate, Research Published in The Iraqi Agricultural Research Journal, 20(1): 205-197, https://www.iasj.net/iasj/article/176105

Joost, J ; W. Wolters ; Y. Dijkxhoorn ; F. Gür and M. Öztürk, (2019), The politics of agricultural development in Iraq and the Kurdistan Region in Iraq (KRI), Journal, Sustainability 2019, 11, 5874, http://dx.doi.org/10.3390/su11215874,

Kour, V. P. and S. Arora, (2020), Recent Developments of the IoT in Agriculture: A Survey, School of Computer Science and Engineering, Shri Mata Vaishno Devi

University, Katra 182320, India, Publisher: EEEE company, Institute of Electrical and electronics engineers., http://dx.doi.org/10.1109/ACCESS.2020.3009298

Mohamed, M.M. and Abdel Ghani, (2019), A study on the readiness of using social media in agricultural extension in Assiut Governorate, Journal of the Union of Arab Universities for Agricultural Sciences, Ain Shams University, Cairo, Egypt, Issue (27) Volume (3) 1783-1801, 2019. https://doi.org/10.21608/ajs.2019.74012

Mohebis I. J. and H. K. Al-Taie. (2019), the problems facing the agricultural innovation system in the field of developing barley cultivation in Iraq from the point of view of agricultural researchers. Al-Rafidain Agriculture Journal, Volume (74), Additional Issue (3), 2019 Proceedings of the Third International Agricultural Conference, College of Agriculture and Forestry, University of Mosul and College of Agricultural Engineering Sciences, University of Duhok 3-9 October 2019. https://www.iasj.net/iasj/article

Sahab, A. Y,. (2022). A proposal for developing the agricultural extension organization in Iraq and activating its role in achieving sustainable development, tikrit journal for agricultural sciences 22 (2):1-12, https://doi.org/10.25130/tjas.22.2.1

Salman, M.A. (2020), The role of agricultural extension against the challenges that facing farmers within their agricultural activitiesm, Plant Archives. 20, Appendix 2, 2996-3001, Essen: 2581-6063 (online), Essen: 0972-5210.https://www.researchgate.net/publication/342562119

Iraqi Journal of Agricultural Sciences –2026:57(4):1199-1213
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

ممارسات زراع الخضر لمواجهة التغيرات المناخية في العراق / دراسة حالة في محافظتي بغداد وبابل

مهدي نجم رخيت[1]، احمد حمدان لفتة[2]

[1]وزارة الزراعة

[2]قسم الإرشاد الزراعي ونقل التقنيات/ كلية علوم الهندسة الزراعية /جامعة بغداد

المستخلص

هدف البحث الى التعرف على واقع ممارسات زراع الخضر لمواجهة التغيرات المناخية في العراق بشكل عام، وفي كل مجال من مجالات البحث، ولتحقيق أهداف البحث تم تصميم استبانة مكونة من (75) ممارسة موزعة على (3) مجالات، بعد استكمال إجراءات تصميمها من حيث الصدق والثبات، تم عرضها على عينة عشوائية طبقية قوامها (128) مزارعا من زراع الخضر وبواقع (82) مزارع من محافظة بغداد و (46) مزارع من محافظة بابل، وتم جمع البيانات ومن ثم تحليلها باستخدام برنامج التحليل الإحصائي الاجتماعي (SPSS)، وقد أظهرت نتائج البحث ان ممارسات زراع الخضر لمواجهة التغيرات المناخية كانت متوسطة الأهمية، إذ حصلت جميع مجالات ممارسات زراع الخضر لمواجهة التغيرات المناخية على أوساط مرجحة تتراوح بين (1.93–1.68) وهي اقل من الوسط الفرضي البالغ (2) درجة، وبوزن مئوي يقع بين (63.33 – 57%)، وقد أوصى البحث بضرورة تكثيف الجهود الإرشادية والتجهيزية لتمكين زراع الخضر من مواجهة التغيرات المناخية.

الكلمات المفتاحية: الإرشاد الزراعي؛ التغيرات المناخية؛ ممارسات؛ زراع الخضر.