

Agricultural Extension Capacity Development Requirements for The Transition to Sustainable Agriculture in Iraq

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ABSTRACT

The aim of this study to identify the requirements for capacity development of agricultural extension system to transform into sustainable and smart agricultural systems in Iraq, and to achieve the research objective a plan was prepared consisting of (35) Requirements distributed to four area. After examining the authenticity and stability of the instrument, the data was collected during the last quarter of 2024 from a sample of its amount (208) employees in the agricultural extension system (higher administrations, middle administrations, workers) in the governorates (Baghdad, Mosul, Salahuddin, Diyala, Babylon, Najaf, Misan and Muthanna). For higher administration, approval averages ranged between (4.23-4.7). intermediate administrations between (4.07-4.48), while for workers approval averaged between (4.2-4.5), the results showed that there were clear differences between the three categories, with p-value in the area of enabling supportive environment.003, in the area of policymakers' commitment .030, in the area of participation 0.001, and in the area of disseminating a development culture 0.001 with a statistical indicator of 0.05.

Keywords: commitment ,enabling environment, participation , decision makers.



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INTRODUCTION

Agricultural extension is one of the most important systems operating in the agricultural sector that provides services to farmers and works to develop their capabilities and facilitate their access to knowledge sources and link them to local and international markets (Abdel-Hussein et al, 2023). The agricultural sector today faces significant challenges, the most important of which are to provide adequate food for the population, conserve natural resources and adapt to climate changes and market fluctuations (FAO, 2021). Iraq seeks to shift to sustainable agricultural systems to meet the challenges of achieving sustainable food security, conserving land and rationalizing water consumption (Haska et al ,2023;Khalaf et al, 2023; Khamis et al, 2023) Agricultural extension is a vital system in the transition to sustainable agriculture and the achievement of

sustainable development goals (Abdel-Hussein et al, 2023; Al-Jadri, 2018; Al-Jubouri et al, 2022) The role of agricultural extension in the process of transition to agricultural systems is important and necessary. Transformation is a process of change and change is intended to move from one situation to another or from another.Change is socio-economic and environmental change with technical and productive changes (Swanson et al, 2014), this requires effective extension services. Farmers may stop applying certain technologies or stop switching to sustainable systems. (FAO, 2022) This highlights the role of agricultural extension in encouraging farmers to sustain and transition to sustainable agricultural systems while providing the best technologies, knowledge and practices that support such transformation (Al-Hamdany et al., 2021). Capabilities are a vital factor influencing the performance and effectiveness of vital

development systems in the agricultural sector, including the agricultural extension system (Abdel-Hussein et al, 2023) The development of these capacities is therefore a prerequisite for the effective functioning of these organizations, if the capacity development process is seen as the process of improving the organizations' and systems' ability to perform their mandated tasks in an effective, efficient and sustainable manner.(FAO, 2023) Capacity development processes improve the performance of individuals and organizations and thus the system and take days or even years to achieve special important results and are continuous and frequent processes to improve the performance of development systems at all levels (Khalaf et al., 2023). The agricultural extension system needs two types of basic capabilities: technical and functional capabilities that enhance interaction, coordination, communication and teamwork capabilities (Tanjung et al., 2018). Agricultural extension work is weak and does not rise to the level required to meet these challenges (Swanson et al, 2014) and faces problems in working and interacting with the innovation system in achieving sustainable agricultural development (Khalaf et al., 2023) Those challenges require effective vital systems that help accelerate and expand the transition to sustainable and smart agricultural systems. (Abdel-Hussein et al., 2023). Today, countries and international organizations are working to find appropriate approaches for the transition to sustainable agriculture and to develop the capabilities of the agricultural innovation system, of which the agricultural extension system is a vital part. (Tanjung et al., 2018) The agricultural extension system is a vital system in the agricultural innovation system and it is called the linking and bridging system, as this system achieves a link and integration between all subsystems in the agricultural innovation system (Lafta et al., 2022), and there are global calls for the reform of agricultural extension systems in developing countries because these systems face problems and weak capacities that limit their contribution to transition processes (Haska et al., 2023; Khamis, 2023). One of the reasons for the weakness of this system in Iraq

is that it is still a public system characterized by non-renewable, traditional activities that are not aligned with the requirements of sustainable agricultural development. (Lafta et al., 2022) The agricultural extension system requires the development of its capacities at all levels (workers, institutions, system) and provide the necessary requirements for transformation and modernization, many studies confirm that there are problems and weaknesses in the system, s capabilities and poor communication and interaction between agricultural extension and actors in the agricultural innovation system, Weak coordination among actors and the provision of separate services from multiple companies, agricultural services and organizations and weak capacity of agricultural extension workers (Ali&Ali, 2023), and weak strategic planning capacities, There are several problems in the capacity of extension service providers in Iraq and meeting farmers' needs and poor communication and interaction skills for agricultural extension workers (Hameed, 2019), and another group of local studies also pointed to weak extension services, poor access and lack of coverage due to poor capabilities of the agricultural extension system (FAO, 2021) The present research is therefore aimed at identifying the requirements for developing the capacity of Iraq's agricultural extension system to transform into sustainable and smart agricultural systems.

MATERIALS AND METHODS

The descriptive approach is used in the current research procedure as a suitable method for diagnostic survey studies. The approach is concerned with the precise scientific description of scientific problems and trying to explore solutions and interpretations based on the results obtained from data and information (Al-Jadri,2018). The survey was conducted through interviews with many decision makers and workers in the extension system, a questionnaire was used in data collection and access to statistics, documents and records related to the agricultural extension system.

Community and Samples

1-a. The research community included all agricultural extension organizations at the level of the Department of Agricultural

Extension and its extension centers and farms and agricultural directorates and agricultural divisions in the governorates.

b. All employees working in agricultural extension organizations in the governorates sample research (higher management, middle administration, workers).

2-A multi-stage random sample was selected with a 50% proportion of workers in 8 randomly selected governorates.

Data Collection & Analysis

The data were collected by a questionnaire of a 35-paragraph using a five-approval scale (not very agree, not agree, neutral, agree, very agree) whose numerical values ranged from (1-5) through interviews with respondents, from mid-August to the end of October 2024. The data was analyzed using EXCEL&SPSS analysis software.

RESULTS AND DISCUSSION

Objective: To identify the requirements for capacity development of the agricultural

extension system to transform into sustainable and smart agricultural systems in Iraq.

1- Enabling supportive environment, The results show that the number of paragraphs in the field of enabling supportive environment has reached 10 paragraphs with approval averages ranging from (4.2-4.45) with an average of 4.33, primarily leadership development through training of leaders and managers on how to manage and develop the team work with an average of (4.45). Incentives for staff participating in capacity development programs on average (4.41) and encouraging the participation of the public and private sector and civil society in capacity development on average (4.4), There was a significant statistical difference between the research categories as determined by the one-way variance analysis the P-value was 0.003, with an indicative level (0.05), as shown in Table (1).

Table 1. Numeric values averages for respondents' approval of the enabling supportive environment

Paragraphs	Rank	Median Weighted	Percentage Weight
1. Develop leadership by training leaders and managers on how to manage the team.	1	4.45	89
2. Incentives for staff participating in capacity development programs.	2	4.41	88.2
3. Encourage public and private sector participation to develop the capacities of the agricultural extension system.	3	4.4	88
4. Enforce continuous education and training of workers in agricultural extension.	4	4.36	87.2
5. Developing infrastructure that supports capacity development.	5	4.35	87
6. Building an organizational culture that encourages continuous learning within agricultural extension institutions.	6.5	4.32	86.4
7. Defining the overall framework.	6.5	4.32	86.4
8. Development of agricultural extension policies that support capacity development.	8	4.28	85.6
9. A general legal framework defines actors involved in capacity development and levels of capacity development.	9	4.22	84.4
10. Provide agricultural policies that can support the development of the agricultural extension system's capabilities.	10	4.2	84
Overall average			
Higher management average		4.33	86.6
Middle management average		4.43	88.6
Workers average		4.27	85.4
P-value(0.05)=0.003		4.37	87.4

From Table (1) it can be concluded: 1. all paragraphs fall within a level that is very agreeable. 2. The need for a supportive enabling environment of policies and

legislation that supports capacity development.³ The need for effective leadership leading capacity development

processes and providing adequate support to the team.

2-Commitment of policymakers

The research results show that the number of paragraphs in policymakers' and decision makers' commitment was 8 averaging between (4.35-4.2) at an average of 4.28, foremost of which is the conviction of agricultural policymakers and decision makers of the need to develop the capacity of Iraq's agricultural

extension system at an average of (4.35), Fully convinced that agricultural extension is a vital system in the transition to an average sustainable agricultural development (4.34), The commitment to make a qualitative shift in the system's operation on average (4.34), and the results of the analysis of the unilateral variation show a clear moral difference between categories (0.03), as shown in Table (2).

Table 2. Numeric values averages for respondents' approval of the commitment of policymakers and decision makers

Paragraphs	Rank	Median Weighted	Percentage Weight
1. Agricultural policy makers and decision makers are convinced of the need to develop the capabilities of Iraq's agricultural extension system.	1	4.35	87
2. Fully convinced that agricultural extension is a vital system in the process of transition to sustainable agricultural development.	2.5	4.34	86.8
3. Full commitment to a qualitative shift in the performance of the agricultural extension system.	2.5	4.34	86.8
4. Recognize the importance of agricultural extension as an effective subsystem in the agricultural innovation system.	4.5	4.32	86.4
5. Supporting policymakers with issues of developing the capacity of the agricultural extension system.	4.5	4.32	86.4
6. Participation of policymakers in developing capacity development strategies.	6	4.28	85.6
7. Participation of policymakers in determining capacity development priorities.	7.5	4.2	84
8. Ensuring sustainable support and commitment by policymakers to develop the long-term capabilities of the agricultural extension system.	7.5	4.2	84
Overall average		4.29	
Higher management average		4.4	
Middle management average		4.11	
Workers average		4.3	
P-value (0.05)=0.03			

From Table (2) concludes: 1. all requirements fall within a level agree to very agree. 2. The need for policymakers and decision makers to be convinced of the need to develop the capabilities of the agricultural extension system to transform to sustainable and smart agricultural systems and thus achieve sustainable development goals. 3. Capacity development is a series of ongoing long-term processes, and its results are not immediate but appear over time.

3-Participation and responsibility

The results show that the number of requirements in the area of participation and responsibility has reached 9 paragraphs (4.15-

4.29) with an average of (4.26), foremost of which is the personal commitment of each individual in the system to improve his or her skills with an average of (4.29), Agricultural Extension Foundation is responsible for providing resources and support for the development of workers' capacities on average (4.29) and the participation of all relevant actors in the implementation of capacity development processes (4.27); The results of the analysis of one-way a nova also show significant differences in morale between the groups' averages of approval of the participatory P-value = 0.001 as shown in Table (3).

Table 3. Numeric values averages for respondents' approval of participation and responsibility

Paragraphs	Rank	Median Weighted	Percentage Weight
1. The personal commitment of everyone in the system to improve their skills.	1.5	4.29	85.8
2. Agricultural Extension Foundation is responsible for providing resources and support for the development of workers' capacities.	1.5	4.29	85.8
3. Commitment to sustain capacity development efforts in the long term.	4	4.28	85.6
4. Empowering society and individuals to participate in capacity development.	4	4.28	85.6
5. Ensure the participation of all relevant stakeholders in the implementation of capacity development processes.	4	4.28	85.6
6. Enhancing capacities through collaborative learning as individuals learn from each other.	6.5	4.27	85.4
7. Involve stakeholders and producers in planning for capacity development of the agricultural extension system.	6.5	4.27	85.4
8. Accountability for individuals and institutions involved in capacity development.	8	4.2	84
9. Encourage the sharing of knowledge and experience.	9	4.15	83
Overall average		4.26	85.2
Higher management average		4.56	91.2
Middle management average		4.11	82.2
Workers average		4.3	86
P-value(0.05)=0.001			

From Table (3) it can be conclude: 1. All requirements fall within an agreed level to a very agree direction. 2. The need for the individual, the guiding institution and society to commit to capacity development. 3. The participation of stakeholders is necessary to accelerate transformation processes, especially since capacity development is a process of social change that begins with changing mentalities.

4- Dissemination and establishment of the development culture: The results of the research show that the number of requirements in the field of dissemination and establishment of the development culture is 8 paragraphs, the

approval averages ranged from (4.24-4.46) with an average of 4.35, the first of which is to organize workshops and seminars periodically to discuss capacity development processes with an average of (4.46), incorporate capacity development into the agricultural extension institution's strategic objectives with an average rating (4.37), support and encourage workers to participate in capacity development programs at an average rate (4.36), and when using one-way a nova analysis to find the moral differences between category approval averages, there were significant moral differences as P-value = 0.001 as shown in Table (4).

Table 4. Numeric values averages for respondents' approval to dissemination and establishment a culture of development

Paragraphs	Rank	Median Weighted	Percentage Weight
1. Organizing workshops and seminars periodically to discuss capacity development processes.	1	4.46	89.2
2. Organizing workshops to explain the importance of capacity development and its positive impact.	2	4.4	88
3. Include capacity development in the strategic objectives of the Agricultural Extension Institution.	3	4.37	87.4
4. Supporting and encouraging workers to participate in capacity development programs.	4	4.36	87.2
5. Building an organizational culture that supports capacity development.	6	4.33	86.6
6. Reward innovative ideas in the field of capacity development.	6	4.33	86.6
7. Sharing success stories related to development in the Agricultural Extension Foundation to motivate workers.	6	4.33	86.6
8. Developing supportive policies within extension institutions that focus on the importance of capacity development.	8	4.24	84.8
Overall average		4.35	87
Higher management average		4.5	90
Middle management average		4.37	87.4
Workers average		4.35	87
P-value (0.05)=0.001			

From Table (4), it can be suggested: 1. all requirements in the field of dissemination and consolidation of the culture of development fall within a level agreed in a very agreed direction. 2. Change usually starts from the mentality and conviction of the importance of capacity development and making it part of the organization's culture. 3. The need to support and encourage the dissemination of the culture of development by higher authorities and support for innovation.

CONCLUSION

Developing the capacities of the agricultural extension system is a process requiring the availability of all its requirements (enabling environment of supportive policies and legislation, commitment of policymakers, participation of actors, effective training programs) and in an integrated manner and any slowdown adversely affects the transformation processes that need to be accelerated and expanded.

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I, the undersigned Israa Jabbar Mhaibes, hereby declare that this research entitled “Agricultural extension capacity development requirements for the transtion to sustainable agrculture in iraq” is the result of my own independent work. No unauthorized assistance

was used in its preparation, and all sources and references have been properly acknowledged and cited according to academic standards .

I further confirm that this research has not been submitted previously, in whole or in part, for any academic degree or qualification at any other institution.

I take full responsibility for the content and integrity of this work.

Researcher's Name: Israa Jabbar Mhaibes

Date: 16/5/2026

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

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AUTHOR'S CONTRIBUTION STATEMENT

Israa Jabbar Mhaibes: Conceptualization, Design, Data Collection, Data Analysis,

Writing, Review & Editing. Hussain K. Al.Taiy : Supervision

REFERENCES

Abdel-Hussein, M. A. R. & S. O. Fayyadh, 2023. Requirements for developing the technical capabilities of agricultural extension service providers to face the effects of climate change in Baghdad province, IOP Conference Series: Earth and Environmental Science, 1259(1), 012131.

<https://doi.org/10.1088/1755-1315/1259/1/012131>.

Al-Hamdany M. H. S & H. S. Al-Rekibe, T. N. Al-Janabi & A.I. Al-Ansari. 2021. Study the administrative efficiency of the agricultural extension and training organization according to the opinions of agricultural extension workers and its relationship to some factors in the southern of Iraq. IOP Conf. Ser.: Earth Environ. Sci. 923 012069.

[doi: 10.1088/1755-1315/923/1/012069](https://doi.org/10.1088/1755-1315/923/1/012069)

Ali, H. A. & N.S. Ali, 2023. Requirements for developing farmers' capabilities in the field of fodder crops cultivation in the side of Rusafa / Baghdad Governorate, IOP Conf. Ser.: Earth Environ. Sci. 1259(1), 012129.

<https://doi.org/10.1088/1755-1315/1259/1/012129>.

Al-Jadri, A. H. 2018, Mentor In The Preparation And Writing Of Theses And Dissertations, Al-Warraq Publishing And Distribution Foundation, First Edition, Jordan.pp:24

<https://petra.gov.jo/Include/InnerPage.jsp?ID>

Al-Jubouri D. A. A. and B. Jabbar, 2022. The technical competencies available to agricultural extension managers in the central region provinces of Iraq, int. J. Agricult. Stat. sci. 18(1) : 2167-2174.

<https://connectjournals.com/03899.2022.18.2167>

Hameed, T. S. 2019. The reality of extension services provided for wheat crop farmers in Zammar region/Nine-veh Governorate/Iraq. IOP Conf. Series: Journal of Physics: Conf. Series 1294 (2019) 092021.

[doi:10.1088/1742-6596/1294/9/092021](https://doi.org/10.1088/1742-6596/1294/9/092021)

Haskah, S. A., M. H. Al.Hamdany & H. M. Amin. 2023. The Opinion of Agricultural Extension Agents on the Importance of Participating in Extension Activities and Procedures Provided by the Agricultural Extension Organization in the Republic of Iraq. IOP Conf. Series: Earth and Environmental Science. 1214 (2023) 012054. [doi:10.1088/1755-1315/1214/1/012054](https://doi.org/10.1088/1755-1315/1214/1/012054)

Khalaf, A. G & A.L.J. Al.Mashhadani, 2023. Requirements for using digital agricultural extension in providing extension service from viewpoint of agricultural extension agents. IOP Conference Series: Earth and Environmental Science,

[doi: 10.1088/1755-1315/1259/1/012134](https://doi.org/10.1088/1755-1315/1259/1/012134)

Khamis A. I., N.S. Ali & A. M. Ali. 2023. Challenges facing the agricultural extension organization and ways to address them IOP Conf. Ser.: Earth Environ. Sci. 1262 102001: [doi: 10.1088/1755-1315/1262/10/102001](https://doi.org/10.1088/1755-1315/1262/10/102001)

Lafta A.H., & AL Khafaji N.J.M. 2022. The work environment of agricultural extension workers in the agricultural extension organization in Iraq. International Journal of Agricultural and Statistical Sciences, 18(1), 2435-2438.

<https://connectjournals.com/03899.2022.18.2435>.

Swanson, Burton & Riikka Rajalahti, 2014, Strengthening Agricultural Extension and Advisory Systems, World Bank, pp: 6-7.

Tanjung H. B, A. Agustar, Sumardju & R. Febriamansyah. 2018. Reformatting agricultural extension institution: Finding from the study of functional interactions among related components to agricultural extension in West Sumatra. IOP Conference Series: Earth and Environmental Science.196 (2018)012050.

[doi: 10.1088/1755-1315/196/1/012050](https://doi.org/10.1088/1755-1315/196/1/012050)

The State of Food & Agriculture, 2021. Making Agri-Food Systems More Resilient to Shocks and Stresses, Food and Agriculture Organization of the United Nations,pp:4-5. Rome . <https://doi.org/10.4060/cb4476en>

متطلبات تنمية قدرات الارشاد الزراعي للتحويل الى الزراعة المستدامة في العراق

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المستخلص

هدفت الدراسة الى تحديد متطلبات تنمية قدرات نظام الارشاد الزراعي في العراق للتحويل الى نظم زراعية مستدامة وذكية، وتحقيقاً لهدف البحث تم اعداد مخطط يتكون من (35) متطلباً وزعت على اربعة مجالات، وبعد ان جرى فحص صدق وثبات الاداة، جمعت البيانات خلال الربع الاخير من عام 2024 من عينة مقدارها (208) من العاملين في نظام الارشاد الزراعي (ادارات عليا، ادارات وسطى، منفذين) في المحافظات (بغداد، الموصل، صلاح الدين، ديالى، بابل، النجف، ميسان، المثنى). فيما يخص الادارات العليا تراوحت متوسطات الموافقة بين (4,23-4,7)، الادارات الوسطى بين (4,07-4,48)، اما بالنسبة للمنفذين فقد تراوحت متوسطات الموافقة بين (4,2-4,5)، كما اوضحت النتائج وجود فروق معنوية بين الفئات الثلاث اذ كانت قيمة p -value في مجال البيئة التمكينية الداعمة 0.003، و في مجال التزام صناع السياسة 0.030، وفي مجال المشاركة 0.001، وفي مجال نشر ثقافة التطوير 0.001 بمستوى دلالة احصائية 0.05.

الكلمات المفتاحية: الالتزام، البيئة التمكينية، المشاركة، متخذي القرار.