**The Impact of Covid 19 on the Management of the Supportive Awareness Program and Its Impact on Rural Development**

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**ABSTRACT**

The management of any extension program is very important, because its success will help the countryside towards sustainable development. The study was conducted in Anbar Governorate to find out the effects on rural development. A questionnaire was used to achieve the objectives of the study; the number of data collected from them was 72 extension employees. The SPSS program was used to analyze the data and find out the relationship between the independent variables and the impact on rural development. The results of the study indicated that most of the employees were young. Less than 45 years old. Likewise, most of the employees have attended training courses, more than 97%. The study showed that the vast majority of employees hold a diploma up to a master's degree. In general, the results of the study in the field of job satisfaction indicated that employees had an average attitude toward job satisfaction. In the field of the impact of Coved 19, the results showed that the trend of the sample was between weak and average. The study concludes that employees have more experience and at ages that allow them to provide more skills and knowledge through their acquired experiences—striving to develop a fixed strategy for agricultural extension centers and agricultural directorates and to benefit from the experiences of the Food and Agriculture Organization, the World Bank and international organizations in this field operating in the governorate.

**Keywords**: Extension programs, rural development, Sustainable development, Agricultural crops, impact of Coved 19.

**INTRODUCTION**

Integrated rural development and agricultural development are interrelated; As they lead to one principle, which is to seek to eliminate the problems and obstacles that exist in rural areas, and the need to develop appropriate treatments for them, through the development of laws and legislative procedures, or strategic policies followed. To achieve the goals of integrated agricultural and rural development and to reach them towards sustainable rural development. The agricultural sector in Iraq faces many challenges, threats and pressures, and this leads to a negative impact on the future of agriculture, as we find that natural resources, including water, land and the environment are deteriorating due to natural processes, and human activities in population expansion (Saleh and Man, 2017). Which resulted in the spread of environmental pollution, a decrease in soil fertility, an increase in the rate of desertification, a decrease in the available water resources in addition to their limitations, and climatic changes? All this confirms that the proportion of natural resources is in a continuous deterioration due to the increasing and continuous population pressure, as well as inappropriate agricultural practices, including waste in the use of irrigation water, fertilization in excess of plants, and the excessive use of pesticides, which led to the destruction of the biological life of the soil, and imbalance in. The relationship between the elements of the environment and the organisms that live on it, and the repercussions of all this on the severe deterioration of limited agricultural lands ( Vulling & Krusman, 2006).

Agricultural extension plays a major role in the vertical and horizontal agricultural development programs and projects. In the field of vertical agricultural development, agricultural extension works to raise the agricultural productivity of the current agricultural area through the application of research results, agricultural discoveries, ideas, experiences and modern agricultural methods. As for the areas of horizontal agricultural development. Guidance can play a major role in helping the new immigrants to adapt to the new conditions of life. It is necessary to work to achieve the goals of agricultural development by increasing agricultural production and improving its quality in line with international standards in order to secure the need for local consumption and achieve a surplus for export to foreign markets by educating farmers on the application of modern technologies and how to benefit from loans to develop their production and agricultural expertise, and then introduce them to how Preserving natural resources and ensuring sustainable development of resources (Saleh, et al, 2022).

Since rural development is a multi-dimensional goal as it seeks to change all economic, social, cultural, organizational, environmental and human aspects of life in the countryside, this has led to a significant change in the task of the agricultural guide, as his mission is no longer limited to providing technical advice and training to farmers in order to increase production. Rather, its mission has gone beyond this technical framework to classify other, no less important tasks related to contributing to the achievement of rural development. Agricultural extension is one of the important tools in helping farmers become more efficient producers and more competitive in the market, and it provides farmers with information and results of research studies that allow them to manage their own farms in an efficient manner (Umar et al, 2018).

The role of agricultural extension lies in transmitting information and results to the farmer at the field level. Today, farmers face many problems such as lack of agricultural equipment, poor information on diseases and pests that affect crops, great damage to agricultural crops, hurricanes, epidemics, unsuitable soil, lack of water, lack of agricultural extension agents, drought, heavy rains, and wars. violence, and security instability. Training farmers and educating them on new agricultural methods that guarantee them to get a good crop of high quality. Agricultural extension works to gain the confidence of farmers by forming good relations based on friendship and respect, and creating a spirit of cooperation with them (Kalfin et al, 2022). Communicating the results of agricultural research and experiments to farmers after simplifying them so that they can become familiar with and apply them. Introducing them to the various agricultural production requirements that are commensurate with their capabilities and capabilities. Disseminate and communicate agricultural and technological innovations to farmers and work to put them into practice on their farms so that they can adopt and adopt them. Involving farmers and inviting them to various agricultural events, symposiums and meetings for their benefit of them by acquiring new experiences through discussion, meeting and observation. The participation of farmers in extension work and in planning and implementing extension programs that fit their circumstances, conditions and needs. Educating farmers in various easy ways and means and urging them to know the laws and regulations related to preserving agricultural wealth and of interest to members of the agricultural community (Saleh et al, 2022).

**OBJECTIVES OF THE STUDY**

This study aimed to achieve the following specific objectives:

1. Identify the personal characteristics of agricultural extension workers.
2. Identify the most important problems and obstacles to rural development.
3. Knowing the relationship between the independent variables in the study (Age, Working years, Marital status, Education level, Number of training courses, Number of training seminars, Position, agricultural sources, Satisfaction with the counseling program), and the dependent variable, the effects on rural development.
4. Identify the levels of the most important agricultural resources used in agricultural work.
5. Identifying the level of satisfaction with the agricultural programs used in the extension work.

**CONCEPTUAL FRAMEWORK**

The Agricultural Extension and Training Department in Iraq is affiliated to the Iraqi Ministry of Agriculture, and the Agricultural Extension and Training Department, headquartered in the capital, Baghdad, is affiliated with fifteen extension centers in the Iraqi governorates, and each extension center is affiliated with a number of extension farms distributed in the districts and sub-districts of the Iraqi governorates. These extension farms, as well as the extension center in the governorate center, carry out extension activities (guiding seminars, training courses, demonstration fields, field days). Plant Protection, Rural Women and Girls Department, Youth and Rural Youth Department, Water Rationalization Department, Guidance Publications Department, Training and Manpower Department, and Livestock Department) in the Agricultural Extension and Training Department.

A future vision is formulated for the development of the agricultural sector in general and the transfer of modern agricultural techniques, and these plans for the Iraqi governorates are within the policy of the Ministry of Agriculture to ensure an increase in agricultural production to reach self-sufficiency in vegetable crops, as well as focus on strategic crops (wheat, barley, rice, and maize). where support programs are being developed for these crops to increase their productivity, for example, there is an awareness program that supports the wheat crop, and it is also carried out in cooperation with the directorates of agriculture in all governorates to achieve an increase in production to reach the highest production and reduce economic costs, and the growth and development of the countryside (Saleh et al, 2022).

This study was conducted in Al-Anbar Governorate, which is located in the western part of Iraq and covers an area of about 33% of the total area of Iraq. This study was conducted because Anbar Governorate is considered the main supplier of vegetables and fruits to the capital, Baghdad. In addition, to the large area of ​​Anbar Governorate, which enables it to grow many crops as well as, to a large number of livestock. Moreover, in order to learn about the role of agricultural extension in this province, which has suffered during the past period, from the events of ISIS, which caused the destruction of all the infrastructure of the agricultural extension departments, including the extension center in Anbar, which takes an alternative location due to the destruction of the extension center building, and since the liberation one of the terrorist gangs of ISIS, but it has not been reconstructed so far. In addition to other extension departments such as the Anah farm, the Heet farm and the Karma extension farm, and this causes a major obstacle to the provision of extension services throughout Anbar Governorate. In addition, the distribution of extension farms in the governorate was incorrect, as there is a large divergence between one farm and another, as there are five extension farms in the western part of the province, which have a sparse population density compared to what exists from the city of Ramadi to the city of Garma, where there is an extension farm one only.

This causes a major imbalance in the provision of extension services in the correct distribution, so in light of the conditions of the Corona pandemic, which caused great confusion in the food supply, and a clear imbalance in the distribution and transportation of agricultural crops to Anbar as well as the capital, Baghdad. From this point of view, this study was conducted in Anbar, to stand on the most important obstacles that hinder the supply of crops to the province of Baghdad, as well as to know the role of agricultural extension towards that. Standing on the obstacles and agricultural problems that stand in the way of achieving self-sufficiency (Sale et al,2022).

As well as the most important thing that stands for rural development, in order to overcome obstacles and develop the agricultural sector in general. In addition, the Agricultural Extension and Training Department accompanies education with guidance seminars that are held in the event of an epidemic or disease that spreads in areas of Iraq or the world, for example, holding seminars to learn about bird flu, or foot-and-mouth disease in animals or the spread of desert locusts and others, in order to stop the spread of those diseases. Epidemics and their elimination.

***METHODOLOGY***

A questionnaire was prepared to achieve the objectives of the study. The apparent validity and the content of the questionnaire (internal validity) were verified. A pre-test was conducted on 15 employees who were not included in the final research, after which data were collected from all agricultural departments in Anbar Governorate, for agricultural extension workers, which included (Agriculture Directorate, Agricultural Divisions, Agricultural Extension Center, and Extension Farms). The number of employees from whom the total data was collected was 72 an indicative employee. Since the number of extension employees is 87. That were 15 employees who were tested pretest were excluded. Al-Khalidi defined the counseling program is a number of organized steps that were planned in advance, according to scientific foundations with principles that have specific goals to achieve, and take place during organized sessions, according to the relationship between the mentor and the mentor.

The questionnaire was prepared to achieve the objectives of the study, and its validity was verified in its content of questions to achieve the objectives of the study, as well as verifying its external validity, as it was presented to psychologists, as well as specialists in agricultural extension at the College of Agriculture. The axes of the study included the axis of personal characteristics of the employees, the axis of satisfaction with the extension programs, the axis of agricultural resources, the axis of agricultural problems and obstacles, and finally the axis of the effects of the Corona pandemic on agriculture and food security. An experimental T-test search was conducted for 15 employees who were excluded from the final research, to modify the questionnaire in the final formula that meets the objectives of the study.

In order to identify the relationship between the study variables to see if the relationship is positive or negative, the following research question were formulated: Is there a relationship between the independent variables in this study (age, Working years, marital status, educational level, number of training courses, number of training seminars, Position, agricultural resources, satisfaction with the extension program) and the dependent variable, effects of COVID-19 on rural development, the impact of Covid 19 included 17 questions in the field of study and its impact on the awareness program. The study of the relationship between the variables can be seen in Figure 1.

***The research hypothesis of this study were formulated***

H0: There is no relationship between the independent variables in this study (Age, Working years, Marital status, Education level, Number of training courses, Number of training seminars, Position, Agricultural sources, Satisfaction with the counseling program), and the dependent variable, the Effects of COVID-19 on Rural development, at an indicative level of 0.5.

H1: The alternative hypothesis is: There is a relationship between the independent variables in this study (Age, Working years, Marital status, Educational level, Number of training courses, Number of training seminars, Position, agricultural resources, satisfaction with the extension program) and the dependent variable, the effects of COVID-19 on rural development, at an indicative level of 0.5. The statistical program SPSS was used to analyze the data, and percentages, mean and standard deviation were used, as well as ANOVA ONE WAY was used to study the relationship between the dependent variable and the independent variables in the study.

 **Independent Variables Dependent Variable**

* Age
* Working years
* Marital status
* Education level
* Number of training courses
* Position
* Agricultural Sources
* Satisfaction with the counseling program

**Effects of COVID-19 on rural development (17questions)**

**Figure 1: Represents the relationship between the independent variables and the dependent variable.**

**RESULTS AND DISCUSSIONS**

1. ***Personal Characteristics of the Extension Staff***

The process of transferring and disseminating new agricultural technology through the employment of integrated skills with a high level of efficiency and skill. It is important that the extension staff have a full understanding of the cultural elements of the local community in which new agricultural technology is spread and the ability to understand farmers about their personal characteristics, skills and attitudes towards accepting modern technology in addition to their level of knowledge and ability to think and use the principle of rationality in making decisions regarding new technological innovations in addition to In addition, the extension cadre needs skill, ability and accurate knowledge in how to diagnose problems and find solutions to them, and the desire to interact with other organizations and institutions that have field information and data, as well as the desire to interact with information delivery systems and efficiency in understanding, modifying and applying new agricultural technological scientific information (Saleh and Man, 2017).

The results of Table 1 indicated about the personal characteristics of the employees. With regard to the development process and the role of the extension cadre, a careful and insightful look should be given to the existing agricultural situation, while avoiding prejudgment as much as possible. The data in table 1 show that Position the percentage of employees of the Directorate of Agriculture was 35,6 followed by 32.9 for the agricultural division employees, and the third place was for the employees of the extension farms spread throughout Anbar Governorate, with 17.8, and finally 12.3 for the employees of the extension center, due to the presence of the extension center employees in Anbar Provence and the lack of recent appointments during the five recent years.

**Table 1: Descriptive Analysis of the Participants**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S. D** | **Percent** | **Frequency** | **Description** | **No** |
| **1.00** | **12.3** | **9** | **Extension center**  | **Position** |  |
| **17.8** | **13** | **Extension farm**  |
| **35.6** | **26** | **Agricultural directorate**  |
| **32.9** | **24** | **Agricultural Divisions** |
| **0.89** | **8.3** | **6** | **Until 25 years** | **Age** | **2.** |
| **34.7** | **25** | **25-35 years**  |
| **36.1** | **26** | **35-45 years**  |
| **20.8** | **15** | **More than 45 years**  |
| **0.78** | **5.6** | **4** | **High school** | **Education level**  | **3.** |
| **23.6** | **17** | **Institute**  |
| **56.9** | **41** | **College** |
| **12.5** | **9** | **Master** |
| **1.4** | **1** | **Ph.D.** |
| **0.54** | **80.8** | **59** | **Married**  | **Martial status**  | **4.** |
| **12.3** | **9** | **Single**  |
| **5.5** | **4** | **Divorce**  |
| **0.89** | **23.3** | **17** | **Until 5 years**  | **Working****Years** | **5.** |
| **41.1** | **30** | **5-10 years**  |
| **26.0** | **19** | **10-15 years** |
| **8.2** | **6** | **15-20 years**  |
| **1.14** | **2.7** | **2** | **0 training courses**  | **Training courses**  | **6.** |
| **39.7** | **29** | **5 training courses** |
| **24.7** | **18** | **5-10 training courses** |
| **16.4** | **12** | **10-15 training courses** |
| **15.1** | **11** | **15-20 training courses** |
| **0.86** | **2.7** | **2** | **0** | **Extension seminars** | **7.** |
| **52.1** | **38** | **Untel 5** |
| **24.7** | **18** | **5-10** |
| **17.8** | **13** | **10-15** |
| **1.4** | **1** | **15-20** |

With regard to the ages of agricultural employees, the ages came in the first place from 35 to 45 years, at a rate of 36.1%, and came in the second place for ages from 25 to 35 years, at 34.7%, followed by ages over 45 years at 20.8%, and finally, businesses under 25 years ranked at 8.3% and this is a good indicator that most of the agricultural employees’ ages are of productive ages, which can be benefited from in a wider and long-term manner, and this is consistent with the study (Saleh and Man, 2017). In the field area of the educational level of agricultural employees in Anbar Governorate, the study indicated that more than half of the employees hold a bachelor’s degree at a rate of 56.9%, followed by 23.6% for employees who have a diploma, while the study showed that those with a master’s degree were 12.3%, while those with a certificate.

The preparatory rate was 5.6%, and finally 1.4% of the PhD holders, and this explains that most of the employees hold a bachelor’s degree upwards, and this gives an indication that the employees are able to perform their tasks in an appropriate manner and provide information to farmers appropriate to develop their agricultural reality ( Saleh et al 2022). With regard to the social status of employees, the majority of employees were from the married category, at a rate of 80%, followed by 12% for the unmarried, and the last 5% for the divorced category. This is also a good indicator that married couples work hard and are responsible towards their work to provide the best. This study agrees with what was stated in the study (Muzna et al, 2021).

The results of the years of work in the agricultural sector, indicated that the highest percentage was for the period of work from 5 years to 10 years, with a total percentage of 41%, followed by 26% for the period from 10 to 15 years, and thirdly 23% for employees who have worked less than 5 years, and finally 15 years to 20 years, 8%. This indicates that some employees have little experience and that is why they need more training during their job to increase their experience and provide the best (Saleh et al, 2022). Obtaining training courses during their career work, indicated that the highest percentage was 39% for training courses only 5 training courses, and 16% for those who obtained the number of training courses from 10 to 15 training courses ranked second, and then came 15% For holders of a number of courses from 15 to 20 training courses. Finally, 2% of employees who did not receive any training course came, so all employees must receive training courses to increase their skills, knowledge and experience in their field of work, and this is indicated by a study (Saleh and Man, 2017).

The results showed that there is a need for specialized training, so it is necessary to conduct survey studies of the needs of farmers and agricultural producers of the necessary training courses in the field of agricultural extension services to improve production practices, enhance crop productivity for various agricultural activities, and preserve and sustain natural resources. (Saleh, 2022). In the last field regarding the counseling seminars, 52.1% came first, followed by 24.7% for those who obtained 5 to 10 counseling seminars, then 17.8% for those who obtained 10 to 15 seminars, and then 2% for those who did not receive any counseling seminars. A percentage of 1.4% for those who have received a number of 15 to 20 counseling seminars, and this indicates that most employees have received counseling seminars, and everyone must obtain a variety of counseling seminars to develop their skills and experience in their work tasks (Saleh et al, 2022).

1. ***Satisfaction with the Extension Program***

There are many broad responsibilities of the extension cadre beyond understanding the local culture and the agricultural situation. One of these important responsibilities is to establish and build relationships of change to reach development with farmers. Based on the foregoing, the extension cadre must have influence and influence on the farmers’ decision to say and use the new agricultural technology, and the farmers’ view must be strengthened.

**Table 2: Represents the Satisfaction with the indicative programs**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No**  | **Extension program name** | **Satisfaction Level** | **Mean** | **S.D** | **T –Test** | **Rank** |
| **Low** | **Average**  | **High** |
| 1- | Functional training courses | 15 | 40 | 16 | 2.01 | 0.66 | 0.177 | 12 |
| 2- | Extension seminars | 3 | 31 | 37 | 2.47 | 0.58 | 6.928 | 1 |
| 3- | Field days | 14 | 33 | 24 | 2.14 | 0.72 | 1.642 | 9 |
| 4- | Brochures | 14 | 31 | 26 | 2.16 | 0.73 | 1.932 | 7 |
| 5- | E-training and electronic workshops | 16 | 26 | 29 | 2.18 | 0.78 | 1.870 | 6 |
| 6- | Internet for agricultural sites | 27 | 23 | 21 | 1.91 | 0.82 | 0.868 | 15 |
| 7- | agricultural books | 22 | 27 | 22 | 2 | 0.79 | 0.000 | 14 |
| 8- | Colleges of Agriculture | 19 | 31 | 21 | 2.02 | 0.77 | 0.304 | 11 |
| 9- | agricultural research centers | 8 | 38 | 25 | 2.23 | 0.64 | 3.130 | 3 |
| 10- | Field visits | 12 | 32 | 27 | 2.21 | 0.71 | 2.483 | 4 |
| 11- | Agricultural Conferences | 15 | 29 | 27 | 2.16 | 0.75 | 1.883 | 8 |
| 12- | agricultural cooperative societies | 14 | 36 | 21 | 2.09 | 0.70 | 1.190 | 10 |
| 13- | Website of the Agricultural Extension Department | 12 | 33 | 26 | 2.19 | 0.71 | 2.337 | 5 |
| 14- | Through Facebook or WhatsApp | 9 | 33 | 29 | 2.28 | 0.66 | 0.177 | 2 |
| 15- | Through television and radio programmes | 15 | 41 | 15 | 2 | 0.58 | 6.928 | 13 |

To the extension cadre as an efficient, capable and highly qualified cadre and has what is useful to publish and deliver it to the rural population. As for the farmers’ reluctance to deal with the extension cadre, the extension staff can encourage farmers to present their problems and the extension staff understand the obstacles to agricultural production by evaluating the farmers’ point of view (Chiranjeeta et al 2021).

The results of the study indicated in Table 2, that the best level of job satisfaction in the first place was around the counseling seminars, with an average of 2. And a standard deviation of 0.66, for employees to receive a large number of seminars as in Table 1, and this is a useful indicator and indicates the efforts of the extension departments to develop the capabilities of their employees, by engaging them with a larger and varied number of counseling seminars.

While it came in second place (through Facebook and WhatsApp) with an average of 2 and a standard deviation of 0.66, and after agricultural research was an average of 2.23, and in Table 2, the rest of the results can be observed sequentially more accurately. And it was ranked last in terms of internet job satisfaction for agricultural sites, because of the huge amount of information, as well as the fact that some sites are for the purposes of advertising for their products, in addition to that some sites are considered inaccurate in scientific information, and this is what is referred to the study of each of (Santoro et al, 2022; and Umar et al, 2018).

The efficiency of the extension cadre and the farmers’ awareness of the role of the extension staff is affected by the extent of the extension staff’s training and ability in the social and economic aspects, their practical experience with farmers, as well as their contacts and interactions with various researchers specialists to develop, devise and adapt new technology in line with the existing situation. According to the sound practical methods that suit their agricultural situation and the level of skills and information they need to make the economic development process successful (Saleh, 2022).

1. ***Agricultural Information Sources***

Rural agricultural extension programs are of great importance to poverty alleviation programs, as they have proven to be a driver for enhancing agricultural productivity for agricultural activities in many countries, including developing countries in particular. As this allows farmers to keep pace with modern knowledge in addition to keeping up with the latest agricultural technologies to meet the challenges that they face as a result of their agricultural activities, and at the same time, researchers can design appropriate technologies that apply to farmers' requirements. However, the most challenging significance of agricultural extension programs is to continue to be relevant in a rapidly changing world, which brings continuous challenges to farmers. Different approaches must be used to provide extension services in different situations. Therefore, extension programs should be applicable enough in their approach to remain relevant and sustainable (Maulu et al, 2021).

The results of the study in Table 3 indicate that the highest rank of agricultural resources was through seminars and training courses, with an average of 2.3 and a standard deviation of 0.81. This indicates that seminars and training courses have an effective impact in developing the skills and knowledge of employees to provide them with the required experiences in their work, and this corresponds to what the study mechanism (Saleh et al, 2022) indicated, and it ranked second in terms of benefiting from agricultural resources by the agricultural departments, with an average of 2.25 and a deviation Standard 0.69, and this refers to the high information and knowledge in the departments of agriculture.

The results of Table 3 showed that the results of research and studies ranked third in terms of utilization with a mean of 2.7 and a standard deviation of 0.78. This leads us to interest in publishing the results of modern research among farmers, to develop their knowledge and provide them with modern knowledge and skills, as indicated by the study mechanism (Chiranjeeta et al, 2021). Finally, the use of CD education was resolved, with a mean of 1.76 and a standard deviation of 0.74. This indicates the less use of educational CDs due to the spread of the Internet and the abundant agricultural information in it (Saleh et al, 2022). The results of the study for the rest of the sources mentioned in the study can be clearly and accurately noted in Table 3.

**Table 3: The use of agricultural resources from the point of view of agricultural extension agents**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No**  | **Name of resources**  | **Degree of Benefit** | **Mean** | **S.D** | **T-test** | **Rank** |
| **Low** | **Average** | **High** |
|  | Colleges of Agriculture | 23 | 26 | 22 | 1.99 | 0.80 | -0.10 | 6 |
|  | agricultural offices | 17 | 35 | 19 | 2.03 | 0.70 | 0.35 | 4 |
|  | Through agricultural websites on the Internet | 28 | 22 | 21 | 1.9 | 0.83 | -1.01 | 8 |
|  | Through an experienced and knowledgeable friend | 25 | 33 | 13 | 1.83 | 0.71 | -1.99 | 9 |
|  | Agriculture Departments | 10 | 33 | 28 | 2.25 | 0.69 | 3.04 | 2 |
|  | Using the results of recent scientific research | 19 | 28 | 24 | 2.07 | 0.78 | 0.75 | 3 |
|  | Through modern scientific information and recommendations | 26 | 26 | 19 | 1.9 | 0.79 | -1.05 | 7 |
|  | Brochures | 17 | 35 | 19 | 2.03 | 0.71 | 0.35 | 5 |
|  | Seminars and Training Courses | 16 | 18 | 37 | 2.3 | 0.81 | 3.08 | 1 |
|  | Educational CDs (CDs) | 30 | 28 | 13 | 1.76 | 0.74 | -2.70 | 10 |

The extension cadre is the mutual link between farmers and research organizations, and this communicative role is often performed by the extension staff. This role depends on the knowledge and information to be delivered and transferred. The process of transferring or transferring agricultural technology and making it commensurate with the field conditions requires the extension staff to establish close relations with the various sources of knowledge and information on the one hand, and on the other hand, the problem of the lack of something that can be transferred to farmers is related to the isolation of the extension staff from the sources of technical information and the results of practical research (Saleh et al, 2022).

1. ***Agricultural Problems and Constraints***

The extension cadre urgently needs to realize this kind of communicative relationship that is part of their role. In addition to the officials supervising the guiding organization, they need to realize the importance of this relationship and the field guiding staff’s need for training in the use of scientific information in an accurate and correct manner. Within this context, one of the activities practiced by the extension staff includes the consolidation of change by providing and delivering promotional messages (extension messages) to farmers that include new information and instructions on how to use a particular new agricultural technology and identify problems and solutions that may result from the use of this technology. In general, the staff the extension has a distinguished role in technological change and the process of transfer and dissemination of new agricultural technology through the employment of integrated skills of a high level (Shaikh, 2021).

**Table 4: Problems and obstacles during the Corona pandemic period.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No**  | **Name of problems and Constraints** | **Impact degree** | **Mean** | **S.D** | **T-test** |
| **Low** | **Average** | **High** |
|  | There is a problem with the difficulty of marketing crops | 43 | 16 | 12 | 1.56 | 0.77 | -4.77 |
|  | Difficulty and delay in obtaining the marketing amount | 27 | 30 | 14 | 1.81 | 0.74 | -2.07 |
|  | Difficulty transporting agricultural products | 34 | 25 | 12 | 1.69 | 0.74 | -3.48 |
|  | Difficulty in obtaining production materials, fertilizer, seeds, and pesticides | 26 | 30 | 15 | 1.84 | 0.74 | -1.74 |
|  | Dealing with state departments, including agricultural, is complicated | 25 | 30 | 16 | 1.87 | 0.75 | -1.41 |
|  | Agricultural equipment is few and depends on favoritism | 32 | 19 | 10 | 1.69 | 0.70 | -3.68 |
|  | Agricultural equipment is more expensive than the local market | 30 | 27 | 14 | 1.77 | 0.76 | -2.49 |
|  | Poor internet in villages and no coverage | 21 | 30 | 20 | 1.98 | 0.76 | -0.15 |
|  | Lack of smart mobile use in Iraq to use agricultural information | 21 | 35 | 15 | 1.91 | 0.71 | -0.99 |
|  | Agricultural information on the Internet is not credible and conflicting | 20 | 31 | 20 | 2.00 | 0.75 | 0.00 |
|  | Too many agricultural websites cause confusion of information | 31 | 30 | 10 | 1.70 | 0.70 | -3.53 |
|  | Not educating farmers about scientifically credible sites | 31 | 29 | 11 | 1.71 | 0.72 | -3.29 |
|  | There is no support for fertilizers, pesticides or seeds | 35 | 22 | 14 | 1.70 | 0.78 | -3.18 |
|  | The seeds that are distributed are of poor quality | 37 | 22 | 12 | 1.64 | 0.75 | -3.91 |
|  | Marketing silos depend on nepotism and administrative corruption | 35 | 26 | 13 | 1.64 | 0.71 | -4.12 |
|  | Marketing vegetable premiums take more than the farmer benefits from his products | 32 | 26 | 13 | 1.73 | 0.75 | -2.98 |
|  | Agricultural policy is unclear and wrong | 36 | 27 | 8 | 1.60 | 0.68 | -4.83 |
|  | Extension departments are few and do not reach all areas to spread knowledge and modern agricultural information | 39 | 20 | 12 | 1.62 | 0.76 | -4.19 |
|  | Too many security controls impede marketing and lead to a loss of quantity and quality, even marketing | 22 | 31 | 18 | 1.94 | 0.75 | -0.62 |

The results of Table 4 indicated that the highest average of problems and obstacles was the agricultural information on the Internet was of little credibility, with an average of 2.00 and a standard deviation of 0. 75. The Internet poverty in the villages and the lack of adequate coverage in those villages ranked second with Maen 1.98, and a standard deviation 0.76 and this affects the arrival of the information required for farmers to develop their capabilities and develop their villages (Saleh et al, 2022). While the axis of the large number of security controls until the farmers reach the market, which leads to the loss of the quality of their products due to the delay until they reach the market, with an average of 1.94 and a standard deviation of 0.75. It came in the last place in the axis of problems and difficulty in marketing agricultural products, with an average of 1 and a standard deviation of 0. This coincides with the study (Yue Zhan et al, 2021), where the study showed the impact of Covid 19 on agricultural production and rural development. We note from the results of Table 4 that the villages suffer from many obstacles that hinder the development of their agricultural reality.

In addition, there is no adequate support for these villages in addition, and procedures must be reduced during the closures that accompanied the pandemic, as the delay of some products may lead to the damage of many of them some farmers indicated that they were frustrated by the pandemic and started to refrain from farming, in addition to the fact that the security authorities must cooperate extensively with farmers by marketing their products as well as bringing the seeds and fertilizers they need to increase their productivity.

1. ***Relationship between independent variables and dependent variable (the impact of COVID-19) on rural development and its impact on the awareness program.***

The need to build an information base on the extension centers and extension farms and their needs, the preparation of their workers, the supplies they need, their annual plans, the number of courses that will be implemented, and so on. The results of Table 5 showed that the highest effect during the Corona pandemic was the following axis (Transportation costs are rising due to the COVID-19 pandemic) with an average of 2.69 and a standard deviation of 1.11, and this indicates the high costs of transporting agricultural products during the pandemic, due to the large number of controls Security and complete isolation, in addition to the lack of oversight and the lack of accountability of carriers when raising their prices, as well as due to financial corruption and the use of security influence financially, and thus the farmer is forced to pay additional wages to ensure the arrival of their products before they are damaged (Santoro et al, 2022).

It came in second place in terms of the impact of the epidemic (because of the pandemic, the fear of planting some vegetable crops due to the inability to sell them because of its distance from the market (for wholesale market/ vegetable market), with a mean of 2.64 and a standard deviation of 1.13. The reason for this is the fear of farmers From their inability to sell vegetable products, because the wholesale market for vegetables is far from their villages, and because they do not have stores to store their products until the end of the closure, in addition to the great distance between their villages and vegetable markets (Saleh et al, 2022).

In addition, the third ranked in terms of the effects of the Corona pandemic, the axis (Inconsistencies in the local market greatly affected our products, as the price increased in some premiums (wholesale market) and decreased in others / supply and demand), where the mean of the axis was 2.57, standard deviation of 1.20 as the contradictions and differences in the local market have a great impact on selling products at reasonable prices to farmers, as they know that in the neighboring markets the prices are higher than the price at which they sold their products, as farmers in the past had the freedom to move and sell to the neighboring markets, either Now, due to the complete closure between the governorates, it has affected the sale of their products at prices that may not cover the costs of their production, and this of course has a great impact in the future, through their fear of planting products that need to be sold to other governorates as was the normal situation in the past (Saleh et al, 2022).

While the next axis ranked last in terms of the impact of the pandemic (it affected the development of the countryside during the period through the lack of access of government employees to the countryside), with a mean of 2.07 and a standard deviation of 1.09, through the impact on rural development due to the failure of the agricultural staff and the rest of the agencies supporting agriculture to reach the villages and the countryside, as it was in the past when the normal situation was (Santoro et al, 2022). The effects can be clearly and accurately observed through the axes studied in Table 5, to know the effects caused by the pandemic during the last period.

The results of Table 6 on the relationship between the independent variables and the dependent variable, the effect of Covid-19, showed that the relationship was positive, at a significant level of 0.5 and a level of 0.1 for the following variables (work site, age, educational level, number of years of agricultural work, number of training courses, Agricultural information sources, job satisfaction).

**Table 5: Impact of the COVID-19 pandemic on agriculture, food security and rural development.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N0**  | **Impact according to the opinion of the agricultural advisor (✓)** | **Score** | **Mean** | **S.D** | **T-test** |
| **1** | **2** | **3** | **4** | **5** |
|  | Impact on obtaining production inputs (seeds, pesticides, fertilizers, fodder, etc.) | 17 | 25 | 20 | 7 | 2 | 2.32 | 1.03 | -5.47 |
|  | Influencing the marketing of products to other governorates | 12 | 25 | 20 | 10 | 4 | 2.56 | 1.10 | -3.32 |
|  | Its effect on the use of manpower in agricultural fields | 21 | 18 | 16 | 14 | 2 | 2.40 | 1.19 | -4.18 |
|  | Its impact on the crop due to the delay in marketing during urban days and road blocks | 24 | 15 | 15 | 12 | 5 | 2.42 | 1.30 | -3.72 |
|  | It affected the development of the countryside during the pandemic period through the lack of access of government employees to the countryside | 27 | 22 | 15 | 4 | 3 | 2.07 | 1.09 | -7.11 |
|  | Its significant impact on the rise in the price of raw materials in the local market | 18 | 24 | 17 | 9 | 3 | 2.36 | 1.12 | -4.74 |
|  | Its effect is through the lack of some materials in the local market / the greed of traders | 13 | 31 | 21 | 6 | 0 | 2.28 | 0.86 | -6.99 |
|  | Inconsistencies in the local market greatly affected our products, as the price increased in some premiums (wholesale market) and decreased in others / supply and demand | 13 | 27 | 14 | 11 | 6 | 2.57 | 1.20 | -2.95 |
|  | Transportation costs are rising due to the COVID-19 pandemic | 11 | 22 | 19 | 16 | 3 | 2.69 | 1.11 | -2.33 |
|  | Due to the pandemic, the fear of planting some vegetable crops due to the inability to sell them due to their distance from the market (for the wholesale market / vegetable market) | 12 | 23 | 17 | 16 | 3 | 2.64 | 1.13 | -2.61 |
|  | Corona pandemic I benefited from by marketing my products at a good (high) price | 17 | 21 | 19 | 9 | 5 | 2.49 | 1.19 | -3.57 |
|  | The pandemic was greatly affected by the rise in food prices (low prices for agricultural products) | 16 | 27 | 15 | 9 | 4 | 2.40 | 1.14 | -4.36 |
|  | The media gave more than what was needed to the Corona pandemic and caused great fear among farmers | 15 | 27 | 17 | 6 | 6 | 2.45 | 1.16 | -3.95 |
|  | The distance of the health centers from the villages had a significant impact on the difficulty of identifying and treating the infected person with Covid-19 | 11 | 33 | 17 | 6 | 4 | 2.42 | 1.03 | -4.68 |
|  | The policy of cutting roads and urbanization greatly affected the marketing of our products and damaged many of them | 18 | 30 | 10 | 10 | 3 | 2.29 | 1.12 | -5.26 |
|  | The impact of the Corona pandemic on food security in general will be | 20 | 25 | 15 | 9 | 2 | 2.26 | 1.09 | -5.63 |
|  | I think that the Corona pandemic will help to rely on local products instead of imported ones | 21 | 24 | 15 | 9 | 2 | 2.25 | 1.10 | -5.68 |

**1=Very Agree, 2=Agree, 3= Neutral, 4=Disagree, 5=Strongly Disagree.**

***Multiple linear regressions***

Through the results of the study shown in Table 6, it was found that there was a positive relationship between the independent variables in the study (Position, Educational level, Extension seminars, Satisfaction with extension programs, and Agricultural sources) and the impact of COVID-19 on rural development, so the research hypothesis must be rejected. And should be accept the alternative hypothesis, which indicates that there are effects of Covid 19 on rural development, at a significant level of 0.5 as well as 0.1, according to what is shown in Table 6.

Therefore, the Agricultural Extension and Training Department must create an appropriate environment to link farmers with modern information technology in remote villages, in order to reduce the impact of COVID-19 on rural development. In addition, it is necessary to strive seriously to overcome all obstacles to rural development, and to assist in improving extension services in the field of information and communication technology, to raise the capacity of farmers to avoid obstacles that prevent the development of the social and economic status of farmers and rural areas in a broad way (Calvin et al., 2022).

**Table 6: Relationship between Effects of the COVID-19 pandemic on agriculture, Food security and rural development with Independent variables.**

|  |  |  |
| --- | --- | --- |
| **No** | **Independent Variables**  | **ANOVA ONE WAY** |
| **Regression coefficient** | **Mean Square** | **F** | **Sig** |
| 1. | Position | -.291 | 1.35 | 1.79 | .041\* |
| 2. | Age | .388 | 0.88 | 1.19 | .296 |
| 3. | Education level | -.202 | 0.95 | 2.79 | .001\*\* |
| 4. | Marital status | .017 | 0.26 | 0.85 | .674 |
| 5. | Working years | .408 | 0.80 | 0.99 | .505 |
| 6. | Training courses  | .704 | 1.61 | 1.50 | -.068 |
| 7. | Extension seminars | -.33 | 1.04 | 2.04 | .017\* |
| 8.  | Satisfaction with the counseling program | .015 | 0.33 | 0.98 | .476\* |
| 9. | Agricultural sources | -.068 | 1.35 | 1.79 | .367\* |

\*Correlation is significant at the 0.05 level (2-tailed

\*\*Correlation is significant at the 0.01 level (2-tailed).

In addition, the results of Table 6, it is necessary to focus on the educational level in those remote villages, because the knowledge of the children and the rural population will clearly contribute to the people of the countryside developing solutions to overcome all obstacles in a reasonable manner and their acceptance and adoption of the results of modern research in a way that contributes to the development of their social and economic level (Pallavi et al, 2022). As well as, providing good training on modern technologies, information and practices, as indicated by the results of Table 6 (Saleh et al, 2022). The results of the study also showed the effect of satisfaction with the extension programs implemented in the countryside on rural development and this calls for the implementation of development programs for the countryside and in cooperation with rural leaders to choose programs that contribute to the development of the agricultural reality (Kalfin et al, 2022).

Moreover, the results of the study showed the clear impact of information sources on rural development, and this coincides with what the study mechanism indicated an impact on through the educational level and position, which refers to its effects on the countryside through remote villages on the services available in city centers, from the Internet and advanced education, and this corresponds to also from the results of a study (Pallavi et al, 2022). There must be an appropriate distribution of the extension farms among the sprawling villages, in order to assist the provision of equitable guiding services among the villages.

**CONCLUSIONS AND RECOMMENDATIONS**

Through the results of the study, it is necessary to develop fixed future plans for agricultural extension centers and agricultural directorates, and to benefit from the experiences of international organizations specialized in the field of agriculture operating in the governorate. The results of the study showed a training need for some aspects of agriculture, so it is necessary to strive hard to build capacities in all fields of agricultural work, through the establishment of specialized workshops to keep pace with recent developments in the field of agriculture, in order to develop information, knowledge and skills and increase the experiences gained, to benefit from the training organized by international organizations operating in Anbar Province. Training must be according to the job needs that the agricultural departments estimate for their employees.

We recommend future studies to focus more on modern demand-driven methods that allow farmers to participate in identifying solutions to their problems. Planning to establish agricultural extension centers in districts and sub-districts to provide the best services and solve technical problems facing farmers and agricultural producers. In addition, the necessity of appointing competent and qualified employees in agricultural extension with the provision of material and moral support to them in order to advance the productive agricultural reality in the countryside. Also, the necessity of making a change in the curricula for agricultural extension, in the faculties of agriculture and other scientific institutions in the light of international standards. It is necessary to pay attention to specialized guidance and animal guidance, as well as guidance for handling crises, by all extension centers and agricultural departments because of its importance to farmers.

**FUTURE STUDIES:** The researchers were unable to cover the western regions of Anbar Governorate, due to its wide distance as well as the security controls spread between the districts, which require obtaining official approvals to move between remote villages, and the researchers. Also, did not address the marketing obstacles between the governorates, and the state’s policies towards them in light of the Corona pandemic.

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**REFERENCES**

Agricultural Trade& Policy Responses During The First Wave of The Covid-19 Pandemic IN 2020. Food and Agriculture Organization of the United Nations Rome, 2021.

Al-Azzawi, N, N, 2020. Differentiation betweenCounselingprograms from the viewpoint of educational counselors. International Journal of Humanities and Social Sciences. No, 17, Vol, 17. 2020.

Al-Khalidi, A, I. 2012. The Basics of Counseling and Mental Health, Iraqi Books and Documents House for the year 2012.

Charles F. Nicholson a,h, Emma C. Stephens b, Birgit Kopainsky c, Philip K. Thornton d, Andrew D. Jones e, David Parsonsf, James Garrett g. 2021. Food security outcomes in agricultural systems models: Case examples and priority information needs. Agricultural Systems 188 .2021. 103030.

Chiranjeeta, D, Debajit B, and Pallabi D, 2021. Assessment of Agricultural Technology Information Centre of Assam Agricultural University on Personal and Economic Empowerment of Farmers in Jorhat, Assam. Asian Journal of Agricultural Extension, Economics & Sociology, 39 (9): 98-110, 2021; Article No.AJAEES.72226ISSN: 2320-7027.

David, Forkuor and Andrews, Korah . 2022. NGOs and sustainable rural development: experience from Upper West Region of Ghana. January 2022 Environment Development and Sustainability DOI: 10. 1007/ s10668-021-02057-w.

El-Tanobi, M, Omar. 1996. Social Change, Knowledge Foundation in Alexandria,Hamza N, Kulkarni U. A narrative review of the challenges, ethical frameworks, and guidelines in the setting of COVID-19 healthcare and research. Perspect Clin Res [serial online] 2022 [cited 2022 Apr 12];13:70-6. Available from: <https://www.picronline.org/text.asp?2022/13/2/70/342659>.

Kalfin; Sukono; Supian, S.; Mamat, M. 2022. Insurance as an Alternative for Sustainable Economic Recovery after Natural Disasters: A Systematic Literature Review. Sustainability 2022, 14, 4349. https:// doi.org/10.3390/su14074349.

Maulu, S, Hasimuna, OJ, Mutale, B. 2021. Enhancing the role of rural agricultural extension programs in poverty alleviation: A review - Cogent Food & - Taylor & Francis

Md. Tanvir Ahmed, Humnath Bhandari, Prudenciano U. Gordoncillo, Cesar B. Quicoy and, Gideon P. Carnaje . 2022. Diversification of rural livelihoods in Bangladesh. Journal of Agricultural Economics and Rural Development. Vol. 2(2), pp. 032-038, July, 2015. © www.premierpublishers.org, ISSN: 2167-047.

Miguel A. Altieri & Clara I. Nicholls, 2020. Agroecology and the reconstruction of a post- COVID-19 agriculture Agroecology and the reconstruction of a post. Journal of Peasant Studies.

Muhammed Shako, Adunea Dinku, Waktola Mosisa, "Constraints of Adoption of Agricultural Extension Package Technologies on Sorghum Crop Production at Smallholder Farm Household Level: Evidence from West Hararghe Zone, Oromia, Ethiopia", Advances in Agriculture, vol. 2021, Article ID 6674606, 14 pages, 2021. <https://doi.org/10.1155/2021/6674606>.

Muzna Alvi a, Prapti Barooah a, Shweta Gupta a, Smriti Saini b. 2021. Women’s access to agriculture extension amidst COVID-19: Insights from Gujarat, India and Dang, Nepal . Agricultural Systems 188 (2021) 103035. Walter S. de Boef a, , Gareth D. Borman a, Arnab Gupta a Abishkar Subedi a, Marja H. Thijssen a, Amsalu Ayana Aga b, Mohammed Hassena Beko b, Swe Zin Myint Thein c, Win Thein c, Folarin Okelola d, Osundiya Olusegun d, Olusegun Philip Ojo d, Chinedu Agbara e, Geoffrey Otim f, Charles Ssemwogerere f, Bonny Ntare f, Patrick Oyee f. 2021. Rapid assessments of the impact of COVID-19 on the availability of quality seed to farmers: Advocating immediate practical, remedial and preventative action. Agricultural Systems 188 (2021) 103037.

Oruche, C. A, ,and Faisal, M. 2022. Impact of Rural Livelihood Diversification among Rural Household inNigeria. 11 OIRT J. Hm. and Soc. Sci., Vol. 1, No. 2, September – October, 2021e-ISSN:2814-1008 DOI: <https://dx.doi.org/10.53944/ojhss-2105>.

Pallavi, S., M. A., Aariff, K., H. Tanguturi , S., Marlabeedu, B. T. and Shankaraiah M.. 2022. Impact of COVID-19 Lock down on Farmers of Nalgonda District, Telangana State. Indian Journal of Extension Education Vol. 58, No. 4 (October–December), 2022, (10-14).

Saleh, J M, 2022. The Role of Workers in the Agricultural Sector in Protecting Natural Resources towards Sustainable Development. South Asian Research Journal of Agriculture and Fisheries. | Volume-4 | Issue-2 | Mar-Apr -2022 | DOI: 10.36346/sarjaf.2022.v04i02.002.

Saleh, J. M., and Man, N. 2017. Training Requirements of Agricultural Extension Officers Using Borich Needs Assessment Model. Journal of Agricultural & Food Information, Taylor, Francis. DOI: 10.1080/10496505.2017.1281748.

Saleh, J.M, and Elhamoly, A., I. 2021. Estimation of Executive Extension Needs of Rural Women in the Field of Rationalizing Food Consumption Using Borich’s. Asian Journal of Agricultural Extension, Economics &Sociology. 39(10): 83-95, 2021; DOI: 10.9734/ AJAEES/ 2020/ v39i1030668

Saleh, M, Jasim,. Aljanabi, R, A, Ali, and Ghaffoori , T, Anwer . 2022. Using the Internet in counseling work during the (Covid 19) Corona pandemic in Anbar province, Iraq. Technium Vol. 4, No. 7 pp.40-51 (2022). DOI: <https://doi.org/10.47577/technium.v4i7>.

Saleh, M, Jasim,. Ibrahim, M, Ahmed , and Ghaffoori , T, Anwer. 2022. Using of the Supporting Awareness Program to Increase the Productivity of Wheat Crops During the Covid 19 Pandemic of Anbar Province/Iraq. Technium Vol. 4, Issue 4 pp.21-31 (2022). https://doi.org/10.47577/technium.v4i4.5636.

Santoro L, Falsetti L, Zaccone V, Nesci A, Tosato M, Giupponi B, Savastano MC, Moroncini G, Gasbarrini A, Landi F, Santoliquido A, on behalf of Gemelli against COVID-19 Post-Acute Care Study Group. Impaired Endothelial Function in Convalescent Phase of COVID-19: A 3 Month Follow Up Observational Prospective Study. Journal of Clinical Medicine. 2022; 11(7):1774. <https://doi.org/10.3390/jcm11071774>.

Santoro, L.; Falsetti, L.; Zaccone, V.; Nesci, A.; Tosato, M.; Giupponi, B.; Savastano, M.C.; Moroncini, G.; Gasbarrini, A.; Landi, F.; Santoliquido, A.; on behalf of Gemelli against COVID-19 Post-Acute Care Study Group. Impaired Endothelial Function in Convalescent Phase of COVID-19: A 3 Month Follow Up Observational Prospective Study. J. Clin. Med. 2022, 11, 1774. https://doi.org/10.3390/jcm11071774

Shaikh, T, H , 2020. Impacts of COVID-19 on the Agri-food Sector: Food Security Policies of Asian Productivity Organization Members, The Journal of Agricultural Sciences - Sri Lanka, Vol 15, No. 2, May, 2020. Pp 116-132.

Umar, S,. Man, N,. Shuaibu, H, and Saleh, J, M,. 2018. The Role of Competency Dimensions And Organizational Support In Climate Change Advisory Service Delivery. PEOPLE: International Journal of Social Sciences, 3(3), 1076-1091.

Yue Zhan a , Kevin Z. Chen. 2021. Building resilient food system amidst COVID-19: Responses and lessons from China. Agricultural Systems 190 (2021) 103102.