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Reality of Extension Programmes of Lands using Sprinkler Irrigation System and Applied Recommendations for Sustainability of Natural Resources in Middle Iraq

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Abstract. The research aim at recognizing the reality of mange activities and extension programs in the field of Farmers management for land use of sprinkler irrigation system and maintaining of recommendation their sustainability natural resources in same region in middle Iraq in (anbar ,bablon , karbala and wasit) provinces , and determine the level of farmers application in domain :1) land management with axis (irrigation treatment, fertilization treatment ,soil conservation) , 2)use of sprinkler irrigation with axis(installation ,turn on , conservation) , 3)sustainability of natural resources with axis (land sustainability , water consumption rationalizing, productivity increment). Data were collected by survey and personal interview of haphazard class sample , proportionality of rate in fact of 130 of 520 farmers . To achieve the research targets a triple standard were prepared for the level description of the type of manger activities and extension programmers services provided to the farmers land using sprinkler irrigation system, which is comprising of 25 items distributed into 5 aspects in extension planning the standard ranges from (25-75) a triple scale of the level of the farmers application for the recommended agricultural recent technology in the field of land management , use of sprinkler irrigation and sustainability natural resources consisting of (92) items distributed (35,34,23)which were used respectively, the standard ranges from (92-276) grads ,research sample were divided into three categories (low, middle, good), the weights are(1,2,3)which were used respectively. The results of the researcher revved that the level of

farmers for the recommended agricultural recent technology in all the three domain with axis described as weak , with an average of 1659 degrees and a standard deviation 12.8, and 60.7% of the respondents are not satisfied with extension activities presented the researcher recommends to exigency of edification for the beneficiary of land manage for use sprinkler irrigation, and their sustainability natural rescues through prepare extensional specialized programs and activities under supervision staff of the province and center.

Keywords. Management, Programs, Sustainability, Land.

1. Introduction

The reality of the agricultural sector in most developing countries is an important role in the development of the national economy because its agricultural products are used directly in food security and it is also a major source of manpower required for sustainable development. Land and water are also essential elements in agricultural production, and the characteristics of quantitative agricultural production, the quality is greatly affected by the characteristics of agricultural land, and that at the forefront of the challenges facing the world, including Iraq, is due to the degradation of the natural agricultural resources of agricultural land, as it is a national wealth that should be preserved for future generations and the sustainability of its resources through the maintenance and reclamation of the land and its preservation from deterioration, as well as Water resources are another important determinant in determining the agricultural area and its expansion, as well as its impact on the quantity and quality of agricultural production. Despite the great support provided to the agricultural sector in Iraq and the clarity of the main tasks to be performed, the rate of self-sufficiency in many crop groups and agricultural products (plant and animal) is still at a low level. Soil is the storehouse of water and plant food, in addition to being an anchor for plant fixation. Soil is a complex compound of minerals and organic matter that results in a specific structure and composition that contains water, food and air that directly affect plant growth and raise agricultural production, and that every damage or damage inflicts properties, soil will reduce productivity from the normal rate, and remediation of damage or damage is done through land reclamation [1]. And that the deterioration of agricultural soil resources is due to their mismanagement and lack of concern for their maintenance [2]. Therefore, it is very important to research that there is good soil management in order to preserve it from deterioration and its physical, chemical and biological properties and to address the problem of salinity, all of this is done through land reclamation (Melioration) as salinity has become a major problem hindering agriculture in most of the soils of the world [3]. Until recent years, the spread of soils affected by salts increased widely in arid and semi-arid regions, including in Iraq. Al- Zubaidi mentioned that the most important lands that need management for reclamation and maintenance include 1- Management and reclamation of salty-affected lands 2- Management and reclamation of acidic lands 3- Management and reclamation of waterlogged lands and swamps soils 4- Management and reclamation of sandy soils (stabilizing sand) 5- Management and reclamation of limestone and gypsum lands, and that preserving and sustaining reclaimed lands in Iraq requires efforts by the owners of lands and agricultural fields (i.e. The farmers themselves) and they are in the thousands to learn knowledge and skills, to improve the management of their lands and

follow the recommendations and modern agricultural practices. It was mentioned in the agricultural sector development plan for the years (2010-2014) issued by The Ministry of Planning and Development Cooperation - Agricultural Planning Department, that the area of reclaimed lands for the year 2007 at the level of Iraq amounted to (2.5) million dunams, and the lands not reclaimed (101) million dunums, which are vast areas that affected agricultural production for various crops in Iraq.

The plant needs water as a necessity for its prediction and growth, and that the process of supplying the soil with water to obtain the necessary moisture for the root group of the plant is called irrigation, the water resources are among the most important natural resources affecting sustainable agricultural development, and the need for irrigation increases in areas where water is scarce from its natural sources (Such as rain, groundwater, dew, etc.), which greatly limits the growth and production of plants. Water resources face a set of challenges, the most important of which is the growing demand for it as a result of annual population increases [4], and the waste resulting from mismanagement and use of water, its scarcity and misuse, to sustainable development, environmental protection, human health and well-being and food security. The present is at risk if it is not used with high efficiency [5]. To expand the cultivated area, the efficient use of water is according to the water needs of the crops in the required quantity and at the right time. To work together to increase production, and that excess irrigation water is a waste of efforts and water, as it causes energy losses water and nutrient leaching in the root zone [6]. In addition to the problems of waterlogging, salinization and low irrigation efficiency, and this problems may be due to the fact that many farmers follow traditional methods of irrigation of agricultural lands, which makes the efficiency of field irrigation does not exceed 40% in the best case [5]. And the weak use of modern technologies in the irrigation process and land leveling, especially in Iraq [7]. That farms are the main axis in improving irrigation efficiency, improving production, achieving the requirements of sustainable development and melioration agricultural resources. In the water field, Iraq suffers from a worsening water crisis for more than four decades, from a severe and continuous shortage of its water revenues, as its water revenues amount to about 43% of its water need in good water years, and it may reach 25% in dry water years , in addition to the deterioration of the quality of water and its increase in pollution as a result of throwing waste and untreated wastewater, and drainage water into the rivers, the salinity percentage in the Shatt al-Arab has reached more than 10,000 parts per million in some cases, and there is a great waste and waste in the amount of water received and misuse by the sectors of agriculture, industry and other water uses, as well as climatic and geographical factors, including scarcity of rain and the spread of desertification, in addition to waste and misuse of water by farmers, insufficient system of dams, reservoirs and irrigation projects, poor efficiency of irrigation networks, as well as weak spread Modern techniques in irrigation, which resulted in the fluctuation and shortage of the area cultivated with the strategic summer crops in particular. The use of modern technologies, including the sprinkler irrigation system in Iraq, which came within the project of modern irrigation techniques in 1999 towards achieving self-sufficiency in basic agricultural crops and water rationalization to ensure agricultural production of grains [8].

The use of modern sprinkler irrigation systems contributed to increasing wheat production to 1.25 tons / dunum and 2-3 tons / dunum of the yellow corn crop [9]. It also shows the economic importance of the systems in rationalizing the use of water and saving it in the use of chemical fertilizers, conducting control in agriculture, and the efficient use of agricultural mechanization, which allows reducing farm costs with the possibility of expanding the area of agricultural land, and modern irrigation systems allow farmers to manage and improve the production elements from their farms are more efficient, which contributes to the increase and sustainability of agricultural production. A study indicated that modern irrigation technologies of

all kinds increase agricultural production by 80-90% and reduce the amount of water by 35-50% of the water needed for irrigation and lead to a reduction in fuel energy user to 70% and that the effectiveness and efficiency of modern irrigation systems is affected by many factors: 1- Design factors 2- Agricultural factors 3- The human factor (operator and user) and the beneficiaries of them, and the level of their use, operation and maintenance is affected by the level of his knowledge and skills [10], and to contribute to the sustainable development of agricultural resources is the management of cultivated lands with the system of modern (and even reclaimed) irrigation technologies, which require scientific and practical experience that comes from the recommendations. and applied practices and familiarity with the technical aspects of the production process and its components and making sound decisions by farmers in adopting and applying new ideas and practices, and that a successful farmer is the one who has the ability to make and implement his decisions regarding them [11], that the process of managing the farms of his land means the optimal use of the elements of production That is a good management of his agricultural land and his best agricultural methods by following the recommended scientific recommendations.

The sustainable development in the agricultural sector is the management and maintenance of the natural resource base for present and future generations continuously [12], and in a manner that preserves land, water, and plant genetic resources that do not cause environmental degradation [13]. Some sustainable agricultural development as an administrative act, as it requires policies, systems, programs, and a great mobilization of material and human resources. The researchers agree that there are a set of characteristics that characterize sustainable agricultural development and include the following: It must be environmentally safe, economically feasible, socially fair, oriented towards caring for human values, and finally it must be adaptive [14], and it must be Sustainable agricultural development has goals that are in line with the general orientation of the state's social and economic policy, in a way that provides a suitable environment for human life, including support for agricultural businesses to ensure the continued economic growth of these agricultural businesses , and the maintenance and strengthening of the list of natural resources such as soil conservation and vital management like(IPM) These divisions include the following: sustainability of land (soil), water sustainability, and the sustainability of increasing agricultural productivity, and modern agricultural technologies are considered an effective means in the sustainability of agricultural production, for pests, biodiversity and others, which enables them to create a kind of divisions for sustainable agricultural development and according to recommendations and practices related to agricultural production. Agricultural natural resources and increasing productivity The production and dissemination of agricultural technologies and their application in the fields of thousands of farmers requires an effective extension system. And an efficient person who depends in his work on the existence of extension programs and activities that are effectively and properly planned. This can be achieved through a strategy for extension programs and their requirements. The extension apparatus is the educational tool to achieve optimal management of the resources used in agriculture [15], and one of the most important foundations for challenging the effectiveness and efficiency of extension agencies is the efficiency of the planning process [16], in When some studies mentioned deficiencies in the planning of extension programs [15,16], it was mentioned that the level of performance of the agricultural extension organization, its impact, and improving its effectiveness in the field of developing rural people and agriculture It is affected by many and varied factors, which the researchers classified into a set of external factors "from the environment in which the organization operates", and a set of internal factors "from within the organization". The extension workers in the various departments of the organization are one of the internal factors as they constitute the human input to the organization [17]. Also adopting researcher recommends with proposed mechanism and not

waste time , effort and reduce the cost prevent conflict in the work of all parties related to agricultural and rural development , particular service agencies (extension workers) [18].

And that there are persistent deficiencies and weaknesses in the indicative planning process in Iraq, and the lack, weakness of extension plans and programs and their neglect will negatively affect the rationalization of the exploitation of natural resources and the failure of efforts directed towards sustainable agricultural development [19]. And when it was mentioned previously and the reasons given, my research raises a question about the level of provision of activities and extension programs in the field of land management using modern irrigation systems, research objective is recognizing the level of provision of extension activities and programs in the field of land management using modern irrigation systems and determining the level of application by farmers who use scientific recommendations in the field of land management using irrigation systems, and the sustainability of agricultural resources .The research hypothesis is the existence of a high level of activities and extension programs provided to farmers with a high level to apply agricultural scientific recommendations in the field of land management, use of modern irrigation systems and maintain the sustainability of agricultural resources.

2. Materials and Methods

The research included all the farmers who own land using modern irrigation systems in some governorates of the central region of Iraq, namely. The proportion of 40% of the research population is for the governorates of 520 farmers, and a stratified random sample of 25% was taken. The total number of the sample is 130 respondents. The questionnaire form was used to collect data as the questionnaire is one of the appropriate means by which information, data and facts can be obtained, and it included preparing a measure of activities and extension programs provided to farmers, and a measure of the level of application of scientific recommendations, and a measure of farmers' reactions(reflexes scale). Those who are applied in the fields of land management and their axes in the use of modern irrigation systems and their axes, and the sustainability of agricultural resources and their axes, and this process has gone through a series of stages, which are as follows:

The first stage: building a scale describing reality extension activities and programs

- The reality of the extension activities and programs was described by test a component of two statements (existing or non-existent) and weights were specified for them (0,1) degrees respectively.
- Description of the standard level of extension activities and programs, as they were measured on a triple scale of expressions (weak, medium, and good) and weights were determined for them (1,2) degrees respectively.
- Description of the extension program planning process, which includes (planning, implementation, and evaluation) which are: (determining the need, setting priorities, setting goals, implementing activities and events, and evaluating). It was measured on a three-scale scale consisting of phrases (weak, medium, and good) and weights were determined for them (1 , 2, 3) degrees respectively. It identified 30 items distributed over the five axes, with 3 domains for axis, as shown in Table (1).

The second stage: measured the level of application of the scientific recommendations consisting of three domains, 9 axes, and 92 items was measured on a triple scale consisting of three expressions (weak, medium, and good) and the weights were determined for them (1,2,3) degrees respectively, for the following areas as shown In Table No. (2).

- The field of land management consists of three axes (irrigation management, fertilization management, and soil conservation management) and 35 items are defined (12, 12 and 11) respectively.
- The field of using modern irrigation technologies, which consists of three

axes (system setup , system running operation, and system maintenance). 34 items are defined for it (10, 17 and 7) respectively.

The field of sustainability of agricultural resources, which consists of three axes (sustainability of land, sustainability of water resources, and sustainability of increasing productivity). It has 23 items distributed (9, 6 and 8) respectively.

The third stage: A triple scale was prepared for the satisfaction of farmers benefiting from agricultural extension services in the field of land management using modern irrigation systems and resource sustainability. The measure's paragraphs reached 25 items.

The fourth stage: developing the scale and the questionnaire:

- Validity examination, the measures were presented in its initial form to 13 experts, seven of them in the field of agricultural extension, and six in the field of soil and irrigation, for the purpose of indicating their approval of the paragraphs to measure the apparent validity and validity of the content using a questionnaire, as the apparent truthfulness and validity of the content is one of the most valid types of validity for use and honesty of all kinds Yet one of the important elements of the objectivity of standards.
- consistency of the scale paragraphs.
- Calculating the averages of the experts 'approval score: agreement on the components of the standards, as a numerical value was specified for each statement on the approval criteria included (3 degree of approval, 2 degree of agreement with the amendment procedure, one degree of non-agreement).
- The fifth stage: Determining the approval scale and the cutoff threshold. A cut-off threshold of 80% has been set as a criterion for the survival of any of the areas, axes and paragraphs included in the questionnaire, and the paragraph or axis remains if it obtains an approval rate of 75%, and all the items of the scales have obtained more than 90% approval.
- Sixth stage: Preparing the questionnaire in its final form To measure the stability and validity of the questionnaire, a pretest of the application scale was conducted on a random sample consisting of 14 farmers who have benefited from modern irrigation techniques from outside the research sample in the governorate of Baghdad 9/2/2020. Cronbach 80% or more, to and estimated Alpha indicate the stability of the questionnaire, and the stability reached 0.90, so this indicates the

Table 1. Distribution of standardized level scale for planning extension programs.

N	The field or domains	axes	Number or items	%
1		Identify the need and problems	5	16.66
2	Planning	define the priorities	5	16.66
3		Setting goals	5	16.66
4	Implementation of	Implementation of activities and events	10	33.36
5	Evaluation	Calendar of activities and events	5	16.66
		Total	30	100

Table 2. Distribution of fields, axes and items of the level of application of the scientific recommendations.

N	the field or domains	Axes	Number or items	%	%
1	Land management and Reclamation	Irrigation management	12	34	13
		Fertilization management	12	34	13

		Soil Conservation management	11	32	11.9
		Total	35	100	
2	The use of modern irrigation systems	Setup Systems	10	29.4	10.8
		Operation systems Running	17	50	18.5
		System maintenance	7	20.6	7.6
	Total		34	100	
3	Sustainability of agricultural resources	Land sustainability	9	39.3	9.8
		Sustainability of water resources	6	26.1	6.6
		Sustaining productivity increases	8	34.6	8.7
			23	100	
Total			92		100

Data were collected from the respondents using the personal interview method and the tool previously prepared (questionnaire form) during the period from 7/5 to 15/8/2020. SPSS software was used to analyze data, as well as percentage, mean, and standard deviation.

3. Result and Discussion

3.1. First: Describe the Reality of Extension Activities and Programs

A-Description of reality the results showed that (63) percent of the research sample mentioned the existence of extension activities and programs provided by the extension agency, while a percentage (37) of the research sample stated that there are no extension activities and programs that reach farmers. The arithmetic mean reached (183.5) grads on a scale whose scores ranged between (92-276) degrees, as shown in Table (3).

Table 3. Distribution of respondents according to the existence of extension activities and programs in the field of land management using the modern irrigation system.

Extension activities and programs	the number	%	$\bar{X}$	R	t calculated	Notes
Existing	82	63	173.83	0.132	1.59	SD=3.62
Does not exist	48	37	102.12		0.01	*T=2.36
Total	130	100			0.05	*T=1.64

It can be deduced from Table (3). Less than half of the respondents answered that there are no activities and extension programs in the field of land management using modern irrigation systems, and this may be due to several reasons, including weakness in the activities and procedures of the agricultural extension system in general and the planned extension programs in particular, as the value of R Correlation 0,132 and it is positive, weak and insignificant, below the level of significance 0, 05. Therefore, the research hypothesis which states that there is a high level of measures, activities and agricultural extension programs provided to farmers who use modern irrigation systems is rejected, and thus it's incompetent and a weak effective impact in improving and applying scientific recommendations from before the farmers spread in the Iraqi countryside.

B-Description of the normative activities and extension programs in the field of land management .The results showed that the percentage of respondents who answered that there is a normal standard description level and the performance of extension activities and programs in the field of land administration

amounted to 36 %, which falls within the category of weak, with an average of 147.42 degrees, and a standard deviation of 3.72 , which was classified into three categories It is (weak, medium, good) and weights (1, 2, 3) a degree, and that 21% of the research sample described the extension activities as good, as shown in Table (4).

Table 4. Distribution of respondents according to the level and description of the normative activities and extension programs in the field of land administration.

Categories	the number	%	X	R	t calculated	Notes
Weak	36	44	121.44	13.89	1.268	SD=3.72
Average	29	35	193.2	0.01		T=2.36
Good	17	21	173.88	0.05		T=1.64
Total	82	100				

It can be deduced from Table (4). That 79% of the respondents described the nature of extension activities and programs as being moderate and tending to be weak. When calculating the strength of the correlation between the categories of the level of reality of activities and programs, it was found that the value of R reached 0.13, which is not significant with a level of significance 0.05, which calls for the rejection of the research hypothesis that states the existence of a high level of agricultural extension procedures, activities and programs and not performing them as required. As it can be concluded from Tables 3 and 4 that 64.6 percent of the research sample indicated that the extension activities and programs range from describing their procedures from weak to none, which is reflected in their weak effective influence in the process of improving the distribution or (publishing) and application of scientific recommendations in all fields (management Land. use of modern irrigation systems, sustainability of agricultural resources), and the low level of management and planning in the extension system.

C-Describe the extension program planning process

The results showed that the highest value obtained by farmers was 81 degrees and the lowest value was 30 degrees the level of describing the reality of the process of planning extension programs in the field of land management using modern irrigation techniques and the sustainability of agricultural resources ranged between 30-90 degrees, with an average of 43.85 degrees and a standard deviation of 6.62 which classified in to three categories it is(weak, Medium, good), as shown in Table (5).

Table 5. Distribution of respondents according to the level of description of the extension program planning process.

Categories	The stages of the extension program planning process										
	Planning						Implementation		Evaluation		X
	Determine the need		define the priorities		Setting goals						
	Number	%	number	%	number	%	Number	%	number	%	
Weak (30-46)	89	68	84	65	78	60	61	50	97	75	
Medium (47-63)	29	22	33	25	35	27	41	32	23	18	
Good (64-81)	12	10	14	10	18	13	24	18	10	7	
Average level description of the extension program planning process	32.36		40.79		46.34		49.48		43.28		43.85
SD					6.62						
N					130						

It can be deduced from Table (5). The highest average level description of the planning process for extension programs reached 47.48 degrees, points in the implementation stage of extension programs, and it falls within the average category and tends to be weak, and the lowest average level description of the planning process for extension programs reached 32.36 degrees at the stage of determine the need for programs and it falls into the category Weak, and therefore we reject the research hypothesis which stipulates the existence of a high level of extension programs provided to farmers who own land by using modern irrigation systems and conserving agricultural resources.

3.2. Second: the Level of Application of Scientific Recommendations in the Fields (Domains)

The level of application of scientific recommendations in the field of land management and the use of modern irrigation systems.

The results of the research showed that the highest numeric value obtained by the farmers is 240 degrees, and the lowest numerical value is 92 degrees, on a three-point scale ranging between 92-276 degrees, with an average of 165.4 degrees, and a standard deviation of 12.8 degrees. The farmers were divided into three categories according to for the levels of application (weak, medium, and good), as shown in Table (6).

Table 6. Distribution of respondents according to the fields of application of scientific recommendations.

N	The axes	Categories	Application degrees	the number	%	Rate the application	X	SD
1	Sustainability of agricultural land	Weak	35-56	63	48.5	44.26		
		Average	57-77	55	24.3	71.21		
		good	78-98	12	9.2	84.32		
total				130	100		66.83	8.1
2	Water sustainability	Weak	23-33	67	51.5	46.2		
		Average	34-44	45	34.6	63.5		
		good	45-55	18	14.9	82.7		
total				130	100		63.7	7.9
3	Sustaining productivity increases	Weak	23-33	68	52.3	28.6		
		Average	34-44	50	38.4	40.1		
		good	45-55	12	9.3	48.2		
total				130	100		35.4	5.9
Total domain		Weak	92-139	66	50.7	118.9		
		Average	140-190	50	38.4	174.8		
		good	191-240	14	10.9	221.2		
Total				130	100		165.9	12.8

It can be deduced from Table (6). The highest rate of application of scientific recommendations for all fields is 50.7%, which falls within the weak category, with an average of 118.9% degrees, and this means that more than half of the respondents from farmers had a weak level of application of scientific recommendations, and the reason may be due to the farmers' possession of the systems recently and not They have sufficient knowledge and skills to apply them in the field of land management using modern irrigation systems and the sustainability of agricultural resources, as well as the weakness of the extension system in the dissemination, application and adoption of agricultural techniques and the weakness of extension activities and programs.

Third: Determine the farmers 'satisfaction with the extension services provided to them in the areas of land management using modern irrigation systems and the sustainability of agricultural resources.

The results of the research showed that the highest degree of satisfaction reached 70 degrees, and the lowest level of satisfaction reached 38, on a three-point scale, ranging between 25-75 degrees, and the respondents

were divided into three categories according to the levels of satisfaction (not satisfied, neutral, and satisfied), and the weights were given. (1, 2, 3) as shown in Table No. (7).

Table 7. Distribution of farmers' reactions towards agricultural extension services.

Categories of Satisfaction	Degrees of satisfaction	the number	%
not satisfied	38-48	79	60.7
neutral	49-59	22	17.0
Satisfied	60-70	29	22.3
Total		130	100

It is deduced from Table No. (7) 60.7 percent of agricultural respondents are not satisfied with the extension activities presented in the fields of land management using modern irrigation systems and the sustainability of agricultural resources. This means that 77.7 percent of the research sample is distributed between neutral to dissatisfied, meaning that more than two-thirds of the farmers ranges between Dissatisfied and neutral, and this may be due to the weakness of extension activities and programs in these areas.

There is a clear weakness in the activities, extension programs and other services provided by the agricultural government agencies that deal in the fields of land maintenance and reclamation, the process of setting up, operating and maintaining modern irrigation systems and equipping them, as well as the farmers' following traditional methods of agriculture and not taking the agricultural scientific recommendations.

The research recommends the necessity of enhancing interest in educating, counseling and training farmers through the intensification of extension activities and programs in order to maintain the sustainability of agricultural resources.

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