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Requirements for Developing the Performance of A Sustainable System to Increase Wheat Crop Productivity

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ABSTRACT

This study identified the requirements for improving the system through which modern agricultural technologies are disseminated to support sustainable increases in wheat productivity in selected provinces of central Iraq. A descriptive-analytical design was used. Data were collected by questionnaire from a stratified random sample of 274 agricultural extension workers drawn from a population of 950 employees in Baghdad, Wasit, Babil, and Karbala. The instrument contained 77 items covering five domains: planning and implementation, management, financing, research and development, and agricultural media. Respondents rated the overall requirements as high (weighted mean = 3.87). Agricultural media received the highest domain mean (3.92), followed by management (3.91), planning and implementation (3.89), financing (3.86), and research and development (3.79). The findings point to practical priorities that include systematic media planning, continuing administrative training, stable financing arrangements, stronger coordination among institutions, and greater support for research and development. Addressing these priorities may improve the capacity of the extension system to deliver relevant technologies to wheat producers.

Key words: agricultural research and development; agricultural resource management; capacity building; institutional coordination

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INTRODUCTION

Wheat occupies a central place in Iraq's food system because it is both a staple crop and an important source of rural income. Its production therefore has implications for household food security, agricultural livelihoods, and national expenditure on imports (Food and Agriculture Organization of the United Nations [FAO] & World Food Programme [WFP], 2021; FAO, 2021; World Bank Group, 2022). Yet domestic productivity remains below its potential. Water scarcity, land degradation, and climatic variability constrain production, but these pressures do not fully explain the gap between attainable and realized yields (FAO, 2021; World Bank Group, 2022; Intergovernmental Panel on Climate Change [IPCC], 2023). Institutional conditions also shape whether farmers can obtain and use improved technologies. In Iraq, agricultural extension operates within a system that includes planning, administration, financing, research and development, and agricultural media. Weak coordination across these functions can delay the movement of knowledge from research organizations to the field, limit staff capacity, and reduce the continuity of services available to farmers (Hameed & Sawicka, 2023; Hameed & Abd AlFaraje, 2024; Organisation for Economic Co-operation and Development [OECD], 2024; Hammadi & Salman, 2025). Similar evidence from other settings shows that technology adoption depends not only on the merits of an innovation, but also on advisory support, institutional linkages, incentives, and the conditions under which farmers make decisions (Birner *et al.*, 2021; Ruzzante *et al.*, 2021; Shang *et al.*, 2021; Alam *et al.*, 2024). A functional sustainability system must therefore connect organizational reform with investment in people, finance, research, and

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communication. Digital tools and precision technologies can improve the efficiency of agricultural production, but their contribution depends on supportive policy, appropriate skills, and channels that translate technical information into locally usable guidance (Balafoutis *et al.*, 2017; Ehlers *et al.*, 2022; Anteneh & Melak, 2024; Kante, 2024; Li *et al.*, 2024; Khan *et al.*, 2025). Recent international assessments likewise emphasize resilient institutions, sustained agricultural investment, and innovation systems that can respond to climate and market pressures (FAO, 2022; FAO, 2023; OECD, 2023; FAO, 2024; OECD, 2024; OECD, 2025). For extension organizations, this requires clear responsibilities, capable personnel, workable financing mechanisms, and communication that reaches producers in forms they can readily apply. Previous studies have examined individual constraints on agricultural production and technology adoption, but less attention has been given to the institutional requirements of the dissemination system as an integrated whole. This gap is especially relevant in the central Iraqi provinces, where extension organizations must serve large wheat-producing areas while working within limited administrative and financial resources. The present study addresses that gap by examining five interdependent domains—planning and implementation, management, financing, research and development, and agricultural media—and identifying the requirements that extension workers consider most important for improving system performance (Setsoafia *et al.*, 2022; OECD, 2024; OECD, 2025).

THE STUDY AIMED TO

Identify the requirements for improving the performance of the system responsible for disseminating modern agricultural technologies and supporting sustainable increases in wheat productivity in selected provinces of central Iraq.

MATERIALS AND METHODS

A descriptive-analytical design was adopted to examine the perceived requirements of the technology-dissemination system across its main institutional domains. The questionnaire was developed through a review of relevant literature and established guidance on scale construction (Boateng *et al.*, 2018).

Research Area: The study was conducted in Baghdad, Karbala, Babil, and Wasit. These four governorates constitute half of the eight governorates classified within central Iraq.

Research Community and Sample:

The study population comprised agricultural extension workers employed by the agricultural directorates in Baghdad, Wasit, Babil, and Karbala. A stratified random sample of 274 respondents was selected from this population using Thompson's formula (Thompson, 2012), as shown in (Table 1).

Table 1. Research community and research and pilot samples

province	Research community	Research sample	% of the research sample	Survey sample
Baghdad	400	115	42.0	13
Wasit	200	58	21.2	6
Babylon	200	58	21.2	6
Karbala	150	43	15.6	5
Total	950	274	100%	30

Data Collection

The questionnaire was developed from relevant literature, earlier studies, consultations with specialists in agricultural extension and rural development, and field visits to agricultural directorates and units in the study area. Closed-ended items were used to obtain comparable judgments from respondents (Thompson, 2012; Boateng *et al.*, 2018). The final instrument comprised 77 items distributed across five domains:

Administration (15 items)
Financing (12 items)
Research and Development (14 items)
Agricultural Media (16 items)
Planning and Implementation (20 items)

The items were constructed using a five-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) with corresponding values (5, 4, 3, 2, 1), to measure the extent to which these requirements are met from the respondents' perspectives.

Validity: Validity refers to the degree to which an instrument measures what it is intended to

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measure. The validity of the research instrument was ensured using two approaches:

• First: Face Validity: The initial version of the instrument was presented to a panel of 24 experts in agricultural extension, rural development, and educational measurement. Their feedback was used to revise and refine the questionnaire without altering its structure or content domains (Boateng *et al.*, 2018).

• Second: Logical Validity: This was confirmed by ensuring that all questionnaire items adequately covered the domains of the study and were aligned with the research objectives and theoretical framework.

Pilot Test: To ensure the clarity and comprehensibility of the questionnaire items and the accuracy of the procedures, a pilot test was conducted on a sample of 30 respondents who were selected from outside the main study sample using stratified proportional sampling. The respondents were distributed as follows: Baghdad (13), Wasit (6), Babil (6), and Karbala (5). Data collection for the pilot study was carried out between November 22, 2023 and January 21, 2024.

This step was useful in determining the time required for completion and in revising general instructions as needed (Boateng *et al.*, 2018).

Instrument Reliability: The reliability of the instrument was verified using Cronbach's Alpha coefficient. The results showed strong internal consistency across all domains of the questionnaire, as follows:

• Planning and Implementation: 0.92
• Administration: 0.88
• Financing: 0.91
• Research and Development: 0.84
• Agricultural Media: 0.93

These values indicate that the instrument is highly reliable and internally consistent (Cronbach, 1951; Tavakol & Dennick, 2011).

Data Collection Procedures: Data were collected in Baghdad, Wasit, Babil, and Karbala from November 3 to December 13, 2024. Questionnaires were administered through personal interviews so that unclear items could be explained consistently. All 274 distributed questionnaires were retrieved and retained for statistical analysis (Thompson, 2012).

Data Analysis: Data were analyzed with the Statistical Package for the Social Sciences (SPSS). Descriptive statistics included means, standard deviations, and relative weights.

The researcher adopted a five-point reference scale to classify the degree of agreement as follows: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree (Boone & Boone, 2012).

RESULTS AND DISCUSSION

The findings are presented by domain to show how extension workers prioritized the requirements for improving the agricultural technology-dissemination system.

Weighted means for the five domains ranged from 3.79 to 3.92 and all fell within the high category. The overall weighted mean was 3.87 (Table 2).

Table 2. Requirement domains for developing the sustainability system according to respondents' opinions

Rank sequence	Form sequence	Field	Weighted mean	Percentage weight	level
1	4	Media	3.92	0.78	high
2	2	Management	3.91	0.78	high
3	1	Planning and Implementation	3.89	0.78	high
4	5	Finance	3.86	0.77	high
5	3	Research and Development	3.79	0.76	high
Overall weighted average of the fields			3.87	0.77	high

Agricultural media ranked first (3.92), followed closely by management (3.91), planning and implementation (3.89), financing (3.86), and research and development (3.79) (Table 2). The narrow spread between the domain means indicates that respondents did

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not view improvement as a single-sector task. Rather, they recognized a set of related institutional needs. The first-place ranking of agricultural media points to the immediate value of communication and awareness work, while the lower mean for research and development suggests that support, partnerships, and pathways for applying research outputs remain comparatively less developed.

First Domain: Planning and Implementation

Responses to the 20 planning and implementation items produced weighted means from 3.47 to 4.13. Every item fell within the high category (3.40–4.19), as reported in (Table 3).

Table 3. Weighted means and percentage weights for planning and implementation items

Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
1	1		4.13	0.83	high
2	2	Developing training programs for planning and implementation processes	4.08	0.82	high
3	4	Attracting and retaining competent planning and implementation personnel	4.06	0.80	high
4	3	Providing the necessary resources to develop planning and implementation processes	4.03	0.81	high
5	16	Updating and amending policies related to planning and implementation processes	4.03	0.81	high
6	6	Maintaining leadership continuity during planning and implementation processes	3.99	0.80	high
7	18	Periodic evaluation of planning and implementation processes	3.98	0.80	high
8	7	Enhancing community participation in planning and implementation processes	3.97	0.79	high
9	8	Establishing mechanisms for cooperation and planning and implementation	3.96	0.79	high
10	9	Establishing common frameworks for the planning and implementation process	3.96	0.79	high
11	10	Simplifying administrative procedures related to the planning process	3.95	0.79	high
12	11	Delegating authority to implementation personnel	3.91	0.78	high
13	12	Developing evaluation tools for the implementation process	3.87	0.77	high
14	13	Ensuring transparency in implementation reporting	3.79	0.76	high
15	14	Increasing budgets allocated to planning and implementation	3.84	0.76	high
16	15	Encouraging innovation in planning processes and implementation methods	3.79	0.80	high
17	5	Adopting digitization and modern technology to facilitate planning and implementation processes	3.75	0.79	high
18	17	Preparing long-term plans to achieve optimal results	3.69	0.79	high
19	20	Focusing on strategic leadership in planning processes	3.57	0,78	high
20	19	Aligning policies with planning and implementation processes	3.47	0.77	high

The five highest-ranked planning and implementation items concerned actions that respondents could readily associate with routine extension work, including staff training, clear implementation procedures, and regular follow-up (Table 3). Their prominence suggests that respondents favored requirements with visible operational consequences. Items ranked 14–20 dealt more often with longer-term arrangements, external partnerships, or

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institutional evaluation. Although these functions remain important, their lower means may reflect limited authority or limited direct experience among extension workers rather than a judgment that they are unnecessary.

The second domain: Management

The 15 management items recorded weighted means between 3.81 and 4.06, placing every item within the high category (Table 4).

Table 4. Weighted means and percentage weights for management items

Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
1	1	Develop training programs for administrators	4.06	0.81	high
2	2	Continuous training on sustainable management	4.04	0.81	high
3	3	Define clear roles and responsibilities	4.01	0.80	high
4	5	Enhance cooperation between departments	3.99	0.80	high
5	8	Encourage administrative innovation	3.96	0.79	high
6	9	Improve the continuity of administrative policies	3.95	0.79	high
7	4	Establish coordination committees for departments	3.93	0.79	
8	10	Develop simplified administrative procedures	3.92	0.78	
9	6	Implement mechanisms for transparency and interaction between departments	3.88	0.78	high
10	12	Activate the knowledge management system	3.87	0.77	high
11	15	Optimize resource allocation through departmental improvement	3.86	0.77	high
12	7	Periodic performance reviews of departments	3.85	0.77	high
13	13	Enhance stakeholder participation in departmental evaluation	3.85	0.77	high
14	14	Link performance to incentives to raise administrative standards	3.82	0.76	high
15	11	Implement e-governance	3.74	0.75	high

Management priorities were led by "Developing training programs for administrators," which recorded a weighted mean of 4.06 (Table 4). Respondents therefore placed particular emphasis on strengthening administrative competence. Items involving electronic management and other system-level changes appeared toward the lower end of the ranking; "Implementing e-management" ranked last at 3.81. This result should not be read as rejection of digital management, because the item still received a high mean. It more likely indicates that respondents saw staff development and immediate administrative practices as more pressing or

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more feasible under current institutional conditions.

Third Domain: Finance: Weighted means for the 12 financing items ranged from 3.47 to 3.99, and all were classified as high (Table 5).

Table 5. Weighted means and percentage weights for financing items

Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
1	1	Establishing sustainable financing funds	3.99	0.80	high
2	2	Enhancing transparency in financial management	3.97	0.80	high
3	3	Monitoring and evaluating spending	3.96	0.80	high
4	4	Facilitating loans and financing	3.95	0.79	high
5	5	Improving financial legislation	3.92	0.78	high
6	11	Ensuring sustainable financial flows	3.86	0.77	high
7	7	Cooperating with international banks and institutions	3.86	0.77	high
8	8	Leveraging international grants	3.85	0.77	high
9	9	Establishing participatory financing mechanisms	3.85	0.77	high
10	12	Effective negotiation with creditors	3.83	0.77	high
11	6	Enhancing financial governance	3.79	0.76	high
12	10	Assessing financial risks	3.47	0.69	high

"Establishing Sustainable Financing Funds" ranked first in the financing domain, with a weighted mean of 3.99 (Table 5). This result reflects concern about the continuity of funding for technology-dissemination programs and farmer support. "Assessing Financial Risks" ranked last at 3.47, although it remained within the high category. The difference may arise because financing funds are a visible and immediate need, whereas risk assessment is a specialized planning function with which many respondents have less direct involvement.

Fourth Domain: Research Development

The 14 research and development items had weighted means ranging from 3.48 to 4.11; all were within the high category (Table 6).

Table 6. Weighted means and percentage weights for research and development items

Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
1	1	Increasing financial support and funding for research and development institutions	4.11	0.82	high
2	2	Providing financial incentives to encourage progress in scientific research	4.08	0.82	high

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Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
3	3	Advanced training programs to develop the scientific and technical skills of researchers	4.02	0.80	high
4	4	Attracting highly qualified scientists and experienced researchers	3.99	0.80	high
5	5	Forming strategic partnerships between universities and research centers to advance sustainability research	3.96	0.79	high
6	6	Establishing cooperation platforms between all relevant institutions, including research centers and scientific institutions	3.88	0.78	high
7	12	Expanding channels for publishing sustainability research	3.86	0.78	high
8	8	Establishing integrated databases to facilitate access to information for researchers	3.84	0.77	high
9	9	Setting research priorities for sustainability programs	3.78	0.76	high
10	10	Promoting a culture of scientific research among higher authorities	3.57	0.71	high
11	11	Incentivizing efforts to transform research into practical applications to determine its potential benefits	3.55	0.71	high
12	7	Reforming research and development policies	3.53	0.71	high
13	13	Improving mechanisms for protecting scientific innovations and intellectual property rights	3.51	0.70	high
14	14	Facilitating patent registration procedures and providing support to researchers	3.48	0.70	high

The highest-ranked research and development item was “Increasing support and financial funding for research and development institutions” (4.11) (Table 6). Respondents thus linked system improvement to the capacity of research organizations to identify problems and generate usable solutions. “Facilitating patent registration procedures and providing support to researchers” ranked last at 3.48. Its lower position may reflect the limited involvement of extension personnel in intellectual-property procedures and the greater immediacy of funding, coordination, and applied research needs.

Fifth Domain: Media: The 16 agricultural media items produced weighted means from 3.74 to 4.09, with every item classified as high (Table 7).

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Table 7. Ranking of media items according to respondents' opinions

Rank sequence	Form sequence	Paragraphs	Weighted mean	Percentage weight	level
1	1	Develop a comprehensive media plan	4.09	0.82	high
2	2	Coordinate media efforts	4.05	0.81	high
3	3	Build partnerships with media outlets	4.04	0.81	high
4	4	Organize training programs for journalists	4.02	0.80	high
5	5	Produce educational and awareness content	3.99	0.80	high
6	6	Expand digital presence to improve media	3.98	0.80	high
7	7	Enhance communication between departments to develop media	3.98	0.80	high
8	8	Communicate information effectively	3.96	0.79	high
9	9	Conduct periodic evaluations of media programs	3.94	0.79	high
10	10	Provide funding and technical support for media programs	3.91	0.79	high
11	11	Leverage technology in media programs	3.88	0.78	high
12	12	Publish transparent reports	3.84	0.77	high
13	13	Launching educational campaigns	3.81	0.77	high
14	16	Developing crisis management plans	3.79	0.76	high
15	15	Reaching remote areas	3.77	0.75	high
16	14	Using local languages	3.74	0.75	high

"Developing a Comprehensive Media Plan" was the highest-ranked media requirement, with a weighted mean of 4.09 (Table 7). Respondents therefore viewed coordinated and continuous communication as a practical foundation for awareness and outreach. "Using Local Languages" ranked last at 3.74 but still received a high rating. Its relative position may indicate that respondents generally rely on standard language in current programs or have had limited experience in adapting content to local speech patterns. The finding nevertheless points to an opportunity to test whether locally adapted messages improve comprehension and participation.

CONCLUSIONS

1. The study concludes that improving the performance of the sustainability system in disseminating modern technologies requires addressing fundamental organizational and technical deficiencies that currently hinder its effectiveness in increasing wheat productivity in central Iraq.
2. Sustainable agricultural development in the region cannot be achieved without establishing robust financial support mechanisms, as the study highlights the critical need for integrated and long-term agricultural financing strategies.
3. The findings underscore the importance of strengthening the institutional linkages between agricultural research centers and extension services to ensure that research outputs are translated into practical, field-level innovations.
4. The relatively strong performance of the agricultural media domain indicates an existing communication infrastructure that can be strategically leveraged to enhance farmers'

awareness, encourage technology adoption, and support behavior change in rural communities.

5. The study emphasizes the necessity of institutional reform within the sustainability system, particularly through the introduction of clear job descriptions and the implementation of ongoing training programs to build human capital and improve system-wide efficiency.

RECOMMENDATIONS

1. Develop a national strategy for sustainable agricultural financing to support the implementation and expansion of modern technologies among farmers.
2. Strengthen institutional coordination between research and extension bodies to ensure role integration and better application of research findings in the field.
3. Update job description frameworks for agricultural extension workers to align with modern field and technical requirements.
4. Design and implement ongoing professional training programs based on actual workforce needs, focusing on core competencies in extension and technical work.
5. Utilize and expand existing agricultural media platforms to include digital training and interactive content aimed at enhancing farmers' awareness of sustainable technologies.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

AUTHOR/S DECLARATION

The authors confirm that all tables in the manuscript are original. Any material not belonging to the authors has been incorporated with the required permission for republication.

ETHICAL APPROVAL STATEMENT

The study was conducted following the protocol authorized by the Head of the Ethics Committee, University of Baghdad, Republic of Iraq. Informed consent was obtained from all respondents.

ETHICAL CLEARANCE AND ANIMAL WELFARE

Participation was voluntary, and respondents' information was handled confidentially. The study did not involve animals; therefore, animal welfare approval was not applicable.

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AUTHOR'S CONTRIBUTION STATEMENT

H. A. M. Hussein: conceptualization, methodology, investigation, data collection, formal analysis, and writing—original draft. H. S. Al-Rikabi: supervision, validation, and writing—review and editing. Both authors have read and approved the final manuscript.

REFERENCES

Alam, M. J., Sarma, P. K., Begum, I. A., Connor, J., Crase, L., Sayem, S. M., & McKenzie, A. M. (2024). Agricultural extension service, technology adoption, & production risk nexus: Evidence from Bangladesh. Heliyon, 10(14), Article e34226. https://doi.org/10.1016/j.heliyon.2024.e34226

Anteneh, A., & Melak, A. (2024). ICT-based agricultural extension and advisory service in Ethiopia: A review. Cogent Food & Agriculture, 10(1), Article 2391121. https://doi.org/10.1080/23311932.2024.2391121

Balafoutis, A., Beck, B., Fountas, S., Vangeyte, J., van der Wal, T., Soto, I., Gómez-Barbero, M., Barnes, A., & Eory, V. (2017). Precision agriculture technologies positively contributing to GHG emissions mitigation, farm productivity and economics. Sustainability, 9(8), 1339. https://doi.org/10.3390/su9081339

Birner, R., Daum, T., & Pray, C. (2021). Who drives the digital revolution in agriculture? A review of supply-side trends, players and challenges. Applied Economic Perspectives and Policy, 43(4), 1260–1285. https://doi.org/10.1002/aepp.13145

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, & behavioral research: A primer. Frontiers in

Public Health, 6, Article 149. https://doi.org/10.3389/fpubh.2018.00149

Boone, H. N., Jr., & Boone, D. A. (2012). Analyzing Likert data. Journal of Extension, 50(2), Article 48. https://doi.org/10.34068/joe.50.02.48

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16(3), 297–334. https://doi.org/10.1007/BF02310555

Ehlers, M.-H., Finger, R., El Benni, N., Gocht, A., Sørensen, C. A. G., Gusset, M., Pfeifer, C., Poppe, K., Regan, Á., Rose, D. C., Wolfert, S., & Huber, R. (2022). Scenarios for European agricultural policymaking in the era of digitalisation. Agricultural Systems, 196, Article 103318. https://doi.org/10.1016/j.agsy.2021.103318

Food and Agriculture Organization of the United Nations. (2021). The state of the world's land and water resources for food and agriculture: Systems at breaking point. https://doi.org/10.4060/cb7654en

Food and Agriculture Organization of the United Nations. (2022). The state of food and agriculture 2022: Leveraging automation in agriculture for transforming agrifood systems. https://doi.org/10.4060/cb9479en

Food and Agriculture Organization of the United Nations. (2023). The state of food and agriculture 2023: Revealing the true cost of food to transform agrifood systems. https://doi.org/10.4060/cc7724en

Food and Agriculture Organization of the United Nations. (2024). The state of food and agriculture 2024: Value-driven transformation of agrifood systems. https://doi.org/10.4060/cd2616en

Food and Agriculture Organization of the United Nations and World Food Programme. (2021). Agricultural value chain study in Iraq: Dates, grapes, tomatoes and wheat. https://doi.org/10.4060/cb2132en

Hameed, T. S., & Abd AlFaraje, D. M. (2024). The reality of the extension services provided to vegetable growers in the field of agricultural pest control in Alqosh District/Nineveh Governorate. Anbar Journal of Agricultural Sciences, 22(1), 173–181. https://doi.org/10.32649/ajas.2024.183719

Hameed, T. S., & Sawicka, B. (2023). Role of agricultural extension in adoption of sustainable agriculture practices. Anbar Journal of Agricultural Sciences, 21(1), 250–260. https://doi.org/10.32649/ajas.2023.179947

Hammadi, A. Y., & Salman, M. A. (2025). Obstacles in the practice of change leadership in agricultural extension organizations to achieve sustainable development dimensions, Iraq. Anbar Journal of Agricultural Sciences, 23(2), 1122–1138. https://doi.org/10.32649/ajas.2025.189161

Intergovernmental Panel on Climate Change. (2023). Climate change 2023: Synthesis report. https://doi.org/10.59327/IPCC/AR6-9789291691647

Kante, M. (2024). Agricultural extension officers' adoption of ICT-based extension services: A critical realist approach in Mali. The Electronic Journal of Information Systems in Developing Countries, 90(4), Article e12319. https://doi.org/10.1002/isd2.12319

Khan, R. P., Gupta, S., Daum, T., Birner, R., & Ringler, C. (2025). Levelling the field: A review of the ICT revolution and agricultural extension in the Global South. Journal of International Development, 37(1), 1–21. https://doi.org/10.1002/jid.3949

Li, L., Han, J., & Zhu, Y. (2024). Empowering sustainability: How digital agricultural extensions influence organic fertilizer choices among Chinese farmers. Journal of Environmental Management, 371, Article 123340. https://doi.org/10.1016/j.jenvman.2024.123340

Organisation for Economic Co-operation and Development. (2023). Agricultural policy monitoring and evaluation 2023: Adapting agriculture to climate change. OECD Publishing. https://doi.org/10.1787/b14de474-en

Organisation for Economic Co-operation and Development. (2024). Agricultural policy monitoring and evaluation 2024: Innovation for sustainable productivity growth. OECD Publishing. https://doi.org/10.1787/74da57ed-en

Iraqi Journal of Agricultural Sciences –2026:57(10):2683-2694
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI:

Organisation for Economic Co-operation and Development. (2025). Agricultural policy monitoring and evaluation 2025: Making the most of the trade and environment nexus in agriculture. OECD Publishing. https://doi.org/10.1787/a80ac398-en

Ruzzante, S., Labarta, R., & Bilton, A. (2021). Adoption of agricultural technology in the developing world: A meta-analysis of the empirical literature. World Development, 146, Article 105599. https://doi.org/10.1016/j.worlddev.2021.105599

Setsoafia, E. D., Ma, W., & Renwick, A. (2022). Effects of sustainable agricultural practices on farm income and food security in northern Ghana. Agricultural and Food Economics, 10, Article 9. https://doi.org/10.1186/s40100-022-00216-9

Shang, L., Heckelei, T., Gerullis, M. K., Börner, J., & Rasch, S. (2021). Adoption and diffusion of digital farming technologies—Integrating farm-level evidence and system interaction. Agricultural Systems, 190, Article 103074. https://doi.org/10.1016/j.agsy.2021.103074

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International Journal of Medical Education, 2, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thompson, S. K. (2012). Sampling (3rd ed.). Wiley. https://doi.org/10.1002/9781118162934

World Bank Group. (2022). Iraq country climate and development report. World Bank. https://www.worldbank.org/en/country/iraq/publication/iraq-country-climate-and-development-report

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متطلبات تطوير أداء منظومة مستدامة لزيادة إنتاجية محصول الحنطة

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المستخلص

هدف البحث إلى تحديد المتطلبات اللازمة لتطوير أداء منظومة الاستدامة في نشر التقانات الحديثة لزيادة إنتاجية محصول الحنطة في محافظات مختارة من المنطقة الوسطى في العراق. استخدم المنهج الوصفي التحليلي، وجمعت البيانات باستبانة من عينة عشوائية طبقية بلغت 274 من العاملين في الإرشاد الزراعي اختيروا من مجتمع بلغ 950 موظفا في محافظات بغداد وواسط وبابل وكربلاء. تضمنت الأداة 77 فقرة موزعة على خمسة مجالات هي التخطيط والتنفيذ، والإدارة، والتمويل، والبحث والتطوير، والإعلام الزراعي. أظهرت النتائج أن المستوى العام للمتطلبات كان مرتفعا بمتوسط مرجح كلي بلغ 3.87. جاء مجال الإعلام الزراعي أولا بمتوسط 3.92، تلاه مجال الإدارة بمتوسط 3.91، ثم التخطيط والتنفيذ بمتوسط 3.89، فالتمويل بمتوسط 3.86، وأخيرا البحث والتطوير بمتوسط 3.79. وتؤكد النتائج ضرورة وضع خطة إعلامية شاملة، وتنفيذ تدريب إداري مستمر، وتطوير آليات تمويل مستدامة، وتعزيز التنسيق المؤسسي، وزيادة دعم البحث والتطوير. وتمثل هذه المتطلبات إطارا عمليا لتحسين فاعلية منظومة الاستدامة ودعم نشر التقانات الزراعية الحديثة لزيادة إنتاجية الحنطة.

الكلمات المفتاحية: البحث والتطوير الزراعي، إدارة الموارد الزراعية، تنمية القدرات، التنسيق المؤسسي.