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Diagnosing the reality of the performance of the sustainability system in the field of disseminating modern technologies to sustainably increase the productivity of the wheat crop in some provinces of the central region of Iraq (Baghdad, Wasit, Babylon, and Karbala)

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Abstract

This research aims to diagnose the reality of the sustainability system's performance in the field of disseminating modern technologies to increase wheat productivity in some provinces of the central region of Iraq (Baghdad, Wasit, Babil, and Karbala). The research relied on a descriptive approach, where data was collected from 274 agricultural extension workers using a questionnaire containing 45 items distributed across five main areas: planning and implementation, management, finance, research and development, and media. The results showed that the system's performance was high in all areas, with the media area receiving the highest weighted average (3.98), followed by planning and implementation (3.97), while finance ranked last with a weighted average (3.91). The results also revealed weak integration between responsible agencies, shortcomings in administrative and financial aspects, and weak media performance. Based on this, recommendations were made to enhance institutional coordination, improve management, increase funding, and enhance the role of the media to achieve sustainable wheat production.

Keywords: Agricultural Sustainability – Modern Technologies – Wheat Productivity – Agricultural Extension – Planning – Management – Financing

I. Introduction:

Wheat is a strategic crop upon which food security in Iraq depends, as it contributes significantly to meeting the basic needs of the population (Al-Jubouri, 2019). Through its agricultural institutions, the state seeks to increase the productivity of this crop by introducing modern agricultural technologies within the framework of a sustainability system (Al-Samarrai, 2020). However, the actual reality indicates clear disparities in the performance of this system, calling for a precise scientific diagnosis of its various aspects, from planning and management to agricultural information (Al-Zubaidi, 2022). In light of the environmental and economic challenges facing the agricultural sector, the need for integrated roles among the parties involved in the transfer and application of agricultural technologies has emerged, requiring a careful assessment of the level of performance within the institutions operating in this field (Karim, 2021). From this perspective, this research aims to diagnose the reality of the sustainability system's performance in disseminating modern technologies to increase wheat productivity in the central provinces (Baghdad, Wasit, Babylon,

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and Karbala), through five main areas. The national strategy for sustainable agriculture in Iraq is based on six main, integrated axes (Al-Tamimi, 2023):

Planning: This includes developing agricultural policies based on technical and economic feasibility studies, taking into account the ecological characteristics of each region.

Implementation: This addresses the mechanisms for implementing agricultural programs on the ground, including the distribution of agricultural inputs and the implementation of modern irrigation projects.

Administrative: This focuses on structuring agricultural institutions and developing monitoring and evaluation systems to ensure institutional efficiency.

Financial: This focuses on mechanisms for providing sustainable financing through subsidized agricultural loans and agricultural development funds.

Research and development: This includes developing improved plant varieties and innovating agricultural technologies adapted to climate change.

Media: This focuses on spreading agricultural awareness through extension campaigns and knowledge transfer programs for farmers (Al-Lami, 2020).

Data from the Iraqi Ministry of Agriculture (2023) indicates a production gap estimated at 1.5 million tons between actual production and consumer needs, underscoring the need to assess the efficiency of the current agricultural system. Accordingly, this research relies on a methodology for evaluating key performance indicators in each of the six areas, focusing on the central provinces , which represent 58% of the total wheat cultivated area in Iraq (Abdullah, 2021). This study gains its importance by providing an integrated analytical framework that helps identify the strengths and weaknesses of the current agricultural system and proposes practical solutions to achieve the strategic goals of sustainable agricultural development in Iraq. Based on the above, the current research aims to answer the following research questions:

1- What is the reality of the sustainability system's performance in the field of disseminating modern technologies to sustainably increase wheat productivity in the central provinces of Iraq (Baghdad, Karbala, Babylon, and Wasit)?

2- What is the order of the paragraphs in each research area?

Research objectives:

First: Analyzing the reality of the sustainability system's performance in the field of disseminating modern technologies to sustainably increase wheat productivity in the central Iraqi provinces (Baghdad, Karbala, Babil, and Wasit). This was achieved through:

1- Arranging the areas of the sustainability system's performance in the field of disseminating modern technologies to sustainably increase wheat productivity, according to the respondents' opinions.

2- Arranging the paragraphs of the areas of the sustainability system's performance, according to the respondents' opinions (planning and implementation, management, financing, research and development, and media).

Significance of the Research:

The importance of this research stems from the vital role the sustainability system plays in enhancing food security, especially in light of the environmental and economic challenges facing agriculture in Iraq. Wheat is a strategic crop

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upon which the country relies for food security, making it necessary to work to diagnose the performance of the system responsible for disseminating and applying modern technologies that contribute to increasing its productivity in a sustainable manner.

Procedural Definitions:

1- Sustainability System: An integrated framework aimed at achieving a balance between the environmental, social, and economic dimensions of sustainable development.

2- Sustainability System Workers: The individuals and entities involved in implementing sustainability principles across various sectors.

3- Technology Dissemination: The process of transferring knowledge and modern technologies from the development or innovation stage to widespread application in society or the market with the aim of promoting economic and social progress.

4- Increasing Wheat Productivity: This means improving the quantity and quality of the resulting crop using advanced methods and technologies while preserving natural resources.

Research Methodology:

1- Research Methodology

The current research falls within the descriptive approach. A method is defined as the approach followed by the researcher in studying a specific phenomenon, through which diverse ideas are organized in a way that enables the researcher to address the research problem (Al-Mahmoud, 2019). In the current study, the researcher chose the descriptive approach, which is the most widespread and most appropriate research method for social research. This approach aims to understand phenomena and extract their characteristics through an investigation focused on a phenomenon as it exists today, with the aim of diagnosing it, revealing its aspects, and identifying the relationships between its aspects (Al-Azzawi, 2008: 97).

- 2Research Area:

The provinces of Baghdad, Karbala, Babil, and Wasit were selected as the areas for conducting the current research from among the provinces of the central region of Iraq.

3-Research Community and Sample:

In statistics, the research community is defined as the field of study that contains a set of elements that we wish to study and obtain some results about (Al-Alwan, 2010: 28). The research community included all workers in agricultural extension in the directorates of agriculture, projects, companies, the Agricultural Extension Department, the Seed Inspection and Certification Department, and the Department of Protection and Agricultural Research in the provinces of Baghdad, Wasit, Babil, and Karbala from among the provinces of the central region. The number of workers in agricultural extension in these provinces was (950), from which a stratified random sample was drawn using the equation (Thompson, 2012: 65). The sample size was (274) respondents, as shown in Table (1).

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Table (1) Research Community and its Research and Exploratory Sample

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

4- Data Collection Tool:

A questionnaire was prepared after the researcher reviewed the literature, scientific sources, research, and related studies, consulted with specialized experts, and conducted field visits to agricultural directorates and departments and their affiliated units. The questionnaire is one of the most important tools used to obtain information related to existing conditions and methods. It is the most widely used data collection tool, as it helps gather information about knowledge, attitudes, opinions, and facts (Francisco & Baggett, 2003: 532). A questionnaire is defined as: a set of questions arranged around a specific topic, placed in a form that is sent or hand-delivered to the respondents in preparation for obtaining answers to the questions contained therein (Ammar et al., 2019: 71). The researcher must be familiar with the various tools and methods for collecting data for scientific research purposes (Alyan and Ghanem, 2000: 81). Choosing the best method for obtaining the required information requires mastery. (Agha and Al-Ustadh, 2004, 103). Following these steps, the researcher prepared a data collection tool to achieve the goal of diagnosing the reality of the sustainability system's performance in the field of disseminating modern technologies to sustainably increase wheat crop productivity in the research provinces . The tool included (45) standard measurement items distributed across (5) domains, as follows:

A- Domain One: Planning and Implementation, which included 13 standard items.

B- Domain Two: Management, which included 6 standard items.

C- Domain Three: Financing, which included 10 standard items.

C- Domain Four: Research and Development, which included (9) standard items.

C- Domain Five: Media, which included (7) standard items.

5- Validity

The term validity refers to the degree to which a test measures what it is supposed to measure. It is a preliminary procedure carried out by judging the appearance of the questions as being related to the behavior, trait, or characteristic to be measured (Al-Mashhadani, 2019: 168). Face validity is a basic and performance indicator of the validity of a scale. It refers to the degree to which the scale appears valid for what it was designed to measure and is based on the expertise of the arbitrators (Mohajan, 2017: 73). This is due to the connection between validity and the objective or objectives expected to be achieved by the measurement tool and the extent to which it relates to the type and importance of the decision that will be made accordingly (Al-Nabhan, 2004: 273). Content validity, on the other hand, refers to the content of the items, meaning the extent to which the scale items represent the content to be measured (Al-Mashhadani, 2019: 168). To calculate the validity of the data collection tool and ensure that it achieves the research objectives, it was presented to a group of expert arbitrators totaling (24). Experts were invited to provide their comments and opinions on

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the areas, axes, and paragraphs of the data collection tool and the extent to which the questionnaire components relate to the research objectives. They were also invited to submit their suggestions, opinions, and comments, as they deemed appropriate, regarding approval, deletion, modification, or addition to the questionnaire paragraphs. This was done using a three-point scale consisting of three alternatives (agree, agree with modification, disagree), with numerical values (3, 2, 1), respectively. Based on the responses to the scale alternatives, the experts' level of agreement with the tool was calculated. The experts' opinions and suggestions were collected, and the average of the arbitrators' responses was calculated to obtain the percentage of agreement. The average of the arbitrators' answers was calculated, with the average level of agreement of the arbitrators (more than 75%) with the contents of the questionnaire. All suggestions and comments indicated by the experts were taken into account, and the results are as follows:

1- Maintaining the areas included in the questionnaire form that achieved an agreement rate of more than 75%, and thus not making any changes to them.

2- Maintaining all paragraphs of the data collection tool that achieved an agreement rate of more than 75%.

3- Amending the paragraphs on which the experts' opinions differed, as the total number of paragraphs remained unchanged because none were deleted, and the number remained at 45 paragraphs.

4- The questionnaire form in its final form:

A- The first area: Planning and implementation, which included 13 standard paragraphs.

B- The second area: Management, which included 6 standard paragraphs.

C- The third area: Finance, which included 10 standard paragraphs.

C- The fourth area: Research and development, which included (9) standard paragraphs.

C- The fifth area: Media, which included (7) standard paragraphs.

5- Preliminary Test:

A preliminary test (Per-test) of the data collection tool was conducted on a survey sample of 30 respondents, comprising 13 respondents from the Baghdad Governorate community, 6 respondents from Wasit and Babil Provinces for each, and 5 respondents from Karbala Governorate. The sample was drawn from outside the research community (outside the research sample). The sample was drawn using a proportional stratified sampling method to ensure representation of the community strata, based on the size of each stratum. The researcher used the Facronbach equation to calculate reliability. Data from the survey sample was collected during the period from November 22, 2023 to January 21, 2024. The preliminary test was conducted to verify several objectives:

A. Clarity of the questionnaire items for respondents in terms of wording.

B. Verification of the consistency of respondents' answers to the questions and their impermissibility for different interpretations.

C. Calculating the reliability and validity of the data collection tool.

6- Calculating Reliability:

After conducting the initial test, reliability was calculated using the Cronbach's coefficient. The results of the Cronbach's coefficient showed that the statistical significance coefficients were statistically significant for all research areas,

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reaching (0.92) in the field of planning and implementation, and (0.88) in the field of management. The statistical significance value for the field of finance reached (0.91), while the statistical significance value was (0.84) in the field of research and development, and (0.93) in the field of media. 7- Data collection: Data was collected from the respondents through personal interviews in order to obtain information and data that achieve the objectives of the research entitled "Developing the performance of a sustainability system in the field of disseminating technologies to sustainably increase the productivity of wheat crops in some provinces of the central region of Iraq." Data was collected from the respondents in the period between 11/3/2024 and 12/13/2024. The respondents' answers to all questionnaires were verified and no questionnaire was deleted from them. Thus, the data of 274 questionnaires was analyzed.

8- Measuring Research Objectives:

The diagnosis of the reality of the performance of the Sustainability System in the field of disseminating modern technologies to sustainably increase wheat productivity in the research provinces was measured through 45 standard items distributed across five domains. Each domain was assigned a five-level scale (strongly agree, agree, neutral, disagree, strongly disagree), with numerical values (1, 2, 3, 4, 5), respectively. The number of items in the first domain was (13), the management domain included (6), the finance domain included (10), the research and development domain included (9), and the media domain included (7).

II. Results and Discussion:

The first objective: Analyzing the reality of the Sustainability System's performance in the field of disseminating modern technologies to sustainably increase wheat productivity in the research provinces . This was achieved through the following:

1- Ranking the domains of the Sustainability System's reality of performance in the field of disseminating modern technologies to sustainably increase wheat productivity, according to the opinions of the respondents.

The research results showed that the respondents' responses to the areas set to analyze the reality of the performance of the Sustainability System in the field of disseminating technologies to sustainably increase wheat crop productivity, which numbered (5) areas, obtained weighted averages ranging between (3.91-3.98), with a general weighted average of (3.95). All areas came at a high level according to the weighted averages, falling within the high weighted category of the scale between (3.40-4.19), as shown in Table (2).

Table (2) Ranking of the areas of the reality of the performance of the Sustainability System according to the opinions of the respondents.

Form sequence	Field	Weighted Mean	Percentage weight	Rank	Level
5	Media	3.98	0.80	1	high
1	Planning and Implementation	3.97	0.79	2	high
2	Management	3.95	0.79	3	high
4	Research and Development	3.92	0.78	4	high
3	Finance	3.91	0.78	5	high
total		3.95	0.79	---	high

Table (2) shows that respondents' responses regarding the sustainability system's performance in the field of disseminating agricultural technologies to sustain wheat crop productivity are high across all areas of the sustainability system's performance. This is reinforced by the weighted averages that ranged between (3.91-3.98) for all areas of the sustainability system's performance. The media area ranked first in terms of respondents' degree of agreement, with the

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highest weighted average of (3.98). This may be due to respondents' awareness of the importance of the media in promoting and conveying information about modern agricultural technologies for the purpose of disseminating information about the programs implemented by the sustainability system. The financing area ranked last, with the lowest average (3.91), which is also high. This may be due to respondents' neglect of the importance of funding the programs and projects implemented by the sustainability system in the field of disseminating technologies to sustainably increase wheat crop productivity.

2- Ranking the paragraphs of the areas of the sustainability system's performance according to respondents' opinions

First area: Planning and implementation.

The research results showed that the respondents' responses to the (13) planning and implementation domain items obtained weighted averages ranging between (3.86-4.11) points. The weighted average values were high for all items, falling within the high weighted category of the scale, between (3.40-4.19). The analysis results are shown in Table (3).

Table (3): Ranking of the planning and implementation domain items according to the respondents' opinions.

Questionnaire sequence	Paragraphs	Weighted Mean	Percentage weight	Rank	Level
1	Defining sustainability goals	4.11	0.82	1	high
6	Establishing specialized working groups	4.05	0.81	2	high
3	Conducting gap analysis	4.03	0.81	3	high
12	Adapting to changes	4.01	0.80	4	high
2	Developing a strategic vision	3.99	0.80	5	high
5	Defining implementation strategies	3.98	0.80	6	high
9	Monitoring progress	3.97	0.79	7	high
4	Formulating sustainability policies	3.96	0.79	8.5	high
13	Continuous development	3.96	0.79	8.5	high
10	Preparing periodic reports	3.95	0.79	10	high
7	Coordinating between stakeholders	3.91	0.78	11	high
8	Activating programs and initiatives	3.87	0.77	12	high
11	Conducting periodic reviews	3.86	0.77	13	high

It is clear from Table (3) that the paragraph (setting sustainability goals) in the field of planning and implementation came in first place in terms of rank and degree of approval of the respondents, as it obtained the highest weighted average of (4.11). The reason for this is the respondents' knowledge and awareness of the importance of setting goals that are clearly formulated, styled and written, through which the path of performance of the sustainability system is determined in the field of disseminating technologies to sustainably increase wheat productivity. The goals are also standards for evaluating the level of performance of the sustainability system, and without them it is not possible to know the extent to which the sustainability system has achieved its programs and goals for which it was created. While the paragraph "Conducting Periodic Reviews" ranked last in terms of rank and degree of approval by the respondents, it received the lowest weighted mean of (3.86) points, also at a satisfactory level. This may be due to the respondents' lack of interest in conducting periodic reviews of the sustainability system's performance, or to the senior management in the sustainability system's lack of interest in conducting periodic reviews, or their disregard for their importance in the extent to which the sustainability system achieves the guidance activities it implements.

Second Domain: Management

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The research results showed that the respondents' responses to the (6) paragraphs in the management domain received weighted means ranging between (3.86-4.01) points. The weighted mean values were high for all paragraphs, as they obtained weighted means that fell within the high weighted category of the scale, between (3.40-4.19). The analysis results are shown in Table (4).

Table (4) Ranking of the paragraphs in the management domain according to the respondents' opinions.

Form sequence	Paragraphs	Weighted Mean	Percentage weight	Rank	Level
5	Qualifications of staff working in development programs or directorates	4.01	0.80	1	high
2	Establishing a government sustainability committee	3.99	0.80	2	high
1	Establishing a clear administrative structure	3.97	0.79	3	high
3	Managing natural resources	3.96	0.79	4	high
4	Training programs for government employees	3.89	0,78	5	high
6	Joint interaction between workers and farmers to achieve the desired development	3.86	0.77	6	high

It is clear from Table (4) that the paragraph (qualifications of workers in development programs or directorates) within the field of management came in first place according to rank and degree of approval of the respondents, as it obtained the highest weighted average (4.01) points. The reason for this may be due to the necessity of adopting the academic qualifications of workers in the Sustainability System programs in the field of disseminating technologies for the sustainability of wheat crop productivity. This means adopting scientific and practical expertise in managing Sustainability System programs and benefiting from the expertise of workers in managing Sustainability System programs in a clear and precise manner. This is positively reflected in the field of disseminating technologies for the sustainability of increasing wheat crop productivity. While the paragraph (joint interaction between workers and farmers to achieve the required development) came in last place according to the rank and degree of approval of the respondents, as it obtained the lowest weighted mean of (3.86) points, which is also a high value according to the respondents' duties. The reason for this may be due to the lack of interest or neglect of the importance of managing the joint interaction between workers in the sustainability system programs and farmers, and focusing on the program workers only. This negatively affects the extent of farmers' cooperation in the programs in the field of spreading sustainability technologies, despite the fact that the joint interaction between workers and farmers is of great importance in accepting development programs, and this is an important factor in the success of sustainability programs. Third Domain: Finance

The research results showed that the respondents' responses to the (10) finance domain items yielded a weighted average ranging between (3.83-3.99) points. The weighted average values were high for all items according to the respondents' responses, as they yielded weighted averages that fell within the high weighted category of the scale, between (3.40-4.19), as shown in Table (5).

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Table (5): Ranking of the finance domain items according to the respondents' opinions.

Form sequence	Paragraphs	Weighted Mean	Percentage weight	Rank	Level
1	Types of available funding sources	3.99	0.80	1.5	high
3	Assessment of available funding sources	3.98	0.80	2.5	high
7	Payment-for-performance mechanisms	3.98	0.80	2.5	high
2	Targeted funding programs	3.95	0.79	4	high
5	Partnerships with the private sector	3.92	0.78	5	high
4	Integrating sustainability into government budgets	3.86	0.77	6.5	high
6	Sustainable investment	3.86	0.77	6.5	high
8	Financial risks	3.85	0.77	8.5	high
10	Spending plans based on the nature of the program or project	3.85	0.77	8.5	high
9	periodic financial reports	3.83	0.77	10	high

It is clear from Table (5) that the paragraph (type of available funding sources) in the field of funding came in first place according to the rank and degree of approval of the respondents, as it obtained the highest weighted average of (3.99) points. The reason for this may be due to the respondents' emphasis on the importance of determining the type of funding sources due to their importance in financing the programs implemented for farmers, as the capabilities available to the sustainability system may not be able to finance projects and programs that require large and diverse funding sources. This is due to the interest of the management of the sustainability system in the field of disseminating technologies to sustainably increase the productivity of the wheat crop by determining the available funding sources according to the requirements of implementing the programs planned to be implemented, as funding is one of the most important resources when implementing programs. While the paragraph (periodic financial reports) came in last place according to the rank and degree of approval of the respondents, as it obtained the lowest weighted average of (3.83) points, which is also at a high level. The reason for this may be due to the lack of interest of the workers in the Sustainability System Program in spreading modern technologies to sustainably increase wheat productivity and their neglect of the importance of periodic reports on the sources of funding that must be available or that require their availability to implement the programs and activities of the Sustainability System.

Fourth Domain: Research and Development.

The research results showed that the respondents' responses to the (9) items in the research and development domain received a weighted average ranging between (3.78-4.03) points. The weighted average values were high for all items in the research and development domain, as they obtained weighted averages that fell within the high weighted category of the scale, between (3.40-4.19). The analysis results are shown in Table (6).

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Table (6): Ranking of the items in the research and development domain according to the respondents' opinions.

Form sequence	Paragraphs	Weighted Mean	Percentage weight	Rank	Level
4	Appropriate technology and equipment for conducting research	4.03	0.81	1	high
7	Exchange of knowledge and expertise	3.99	0.80	2	high
5	Amount of support available for conducting research and studies to advance the program or project	3.97	0.79	3	high
3	Establish specialized research centers	3.96	0.79	4	high
9	Establish a strong research and development system that supports government sustainability goals	3.95	0.79	5	high
6	Encourage innovation in sustainable technologies	3.89	0.78	6	high
8	Methods used for technology transfer	3.88	0.78	7	high
1	Identify key research areas	3.86	0.77	8	high
2	Align research with national goals	3.78	0.76	9	high

It is clear from Table (6) that the paragraph (technology and equipment suitable for conducting research) came in first place in the field of research and development according to the rank and degree of approval of the respondents, obtaining the highest weighted average of (4.03) points. This may be due to the awareness of those working in the sustainability system of the importance of using technology and equipment suitable for conducting scientific research, due to the effective role of research in determining the best level of system performance, avoiding weaknesses and shortcomings, or finding solutions to the problems facing those working in the sustainability system in the field of disseminating agricultural technologies to sustain wheat crop productivity. Meanwhile, the paragraph (aligning research with national goals) came in last place in the field of research and development, as it obtained the lowest weighted average of (3.78) points. This may be due to those working in the sustainability system neglecting the need to align scientific research with the national goals set for the performance of the sustainability system. The focus may be only on conducting research without paying attention to the extent to which research is compatible with national goals and agricultural policies, and this negatively affects the performance of the sustainability system. Fifth Domain: Media

The research results showed that the respondents' responses to the (7) media domain items obtained weighted averages ranging between (3.86-4.02) points. The weighted average values were high for all items, as they obtained weighted averages that fell within the high weighted category of the scale, between (3.40-4.19). The analysis results are shown in Table (7).

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Table (7): Ranking of the media domain items according to the respondents' opinions.

Form sequence	Paragraphs	Weighted Mean	Percentage weight	Rank	Level
1	Comprehensive Media Strategy	4.02	0.80	1	high
6	Highlighting Successes	4.01	0.80	2	high
3	Communicating Through Traditional Media	4.01	0.80	3	high
2	Educational Content	3.99	0.80	4.5	high
5	Collaborating with Influencers	3.99	0.80	4.5	high
4	Digital Media	3.94	0.79	6	high
7	Promoting Leadership	3.86	0.77	7	high

Table (7) shows that the paragraph (Comprehensive Media Strategy) in the field of media ranked first in terms of rank and respondents' approval rating, with the highest weighted mean of (4.02). This may be due to the respondents' awareness of the importance of a comprehensive media strategy for all activities of the sustainability system for disseminating technology to sustainably increase wheat crop productivity, build relationships with media companies, and coordinate all media efforts to effectively transmit information in the form of educational and awareness-raising content directed at beneficiaries. They also show great care and interest in continuing this media strategy to cover all activities. Meanwhile, the paragraph (Promoting the Pioneering Role) ranked last in terms of rank and respondents' approval rating, with the lowest weighted mean of (3.86). This may be due to the lack of interest of the respondents and those working in the sustainability system in promoting the pioneering role, and the neglect of promotion and media, through which it is possible to clarify what the sustainability system for disseminating technology to the agricultural public must do.

III. Conclusions and Recommendations:

First: Conclusions

1. Weak integration of planning and implementation efforts among the entities responsible for the sustainability system, leading to duplication of some activities and a lack of joint coordination in program implementation.

2. Deficiencies in the administrative and organizational aspects, as qualified human resources were not optimally utilized, in addition to the limited powers granted to staff working in the extension and technical fields.

3. Weak funding allocated to programs for disseminating modern technologies, which limits the system's ability to provide extension services and activities, and reduces the number of demonstration fields and model farms.

4. Poor coordination between scientific research centers and executive agricultural institutions, which has weakened the link between research results and practical application among farmers.

5. A clear deficiency in agricultural media performance, as there are no regular awareness programs sufficient to disseminate the concepts of modern technologies or enhance agricultural community awareness of sustainability.

6. The absence of a unified central database that facilitates the relevant authorities' tracking of program implementation stages and the extent of their benefits in the targeted provinces .

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Second: Recommendations

1. Enhance integration and institutional coordination between the agricultural directorates, research centers, and the Extension Department through unified work programs characterized by flexibility and accountability.

2. Restructure the administrative aspect within the system by distributing powers in a balanced manner and activating the role of technical competencies in field decision-making.

3. Increase financial allocations for modern technology dissemination programs within the budgets of the Ministries of Agriculture and Planning, contributing to the expansion of agricultural services.

4. Establish a unified electronic system for managing agricultural information and monitoring the implementation of extension programs, linking it to institutional performance indicators.

5. Launch seasonal agricultural media campaigns via radio, television, and digital platforms to raise community awareness of the importance of using modern technologies.

6. Utilize the results of applied research and link them directly to field extension programs through joint coordination committees comprising researchers and agricultural extension workers.

7. Organize ongoing workshops and training courses for sustainability system staff to enhance their efficiency in planning, administrative, and technical aspects.

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