ECONOMIC EFFECTS OF INTENSIFYING THE USE OF AGRICULTURAL INPUTS AND MODERN TECHNOLOGIES ON THE WHEAT PRODUCTIVITY IN IRAQ.

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ABSTRACT

This research aimed to illustrate the significant role of modern technology packages in agriculture, in particular in the growth of wheat cultivation. In this research will attempt to use O-Ring method. The purpose our using of this method is to prove that the modern technological packages used in agriculture, wheat cropping combined have a significant impact on increasing the productivity of the wheat crop in Iraq. A sample is taking from 290 farms, by divided into three governorates Namely Wasit, Babil and Diwaniyah. The packaging used to grow wheat was micronutrients, seeds, fertilizers, laser-level potassium sulphate, seeds, potassium sulphate fertilizers, Pallas herbicide, Atlantis herbicide and the farming cycle. All these elements were expressed; as A3i. This is an indicator of the intensification of agricultural inputs for developing wheat cultivation in Iraq. The results of the analysis showed that there is a high degree of correlation between each of the modern technological inputs and the rest of the modern inputs. The results also indicated that there is a growth and development in the productivity of the wheat crop because of the use of modern technologies, as there is a correlation between the use of the modern technology package and the development of the productivity of the wheat crop in Iraq.

Keywords: O-Ring function, Wheat, Technology package, Productivity, Correlation.

الآثار الاقتصادية لتكثيف استخدام المدخلات الزراعية والتقانات الحديثة على إنتاجية القمح في العراق.

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المستخلص:

يهدف البحث إلى توضيح الدور المهم لحزم التقانات الحديثة في الزراعة، ولا سيما في نمو زراعة القمح. في هذا استند البحث الى استخدام طريقة O-Ring. الإنتاج الحلقي لإثبات فرضية أن الحزم التكنولوجية الحديثة المستخدمة في زراعة محصول القمح مجتمعة لها تأثير كبير في زيادة إنتاجية محصول القمح في العراق. أخذت عينة من 290 مزرعة موزعة على ثلاث محافظات وهي واسط وبابل والديوانية. كانت الحزم المستخدمة في زراعة القمح عبارة عن العناصر الصغرى، البإذره المسمدة، التسوية الليزرية، كبريتات البوتاسيوم، البإذرة المسمدة مع كبريتات البوتاسيوم، مبيد الأدغال بالاس، مبيد الأدغال اتلنتس، الدورة الزراعية. تم التعبير عن كل هذه العناصر بالرمز A3i. وهو مؤشر على تكثيف المدخلات الزراعية لتطوير زراعة القمح في العراق. أظهرت نتائج التحليل أن هناك درجة عالية من الارتباط بين كل واحدة من المدخلات التكنولوجية الحديثة وبقية مدخلات الحديثة كما أشارت النتائج الى وجود نمو وتطور في إنتاجية محصول القمح نتيجة لاستخدام التقانات الحديثة حيث هناك ترابط بين استخدام حزمة التقانات الحديثة وتطور إنتاجية محصول القمح في العراق.

الكلمات المفتاحية: دالة الإنتاج الحلقي، القمح الحزم التكنولوجية، الإنتاجية، الارتباط.

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INTRODUCTION

Wheat is a grain crop and covers the largest dunm of crops on Earth. What is at the forefront of strategic crops globally because of its nutritional significance? It is an important source of food for 35% of the global population (15). The cultivation of wheat in Iraq is the first strategic crop for the cultivated area and agricultural production as well as for agricultural revenue. However, it is an important culture in Iraq, which faces very serious challenges. In addition, one of the most prominent of those challenges. In addition, the problem is the lack of commitment by farmers to using or applying modern technology packages in the wheat crop (2). Considered to have the most significance on increasing wheat productivity. This problem is the reason of the low production of wheat in Iraq (17), did not meet the local needs of this crop(15). To find the solutions to this problem requires searching for sources that increase its production vertically and reducing the issue of horizontal expansion in the area to increase production. In accordance with the above, the objective of this research is to study the possibility of increasing agricultural inputs to increase productivity. Accelerating agricultural productivity growth in Iraq and conducting an empirical measure of input density, in which we estimate the agricultural input intensification index (4).This takes into account the correlations between farmers' adoption and using modern inputs. Then summarizes these decisions in one variable. Then we assess the impact of agricultural intensification on crop yield and the causes of unobservable heterogeneity. Where this study presupposes that farmers adopt modern technology, represented by modern technological ensembles. In addition to traditional inputs, this will have a significant and positive impact on farmland productivity and will lead to increased adoption of additional technologies. Consequently, obtain higher yields by farmers who adopt modern technology, which is the one, named in these research technology packages. The study sample consists of 290 farms to produce wheat in Iraq, divided into three governors, namely Wasit, Babil and Al-Diwaniyah. Where more than one product input, used. On these farms, including traditional inputs. As the seeds. Therefore, the optimal percentage of seeds; that should be added to planting a dunm of wheat cultivation is 45 kg / dunm. Based on recommendations by the Department of Agricultural Research and the General Agricultural Extension Authority of the Iraqi Ministry of Agriculture. However, we did see that the majority of farmers use more seed per dunm. When the rate of seed use per dunm. About 59 kg / dunm. Moreover, the reason for these seeds are improved seeds they are of two types: Ibaa 99 and the second type is lower than 99. Where these seeds subsidized by the state and the percentage of support for farmers can reach 70% of their real price in the local market. As for the second traditional source of income it is phosphate fertilizer DAB. It is worth mentioning that the recommended quantities of phosphate fertilizer DAB by the Agricultural Research Department and the General Authority for Agricultural Extension are 50 kg / dunm. While farmers use approximately 53 kg/dunm of this fertilizer (3). So reason is also due to the support provided by the state to farmers. Where the state provides subsidies of up to 50% of the actual needs of the farms, which led to a reduction in the price of this fertilizer in the local market and the ability of the farmer to purchase from the local market to cover the remaining part of the need for this fertilizer. Another traditional input also used, which is nitrogen fertilizer urea. The optimum amount recommended by the Agricultural Researches Department and the General Authority for Agricultural Extension in the Ministry of Agriculture, as well as some agricultural research centers is 75 kg / dunm, while farmers use approximately 87 kg / dunm. In the farms of wheat, crop production. The reason is that approximately 75% of this using subsidized by the state, and the remaining quarter actual easily purchased by farmers from the local market because of the low price of urea fertilizer in the local market due to the great support provided by the state to farmers. As for the use of modern technological packages, the use of modern technological packages had an important role in the production of wheat crop. That used by the study sample, which amounted to 290 farms divided into three governorates, namely Wasit, Babil and Diwaniyah, was collected through questionnaires and personal interviews with farmers.

MATERIAL AND METHOD

we are developing the conceptual framework with the highlights importance of adopting modern inputs as a package for accelerating productivity growth of wheat crop. We also carry out our methodology for measuring the intensification of agricultural inputs using an indicator A3i. This indicator combines the intensification of agricultural inputs with its multiple dimensions. Calculate the integration of the inputs into the agricultural production function with a focus on creating an indicator A3i to measure the intensification of agricultural inputs. We develop a simple conceptual framework to illustrate the importance of harnessing the strategic integration of inputs while adopting concurrency. Our model based on the concept of the O-Ring production function: $y = L^{\alpha}\left(\prod_{i=1}^{n} (1+q_i)\right)B$ ... 4 [1] Standard production functions; usually expressed in terms of input levels. The O-Ring has the specificity that it expresses the output as a function of the quality of the input. In Kramer's original formulation 1993 (12). To illustrate, for example, a company uses a production process consisting of several tasks. A single worker performs each of these tasks. Workers characterized by their specific quality as the probability of successfully performing a particular task. Failure to perform a single task can cause in the complete destruction of the final product (3). Uses this type of production function model to derive a number of interesting predictions regarding the demand for certain labor, firm size, wage differentials and productivity between developed and developing countries.

Study sample and questioners: The sample information taken by means of a questionnaire, where the research sample was determined in three Iraqi governorates, namely Wasit, Babil and Al-Diwaniyah. The research sample consisted of 290 wheat farms. The information collected from farmers through personal interview and sometimes by phone call. The useful data used to analyze in this research. To adapt this framework to our analysis, we begin with the important observation that agriculture is like most production processes, in that it consists of and activities of a farmer. Different from the original O-Ring model, our focus is not on skills but rather on the technology. We assume that each activity requires a single entry chosen within a group ranging from the most traditional to the most advanced. For example, to produce wheat, farmers perform many activities related to land preparation, seed selection, soil amendment, crop protection and harvesting. Weak performance during a single activity due to a low input application rate can significantly reduce the value of the output (18). To illustrate that, we take the following two examples. Suppose a farmer uses hybrid seeds, but fails to apply mineral fertilizers to soil that has depleted nutrients. The production value can be much lower than expected. Assuming that the farmer uses the optimum amount of fertilizer, but fails to protect the plant during the vegetative stage of growth, and then the infestation by weeds, diseases or pests can cause a huge damage to production. For each input i, farmers choose an application level qi and measures qi depend on the type of input (5). For instance, if the variable is seeds, qi takes a value between 0, 1 where 0 indicates adoption of conventional seeds and 1 indicates adoption of hybrid seeds. In the case of fertilizers, manures, pesticides or herbicides qi measures the normal application rate. We rate q^{max}as a maximum that would produce the maximum production (4) and so we have the equation be calculated it by dividing the observed application rate $q^{obs}$by the optimal application

$q_i = 0$ indicates that the farmer did not use the input; $q_i = 0.50$ means that the rate of application of the farmer is half the optimum level. Suppose farmer B who has used minimum modern inputs of production per dunm as well as if all activities are zero intensities. It would be useful to show it :

$B = B\ X_p, X_h, X_v \dots$ 2

Where the farmer as a function of the agricultural plot= Xp

X_v= represents the characteristics of the farmers' community In line with the agricultural evidence

B = we assume that modern inputs increase production beyond the minimum.

Allow agricultural labor to enter the traditional Cobb-Douglas production function and write the function production function O-Ring we have modified as follows, where the Cobb-Douglas function as indicated in the equation:

$Y = c \cdot K^{\alpha} \cdot L^{\beta}$....3

Where

• Y = represents the level of production
• K = capital
• = L represents work
• c = proportionality factor or relativity factor.
• c, α and β = are technology-defined constants.

•The O-Ring function is: $y = L^{\alpha}\left(\prod_{i=1}^{n} (1+q_i)\right)B$ ... 4

It can be clearly see that there is an essential difference between the standard Cobb-Douglas production function and the O-Ring modeled in equation 4.

- Where the main difference in the selection variables lies in the farmer's profit function
- Production is formulating in terms that observed application rate, and how close this rate is an agriculturally optimal rate
- Another major difference noted (14) relates to the incompatibility of the inputs.
- Since the level of intensity, entering the production function multiplied, one input cannot increase to compensate for the lost yield due to lower intensification in the other inputs.
- Another important feature of this O-Ring production function is that it shows an increasing yield for the package by using the inputs rather than the individual inputs (10).

If we assign the price of production to one and infer it was p count the cost of choosing the level of intensification Qi through labor cost. The farmers profit maximization equation will be formulated (21).

$$\underbrace{\text{Max}}_{L,q_i} L^{\alpha}\left(\prod_{i=1}^{n} (1+q_i)\right)B - \sum_{i=1}^{n} p(q_i) - wL \;...\; 5$$

The condition of the first order associated with L and each qi are:

$$...\; 6\; \frac{\partial y}{\partial q_i} = L^{\alpha}\left(\prod_{i\neq 1}^{n} (1+q_i)\right)B = \frac{\partial p(q_i)}{\partial q_i}$$

$$\frac{\partial y}{\partial L} = \alpha L^{\alpha-1}\left(\prod_{i=1}^{n} (1+q_i)\right)B = w \;\;...\;\; 7$$

Equation 6 indicates that in equilibrium, the farmers will incentive up to the point where the marginal return output due to a small increase in inputs I equals cost. Associated with this increase. Otherwise, it is better for the farmer not to make the investment. Similarly, equation 7, which equates the marginal labor product to the labor cost including the opportunity cost of family labor, translates the optimal conditions for labor demand. Together, these equations characterize optimal levels of agricultural input and labor intensification. The conditions of the first order and the intrinsic properties of the O-Ring function (11) indicate that the adoption of modern technologies as a package is associated with an increase in production and productivity. To see this, we note that the production function shows a positive and transverse derivation.

$$\frac{\partial^2 y}{\partial q_i\, \partial}\; \left(\prod_{i\neq 1}^{n} (1+q_i)\right) = L^{\alpha}B > 0 \;...\; 8$$

In other words, marginal productivity with respect to the level of intensity of input Qi increases at the level of intensity of the other inputs taken as a whole, and thus, if farmers with high values of the first in -1 inputs choose a similarly high intensification of the n inputs, the output will be higher. In other words, having a holistic intensive approach in all activities will lead to higher productivity. In this study, we test the means by evaluating productivity gains. Depend on the simultaneous use of multiple inputs (20).There are two ways to create a parametric approach indicator that uses a well-defined function of integrating the observed variables into a single variable which are statistical methods for extracting a component present within a set of observed variables (16). Each approach has its advantages and weaknesses, and the choice between them depends on the constraint conceptual, the availability and quality of data and the preferences of researchers. However, the two approaches generally lead to qualitatively similar results. In this manuscript, we will only discuss the parametric approach (9). Which is the standard approach to A3i estimation is a direct application of our conceptual model, which indicates a multiplicative aggregation of individual input densification variables into a single index as follows:

$A3i = \prod_{i=1}^{n} (1 + q_i)$ with $q_i = \frac{q_i^{obs}}{q_i^{max.}}$ ... 9

where qi obs is the rate of observed application of inputs i and q max i is the rate of application that would produce the highest level of output i.e. optimal application This index is comparable across plots, households, regions, and countries and is normalized so that be the lowest possible for a single value and correspond to

$q_i = 0, \forall i = 1..n ...$ 10And the maximum value 2^n $q_i = 1, \forall i = 1 ... n$

In this formula, we need to estimate $q^{max\ i}$ independently for all farmers to reduce the risk of homogeneity in the yield regression. As an ideal area where information on qmax i should come from agricultural recommendations on the optimal rate of application. Suitable for local growing conditions, for seeds, the optimal recommendation is straightforward, using high yielding hybrids that are treated to perform relatively well under different and unfavorable growing conditions such as drought, flood, etc. (7,8). Agricultural research in empirical stations or in the field it considered the main source of information about optimal application rates in the absence of relevant data for the optimal input in cultivation quantified. To a maximum of qi max, using our observational data and regression-based methods. The same methods followed in 2014 to estimate the unconditional yield response functions for different inputs of the world Johnson, 2018. We use the following quadratic response function.

$$y_{pht} = \alpha_0 + \alpha_1 q_{pht} + \alpha_2 q_{pht}^2 + \beta_1 W_{pt} + \beta_2 X_{ht} + U_{pht} \quad ...11$$

Where pht =is the yield of the plot p belonging to the farm and family h during the crop season *t*.

q_{pht} is the rate at which the input is applied, and q_{pht}^2 is the quadratic term; W_pt and X_ht respectively represent plot and farm level variables showing crop yield, U_{pht} is a compound term containing unobserved plot heterogeneity, unobserved bed heterogeneity ht, time constant effect yt, and random errors.€ pt. The quality of the estimated optimal input application rates depends on the quality of the estimated coefficients. In the yield response function by including the level of detailed plots of land and the characteristics of the level of the farming family and application methods (15), we control the various factors that explain the use of inputs and yield jointly. . However, there are reasonable grounds to believe that there may still be unnoticed factors such as farmers' capacity that affect both input use and yield. If this is the case, the optimal coefficients and application rates, therefore; it will be biased (1). To counteract the threat of heterogeneity, the correlative random effect CRE method developed by (15) is incorporated. The CRE approach helps address the heterogeneity of unobserved plot and farmer level and its correlation with observations by making a model as a function of the more accurate and plausible mean of the time-varying variables, it consists of a CRE substitution. The homogeneity due to selection handled in the dependence of the inputs by using an effective variable. The ideal tool in this context would, need to explain the farmer's decision. To adopt all inputs but remain unrelated to the crop (19).After this study, variables that measure farmers' access to inputs such as distance to markets, membership in farmers' organizations and prices can used as tools that contribute to the adoption of modern inputs in agricultural production. The Approach of Control Function CF allows directly to test the validity of the tools to confirm or reject the problem of homogeneity is an overview of the methods of control function CF to solve the problem of the explanatory variables internal EEV linear and non-linear models. CF methods can often be justified in situations where "plug-in" methods it has known to produce inconsistent estimates of parameters and partial effects. Usually, CF approaches require assumptions less than the maximum probability, and CF methods are computationally simpler. A recent focus is on estimating the mean partial effects, along with theoretical results on the nonparametric determination (22). Once you estimate equation 11 separately for each type of input. We can derive the optimal inputs, which are unconditional input application rates by setting the first derivative of the yield function with respect to q to zero. It follows that the optimal rate is-

$$\frac{\partial y}{\partial q_i} = \hat{\alpha}_1 + 2\hat{\alpha}_2 q_i = 0 \Rightarrow \hat{q}_i^{max} = \frac{\hat{\alpha}_1}{2\hat{\alpha}_2} \quad ... \quad 12$$

The estimated value $\hat{q}_i^{max}$ Used later.

To calculate the index of intensification of agricultural inputs as follows

$$A3i = \prod_{i=1}^{n} (1 + q_i) \text{ . with } q_i = \frac{q_i^{obs}}{q_i^{max}} \text{ and } \hat{q}_i^{max} = \frac{\hat{\alpha}_1}{2\hat{\alpha}_2} \quad ... \quad 13$$

While indexes are useful constructs in economics and other social sciences for analyzing various issues, they have a number of drawbacks that must know it.First, the selection of a set of inputs to calculate the index is often random. This analysis is limited to the variable inputs that decisions must make in each growing season. Where such our index does not capture all production and investment decisions of farmers, by farmers as we compute the index on the set of inputs comprising both yield-enhancing inputs hybrid seeds and nutrients and loss-reducing inputs insecticides and herbicides. Second, index often suffers from an "index number problem" which refers to an insufficient measure of change over time when several fundamental factors change. While it is generally applicable to indicators that use prices and quantities, the index problem is also relevant to this analysis. In our case, we assume that the agriculturally optimal application rates are constant. The equations of standard quantitative analysis (microeconomics) used in the analysis of the model, where the Eviews program and the spss program used, and the equations 12 and 13 applied in this research. Data analysis of all modern technological packages that were used to develop the productivity of the wheat crop in the Iraqi governorates under study, which are Wasit, Babil and Al-Diwaniyah, has been applied. These technology packages used as follows:-

1-Micronutrients: - Where they added to plants at a rate of 125 g / dunm by spraying, which is copper, magnesium, manganese, iron and zinc, and it used with all inputs in the production of wheat crop

2- Fertilized seed: - Fertilized seed used for an area of 10 dunms per farm.

3-Laser leveling - It used for an area of 10 dunms per farm.

4-Potassium sulfate: -Used for an area of 2 dunms per farm.

5-Fertilized seed with potassium sulfate: - It used for an area of 2 dunms per farm.

6-Palace bush pesticide: -Used on an area of 4 dunms per farm

7-Atlantis bush pesticide: - It used for an area of 4 dunms per farm, and it is provided, by the Plant Protection Department of the Ministry of Agriculture at a rate of 20%.

8 The farming cycle: - The farming cycle uses a cultivation system wheat, mung bean, wheat with an area of 10 dunms per farm. To clarify the importance of using technology packages in the production process of the wheat crop in the sample of the research, the number of times the use of the technological package and its relative importance have been clarified, as shown in Table 1.

Table 1. number of frequency of use of each technology package

Package name	Percentage %	number of frequencies	package code
Micronutrients	**2.72**	**78**	**0**
Fertilized of seed	**15.2**	**45**	**1**
laser leveling	**2.8**	**8**	**2**
potassium sulfate	**17.9**	**50**	**3**
Fertilized of seed with potassium sulfate	**11.0**	**34**	**4**
Place exterminator of weed	**12.1**	**35**	**5**
Atlantis exterminator of weed	**10.3**	**30**	**6**
farming cycle	**3.4**	**10**	**7**

Source: Calculated by the researcher based on the research sample and SPSS frequency table analysis

Through Table. 1, it is clear that the package of micronutrients had the highest frequency among the other packages, as its frequency was 78 recurrences, As for the farming cycle package, which farmers used to rely on in agriculture, which is wheat, mung bean, wheat, it had the least frequency in the table, and it amounted to 10 recurrences during the study sample. Where the potassium sulfate bundle, which had 50 recurrences, followed by the fertilized seed bundle, which had 45 recurrences. The share of Atlantis pesticide was 30 recurrences during the analysis of the study sample, which, as we mentioned earlier, was 290 farms divided into three governors Wasit, Diwaniyah, Babil. Figure. 1Below shows the number of frequencies for each technological package during the production process.

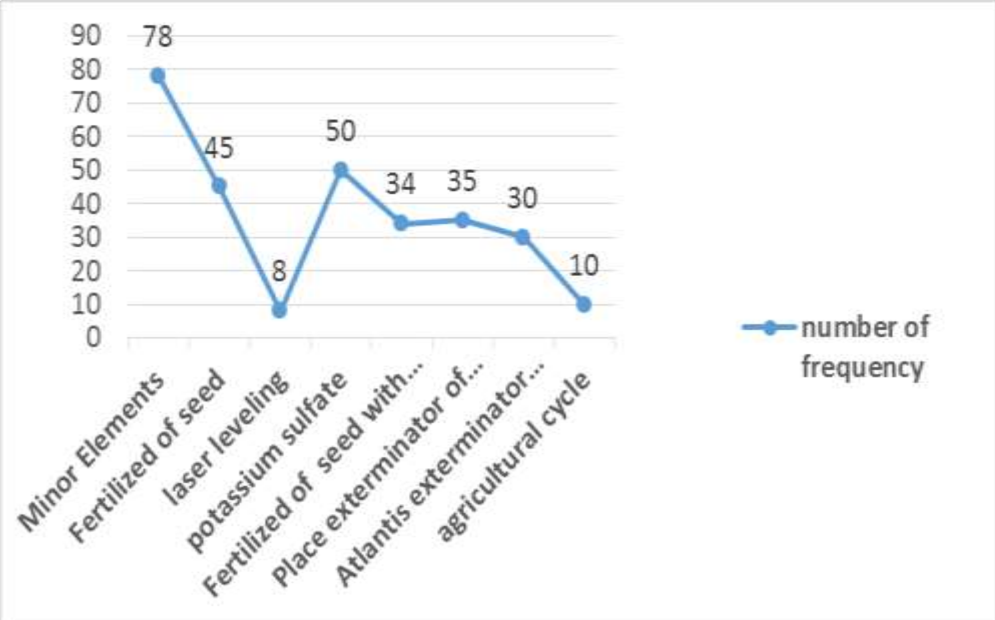

Figure 1. the number of frequencies for each technological package

Source: Figure done by the researcher based on the frequency analysis table

Aggregation: Weighted averages used to aggregate the plot level A3i. For a given crop C to the level A3i at the household level with the weights considering the area share of each plot more accurately where if the household h produces a crop c on different plots NC with size up, c each, then The family level A3i has for this family (6) for this crop is:

$$A3i_c^h = \sum_{p=1}^{n_c} A3i_{p,c} * \frac{a_{p,c}}{\sum_{j=1}^{n_c} a_{j,c}} \quad 14$$

Index of agricultural input intensification for plot p of crop C

A3i at the family level for all crops: - We can also use weighted averages to aggregate the A3ihc crop level into the farmer household level A3ih. Regardless of the crop produced, with weight being the relative importance of each crop in the farm enterprise and the aggregation formula is

$$A3i^h = \sum_{c=1}^{C} A3i_c^h * \frac{\sum_{j=1}^{n_c} a_{j,c}}{\sum_{c=1}^{C} \sum_{j=1}^{n_c} a_{j,c}} \quad ... \quad 15$$

Where C is the total number of crops produced by family

$\sum_{j=1}^{n_c} a_{j,c}\ h$ the total area allocated to plot c is the sum of the area of all crop plots $\sum_{c=1}^{C} \sum_{j=1}^{n_c} a_{j,c}$ the total cultivation area for all crops

RESULT AND DISCUSSION

Through the data obtained from the selected sample, which numbered 290 farms distributed within the Wasit Governorate, Babil Governorate and Al-Diwaniyah Governorate, where the productivity rate per dunm for each of the aforementioned inputs is as follows:

Table 2. the average productivity per dunm of the group of technological production packages used with statistical measures

Package name	coefficient of %variation	standard error	standard deviation	number of samples	Productivity rate kg/dunm	package code
Micronutrients	28.06	27.42618	242.22148	78	863	0
Fertilized of seed	26.69	38.32053	257.06192	45	963	1
laser leveling	20.42	85.48078	241.77617	8	1184	2
potassium sulfate	21.9	36.15866	255.68035	50	1166	3
Fertilized of seed with potassium sulfate	17.09	35.32304	205.96694	34	1205	4
Place exterminator of weed	23.09	41.18129	243.63181	35	1055	5
Atlantis exterminator of weed	26.9	49.73707	272.42116	30	1009	6
farming cycle	17.6	60.54049	191.44584	10	1085	7
Total	-	-	-	290	-	-

Source: calculated by the researcher based on the data of the study sample

Table 2shows the sample size consisting of 290 farms, in which the highest average productivity was 1205kg/dunm for package 4, which had 34 farms with a standard deviation of 205.9, with a standard error of 35.3, The coefficient of variation was 17.09.The lowest productivity rate was for package 0, where the production rate was 863 kg/dunm. The number of farms was 78 samples Because of the very little addition, as it reached 125 g / dunm, with a standard deviation of 242.2. The standard error was 27.4, with a coefficient of variation of 28.06.By conducting the Duncan test, a test created by Duncan in 1955. It is a polynomial test and the characterized by taking the significant differences between the averages, regardless of their number, and for only one time, as shown in its results in Table 3. It found that the totals divided into four groups according to the average productivity, which are as follows; The first group included each of the packages 0,1,6, the second group included the packages 1,6,5,7, the third group included the packages 6,5,7,3and the fourth group included all of the packages 5,7,3,2,4. This means that each group of packages has a different effect on the productivity of one dunm of wheat.

Table 3 the results of the SSR test with a significance level of 0.05 for the average productivity among the technological packages

Fourth group	Third group	Second group	First group	number of farms	package code
			864.6410	78	0
		963.1111	963.1111	45	1
	1009.2333	1009.2333	1009.2333	30	6
1055.1143	1055.1143	1055.1143		35	5
1085.2000	1085.2000	1085.2000		10	7
1166.2600	1166.2600			50	3
1184.5000				8	2
1205.2647				34	4

Source: Calculated based on the results of the analysis of variance

By finding the Agricultural Intensification Inputs Index A3ifor all technological packages and after obtaining the productivity rate of wheat for each technology package, the strength of the correlation between these combined technological packages and the actual productivity measured of wheat crop within the study sample taken. Through the analysis in the SPSS program, a correlation was found between A3i-for everyone and productivity within the Pearson Correlation test, as shown in Table 4.

Table 4. shows the strength of the correlation between productivity and A3i for all

Correlations		productivity	A3i
productivity	Pearson Correlation	1	.158**
	Sig. 2-tailed		.007
	N	290	290
A3i	Pearson Correlation	.158**	1
	Sig. 2-tailed	.007	
	N	290	290

Table 4 shows the correlation between A3i for all packages; and productivity. Where the correlation was 0.158** which is significant at the level of significance 0.01 and it is a positive and acceptable correlation and this confirms the importance of the existence of such an index, which has suitable effectiveness In the development and growth of productivity of the wheat crop. This correlation measured to clarify the positive direct relationship between the indicator A3i and productivity. As well as the analysis of the correlation between the quantitative variable for each of the packages, for which A3i performed with productivity, as in Table 5.

Table 5. shows the correlation between productivity and each of the technical packages used

The degree of correlation to productivity	package name	package code
-.076	Micronutrients	0
-.100	Fertilized of seed	1
-0.1	laser leveling	2
.128**	potassium sulfate	3
.082	Fertilized of seed with potassium sulfate	4
0.81	Place exterminator of weed	5
0.088-	Atlantis exterminator of weed	6
.064	farming cycle	7

Source: Calculated by the researcher based on correlation analysis at the 0.05 level

By table 5, it is show that the expectable correlation was between productivity and the package. The package is symbolized by 3, which represents micronutrients with potassium sulfate, whose correlation value was 0.128**, which was significant at the level of 0.05. While it was a lower Correlation between throughput, and package 1 and package 7. To confirm that A3i for all is very important and we cannot deny the significant role in it, we note from Table 6 that the significance of A3i. For all was high at the level of significance 0.01, as it was 5.055 and with a positive sign. All samples were, analyzed and combined in the analysis of this table. This means that an increase of one unit of A3i for all will lead to an increase in productivity by 5.055 kg/dunm, and this is proof of the significance of A3i for all in developing, the level of productivity of the wheat crop.

Table 6. shows the significance of A3i for all in the regression analysis on productivity

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	934.404	37.251		25.084	.000
A3i	5.055	1.856	.158	2.724	.007

a. Dependent Variable: productivity

Table 7, it is showing that the suitable correlation was between package 0 and A3i for all. Where the correlation was .581** at a level of significance of 0.01. In addition, this means a strong correlation, which indicates the extent of the farmer's commitment to the recommended quantities, and the next correlation was between package 1 and A3i for all, it was 0.219 at the 0.01 significance level. It is regarded an acceptable correlation. This correlation shows the relationship between each of the recent inputs and the package A3i combined.

Table 7. the degree of correlation between A3i-for everyone and all of the used technology packages

The degree of coloration with the A3i for all	package code	package name
-.581**	0	A3i Micronutrients
.219**	1	A3i Fertilized of seed
.022	2	A3i laser leveling
.123*	3	A3i potassium sulfate
.150*	4	A3i Fertilized of seed with potassium sulfate
.123*	5	A3i Place exterminator of weed
.101	6	A3i Atlantis exterminator of weed
.064	7	farming cycle A3i

Source: Calculated by the researcher based on correlation analysis with correlation significantly below 0.01

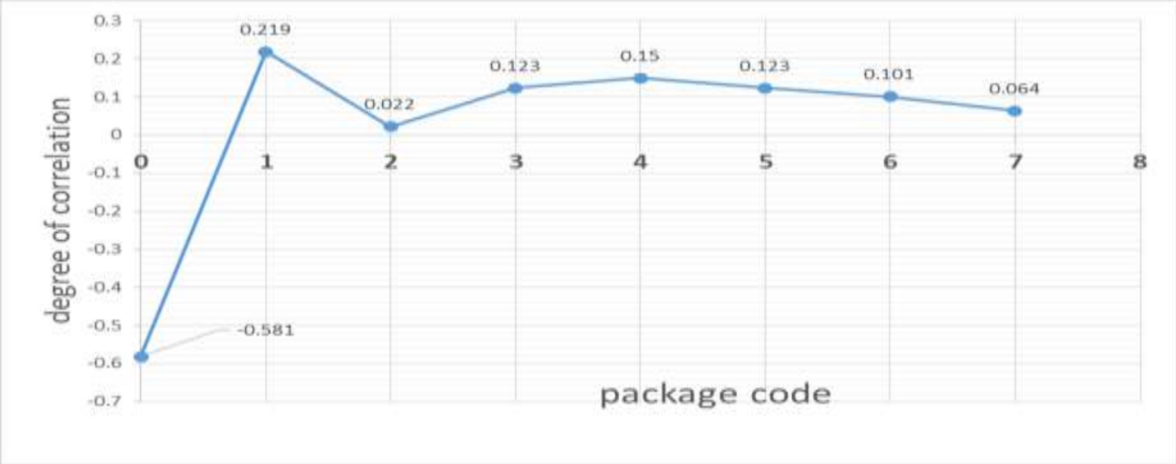

Figure 2. the degree of correlation between A3i-All and all technology packages used

Source: Figure based on correlation analysis

Conclusions

The importance of the use of nitrogen fertilizer in the cultivation of the wheat crop it is active the other inputs. It shows when nitrogen fertilizer added to the soil, the hybrid seeds became very significant. Which is the opposite of their insignificance when analyzed without nitrogen fertilizer. As for the dab fertilizer, it maintained it is significant. While the urea fertilizer had a higher significance than the dab fertilizer. Moreover, this proves the great importance of the nitrogen fertilizer urea by raising the significant effect of the seeds. In addition, keeping the significance of the dab fertilizer in increasing the productivity of the wheat crop. In other word, the strength of the correlation between A3i for all .As well as productivity illustrated with a positive and strong correlation. Moreover, this confirms the critical importance of the existence of the index. Which has great effectiveness in the development and growth of productivity of the wheat crop. What is more, the strongest correlation was between productivity and the package that represents micronutrients with potassium sulfate. In other words, the disparity in the correlation between productivity and each package becomes clear to us; that the importance of the theory of the ring production from the scientist invited Kremer, 1993. With the effectiveness of each ring and each element, this is what was proven when the result of the correlation between A3i for everyone and productivity was very high. Moreover, significant, as it proves that the combined packages lead to raising the level of productivity because of the high correlation between productivity and all packages combined. The analysis by the effect of A3i on productivity found that the significance of A3i for everyone was high. In addition, with a positive sign. The effect of A3i on productivity, it found that the significance of A3i for everyone was high. Moreover, with a positive sign. This means that an increase of one unit of A3i for everyone will guide to an increase in productivity of 5.055 kg/dunm, and this is proof of the significance of A3i for everyone in developing the level of productivity of the wheat crop. Therefore, we recommend the use of modern production packages combined in developing the productivity of the wheat crop due to the positive impact of productivity development.

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