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"ECONOMIC ANALYSIS OF THE IMPACT OF THE PRICE POLICY OF THE WHEAT CROP ON THE DOMESTIC PRODUCT IN IRAQ"

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ABSTRACT

The price policy is one of the most important economic policies implemented by the state to increase and improve agricultural production on the one hand, and to provide food for all members of society at prices that are encouraging to producers and suitable for low-income consumers on the other hand. The wheat crop is one of the most important cereal crops, which represents a distinguished economic center in most countries of the world as it constitutes an important food source for humans because it contains basic nutrients. Therefore, most developing countries in the world, including Iraq, seek to achieve self-sufficiency from it. This study aimed at the economic analysis of the impact of the price policy of the wheat crop on the domestic product in Iraq. The domestic price of the dependent factor wheat (Y) was counted, and the independent factors (X) were (local production, local consumption, cultivated area, price of the competing crop (barley price), subsidy policy (nominal protection factor) and world price in dollars). It was relied on time series data in estimating this phenomenon, in order to reach the best results, a standard model was applied in four formulas (linear, half logarithmic, inverse logarithmic and double logarithmic). The double logarithmic function was adopted based on its superiority and superiority in terms of statistical and standard tests. The results obtained were that the local production (X1) of the wheat crop had a positive significant value, while the local consumption (X2) had a positive and significant effect, and this is consistent with the economic logic. The variable cultivated area (X3) had a positive and significant value, and the variable price of the competing crop (the price of barley) (X4) was shown with a negative sign, and also the support policy variable (X5) had a positive and significant value, and the negative and significant sign of the global price variable (X6) for the crop thoughtful. The study ended with a number of conclusions and recommendations, including: It also became clear that the subsidy policy (the nominal protection factor) had a positive and moral impact on the local price of wheat, and this indicates that the protection was remunerative in favor of prices throughout the study

period. The study also reached a set of recommendations, the most important of which were: It is necessary to work on the integration of agricultural price policies for this strategic crop and other strategic crops with the foreign trade policy and the exchange rate policy.

INTRODUCTION

The agricultural price policy is one of the economic policy tools that contribute to reducing the fluctuations in prices and agricultural incomes that the agricultural sector suffers from, and it is a means to establish a sound price system necessary for the process of economic development. The price policy represents the direct and indirect means to influence the price structure and its components, including the structure of costs, margins, fees, indirect taxes and subsidies that would affect the price level and consequently the spontaneous market power in certain economic sectors or determine prices and price relations between different commodity groups (Iraqi Central Agency for Prices, 1978). Price stability is one of the main pillars of the price policy, which reflects the aspect of economic stability and from another aspect of the important tools to raise the standard of living and ensure the development of productive forces. To achieve several goals that contribute to supporting the national economy, such as increasing exports and reducing imports through the use of an appropriate price system for producers and consumers, as well as increasing government revenues. The price policy can be considered as one of the important economic measures in directing agricultural production towards the required level, in directing consumption and distributing incomes among members of society (Al-Obaidi, 2010). Wheat is one of the main and important grain crops in Iraq and the world, as it represents the main food for the majority of the world's population, it is one of the important strategic crops and closely related to food security (Al-Saadi, 1983).

RESEARCH PROBLEM

The price policy in Iraq suffers from many problems, which leads to the lack of stability in the prices of agricultural commodities, and the policy of supporting the prices of agricultural products was not stimulating to the product and did not contribute to pushing it towards the production of the strategic crop that achieves self-sufficiency in the wheat crop.

RESEARCH IMPORTANCE

The importance of the research comes through the importance of price policy, which is one of the important and influential topics in the agricultural production process, which targets the interest of both the consumer and the producer alike, as well as the importance of studying the economic factors that contribute to increasing the quantities produced from the wheat crop because the price instability gives an indication negatively for the Iraqi economy.

RESEARCH AIM

The research aims to:-

- 1- Studying the agricultural price policy for the strategic wheat crop in Iraq and measuring its impact on local production for the period (1995-2020).

- 2- Studying the reality of production, development and consumption of the strategic crop in Iraq.
- 3- Estimating and analyzing the factors affecting the price of the wheat crop during the studied period.

RESEARCH HYPOTHESIS

The research is based on the hypothesis that following an appropriate price policy for the strategic crop contributes to raising its production rates in Iraq during the period (1995-2020).

DATA SOURCES

The data was obtained from multiple sources for prices, world prices (in dollars), area, production, productivity, and consumption, as follows:

Prices

The price data for the crop were obtained from the Republic of Iraq - Ministry of Planning and Development Cooperation - Central Agency for Statistics and Information Technology - Directorate of Agricultural Statistics - Field price reports, for the period from (1995-2020).

Global Prices

Republic of Iraq, Central Bank of Iraq, Statistics and Research Department, various bulletins for the years (1995-2020).

Area, Production, Productivity and Consumption

Statistical groups for successive years have adopted the records of the Ministry of Agriculture - Planning and Follow-up Department - Department of Agricultural Statistics, for the period (1995-2020) to obtain data on the area, production and productivity of the wheat crop - Republic of Iraq.

The Reality of The Area, Production, Productivity and Consumption of The Wheat Crop in Iraq

Wheat product has an important economic position in many countries of the world. Wheat is one of the most important products that the state attaches great importance to. In the nineties, there has been an increase in the cultivated areas at the Iraqi level. Due to the economic measures taken by the government and its support policy, it has contributed to encouraging farmers to expand cultivated areas, especially irrigated areas. In the 2000s, it witnessed a political and economic deterioration due to the 2003 American invasion and the destruction of the accompanying infrastructure. For this reason, the support of the state to agricultural production has stopped. However, there were no major changes in terms of cultivated areas, production and yield. The average of wheat cultivated area in Iraq during the surveyed period is about 1.4 million hectares. It is observed that there are fluctuations in the cultivation areas over the years. It was determined that the highest value was 2.1 million hectares in 2020 and the lowest value was around 1 million hectares in 2015. During the

study period, the average wheat production in the country reached 2,5 million tons, it is seen that the highest production (6238392 tons) was reached in 2020. The reason for this increase is the increase in cultivation areas, the price supports of the state and the use of fixed and axial irrigation systems in Iraq. The lowest production in wheat was realized in 2000 (1040231 tons). After the economic siege, the country invests in domestic agricultural potential and has no choice but to increase its wheat production rates. For this reason, the level of wheat production has increased in some years. Iraqi wheat production cannot meet the ever-increasing domestic demand. For this reason, imports are constantly increasing. Between 1995 and 2020, the average wheat yield in Iraq reached 1664 kg/ha. While the highest yield was 2910 kg/ha in 2020, it is shown in Table 1 that the lowest yield was 766 kg/ha in 1995. The yield level was low in some years and high in some years. It can be said that it is caused by high yield, sufficient precipitation, quality seeds, fertilizers and irrigation water. Due to the difficult conditions in Iraq and the economic crisis, fluctuations were observed in cultivation areas, production and yield during the period 1995-2020. It was found that the consumption energy of the wheat crop in Iraq increased continuously during the study years, as the general average of the consumption of the wheat crop in Iraq for the period (1995-2020). About (3114138) thousand tons. The consumption ranged between a minimum of (926835) thousand tons in the year (1995) and a maximum of (5103142) thousand tons in the year (2020). The reasons for the expansion in the consumption of wheat are due to the support of wheat prices during the studied period, which resulted in a decrease in the price of wheat compared to other commodities, which led to a diversification of its uses, and the dependence of farmers on wheat and its products in the cities became less expensive than the cost of its production, which led to the emigration of the farmer. From the countryside to the city, this led to a decrease in the volume of production and a significant increase in consumption of the wheat crop, which in turn leads to a significant increase in imports as a result of the increase in consumption (Figure1).

Table (2): Area, Production, Yield, Consumption and Prices of The Wheat Crop In Iraq for The Period (1995-2020).

Years	Area (Hectares)	Domestic Production(Ton)	Yield(kg/ha)	Domestic Consumption	Price
1995	1425506	1091354	766	926835	35000
2000	1077015	1040231	966	3756531	121000
2005	1602666	2228362	1390	2523163	175000
2010	1349124	1892130	1402	2973181	488000
2015	1036674	2645061	2551	3401976	582000
2020	2143421	6238392	2910	5103142	427000
Averag	1439068	2522588	1664	3114138	30466

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Source. Republic of Iraq. Ministry of Planning and Development Cooperation - Department of Planning and Follow-up - Department of Agricultural Statistics - for years (1995 - 2020).

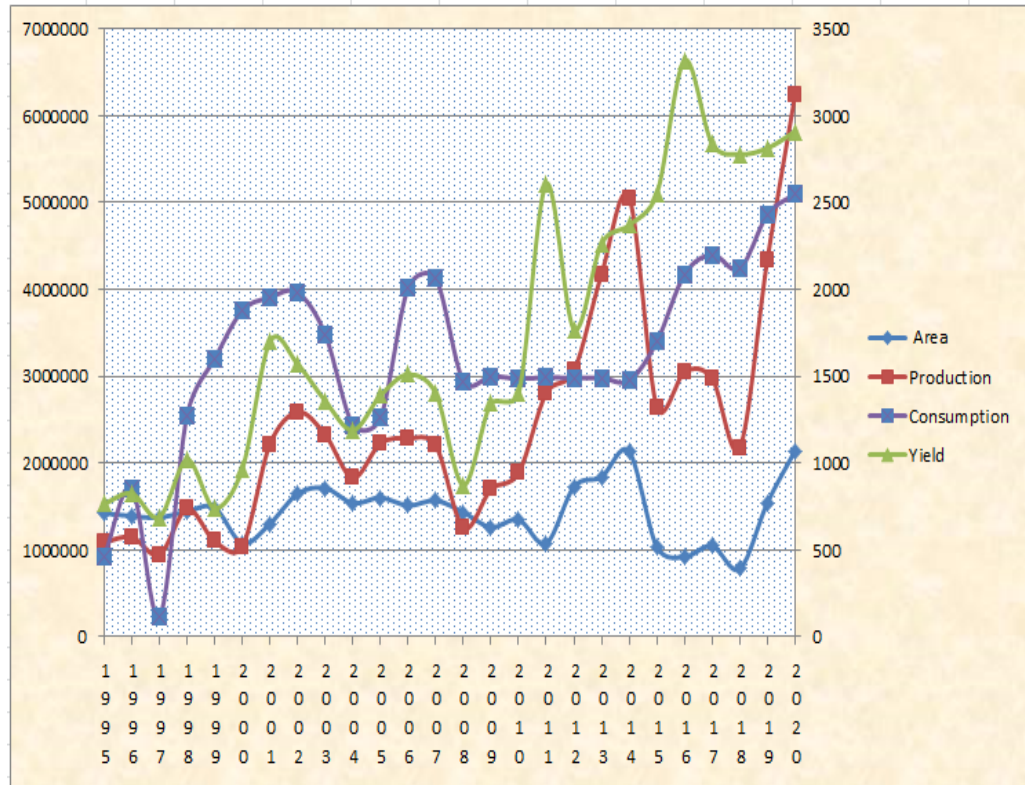


Figure .1. Wheat Area, Production, Yield and Consumption of Iraq

Method of Work and Economic and Econometric Analysis

Starting from the description of the model that represents the beginning of the standard work that defines the problem to be studied and the factors affecting it and helping to explain it, the logic of economic theory and previous applied studies depends in determining the relationship between the variables included in the model and the pre-expectations about the sign and sizes of the estimated parameters, which is a theoretical test that depends on it in Evaluate the results of the assessment (Chang , 1988).

The effect of various variables on the price (thousand dinars) of the wheat crop in Iraq for the period (1995-2020), where the local price of the crop affects the increase or decrease in production. When the local price of the produced crop rises, this encourages farmers to expand the cultivation of this crop to increase local production.

1- The dependent variable: (Y). The local price of wheat (one thousand dinars) has been relied on.

2- Independent variables: a number of economic factors have been relied upon, which represented the independent variables, as follows:

1. X1 Domestic production (Tons)
2. X2 Domestic consumption (Tons)
3. X3 Cultivated area (Hectare)
4. X4 The price of the substitute commodity, the price of the barley crop (thousand dinars)
5. X5 Policy support (Nominal protection factor)
6. X6 Global Price (\$)

The mathematical form of the model used to express the variables in a mathematical form, as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e_i \quad \text{Linear Model}$$

$$\ln Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e_i \quad \text{Semi-Logarithmic}$$

$$Y = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + e_i \quad \text{Inverse Logarithmic}$$

$$\ln Y = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + e_i \quad \text{Double Logarithmic}$$

Y = dependent variable

b_0 = the intercept parameter (constant), which represents the parameter that takes a value when the independent variables take zero values in the case of the linear model.

$b_1 \dots b_6$ = regression parameters whose value indicates the effect of the dependent variable when the value of the independent variable changes by one unit.

$X_1 \dots X_6$ = independent variables.

u_i = random variable representing non-explanatory variables that are not included in the model.

The following is an explanation of the variables mentioned above and how they affect the price policy of strategic crops in Iraq, with a prior clarification of the nature of the relationship between these variables and the variable based on the concepts of economic theory and previous studies.

First: Dependent Variable

(Y) Local Price of Wheat

The local price of the crop affects the increase or decrease in production. When the local price of the produced crop rises, this leads to encouraging farmers to expand the cultivation of this crop to increase local production. The price is a monetary expression of the value of a good or service, and price policy is a set of bases and procedures by which prices are planned and determined that achieve the economic and social goals of a particular society. Agricultural economic development, which varies according to different economic systems, as prices are determined in capitalist systems according to the market mechanism, aiming to achieve the largest amount of economic

profits. Therefore, the price in socialist systems aims to achieve agricultural economic efficiency, build a system of incentives in the agricultural sector, achieve justice in the distribution of incomes, and then achieve an appropriate level of economic prosperity (Abdullah, 2007).

Second: Independent Variables

(X1) Local Production.

The local production shows the locally produced quantity of the strategic wheat crop during a period of one year, measured in thousand tons, as many countries depend on the global market to fill the deficit of their production to cover local demand, whether caused by drought or other climatic changes that pervaded large areas of the world (Al-Khulani, 2005).

(X2) Domestic Consumption.

The local consumption shows the quantities available for local consumption of the totally produced and imported strategic wheat crop during the study period, measured in a unit of thousand tons, and measuring the extent of the effect of this variable on the adopted variable (wheat price) in Iraq.

(X3) Cultivated Area.

This variable shows the areas planted with the strategic wheat crop during the study period, measured in a unit of one thousand acres. Enter this variable to measure the extent of its impact on the approved variable (wheat price) in Iraq.

(X4) The Price of The Substitute Commodity the Price of The Barley Crop.

Which is also supported by the state as a necessary commodity such as wheat, which is an economic indicator that represents the desire of consumers to obtain it when any change in the price of wheat occurs, and what this change represents in determining the price of barley since barley is a complementary or basic commodity.

(X5) Support Policy (Nominal Protection Factor).

It is the ratio between the local commodity price and its border price, and the border price is the price in the world market converted in the local currency using exchange rates. Which is calculated by the following relationship:

Cross NPC = Total nominal protection factor.

Pd = local price.

Pb = The border price is converted at the official exchange price.

The total nominal protection coefficient is taken from the numerical values between greater, smaller, or equal to the right one. If the nominal protection coefficient is greater than the correct one, then local producers or intermediaries receive higher prices under the prevailing price policy, meaning

that the protection for producers, and this type of protection is called positive protection For the product, as for the consumer in this case it will be negative protection, but if the nominal protection factor is less than the correct one, then its interpretation for producers and consumers is unlike the case in the above, and the protection is neutral if the value of the transaction is equal to the correct one, which is the situation in which producers and consumers face And mediators have local prices equal to the border prices they face without interference, and it can be said that the closer the nominal protection coefficient is to one, the greater the impact of the price intervention policy on changing the price structure and hence the incentives to produce or consume the product (Al-Waeli, 2004).

X6 Global Price (\$).

It is the world price for the current year estimated (in dollars) for the wheat crop, and a measure of the impact of this variable on the adopted variable (the price of wheat) in Iraq.

The stage of preparing the standard model for testing comes in which the accuracy of the parameters of the estimated model will be tested through the use of statistical and standard tests, and to identify the extent to which the signals and sizes of the estimated parameters are compatible with the concepts of economic theory.

Statistical Tests. (t) t-test

This test measures the significance of the regression coefficients by (t) computed with (t) tabular If the (t) calculated at the level of 1% or 5% is greater than the tabular (t) we infer that the regression coefficient is significant, but if the calculated (t) is less than the tabular (t), it is not significant (Salvatore,1982).

(F) F-test

This test is used to ascertain the significance of the assumed relationship between the dependent variable and the independent variables, that is, it measures the significance of the equation of the mathematical model as a whole by (F) computed with (F) tabular. If the (F) calculated at the level of 1% or 5% is greater than (F) Tabular we infer the significance of the relationship, but if the calculated (F) is less than the tabular (F), it is not significant (Gazelle, 2003).

(R²) R²-test

It is measured in percentage, and its value lies between (0-1%) whenever its value approaches (100), it is an indicator of the good selection of the variables affecting the functional relationship, and thus it measures the percentage of change in the dependent variable that is explained by the independent variables (Koutsoyiannis, 1979).

Standard Tests

(D-W) Durbin-Watson Test

This test is used to detect the phenomenon of autocorrelation between the values of successive random variables on the basis of calculating the residuals resulting from the use of the ordinary least squares linear regression method. And that is by comparing the calculated (D-W) value (d^*) with two tabulated values, the first representing the upper bound and denoted by (du) and the second representing the lower bound and denoted by (dL).

- $d^* < dL$ = We reject the null hypothesis because there is a positive autocorrelation.
- $d^* < 4-dL$ = We reject the null hypothesis due to the presence of negative autocorrelation.
- $d^* < 4-du < du$ = accept the null hypothesis i.e. there is no autocorrelation.
- $d^* < 4-dL < du < 4-dL$ = This test is considered inconclusive because the value of (d^*) falls within the critical region (Pindyck and Rubinfeld, 1976).

Klein-Test

This test is used to detect the presence or absence of a linear correlation problem between the independent variables by comparing the square root of the coefficient of determination (R^2) with the simple correlation coefficient of any two independent variables. If the square root of the coefficient of determination is greater or equal to its value between any two independent variables, then that It means that there is no linear correlation problem between the independent factors, but if the square root of the coefficient of determination is less than or equal to its value between any two independent variables, this means that there is a problem of linear correlation between the independent variables (Gujarati, 2003) .

The multiple linear regression function has been analyzed using the Ordinary Least Squares (OLS) method, as this method is one of the widely used methods in statistical applications, which depends on the existence of a relationship between two or more variables (Kadhim & Muslim, 2002). And in several forms, including linear, half-logarithmic, inverse logarithmic and double logarithmic. The double logarithmic function was chosen as the best function based on its superiority over other functions by statistical and standard tests (D.W, t , F, R^2) and for the agreement of its parameters for economic logic as in the following equation.

$$\begin{array}{cccccc}
 Y = & 2.803 & +0.398X_1 & +0.666X_2 & +0.701X_3 & -0.123X_4 & +0.198X_5 & - & \\
 & & & & & & & & 1.120X_6 \\
 & (1.81) & (2.62) & (1.88) & (-1.85) & (1.83) & (-3.75) & & \\
 & & & & & & & & t = (0.76) \\
 R^2 & = & 0.90 & & F & = & 29.52 & & D.W & = & 1.93
 \end{array}$$

It was found that the value of the coefficient of determination R^2 amounted to about 0.90, which means that 95% of the fluctuations in the dependent variable are due to the explanatory variables present in the model and 10% are due to other variables that were not included in the model and their impact was absorbed by the random variable. When t-test, it was found that the independent variables are able to explain fluctuations and fluctuations in the dependent variable and that the calculated t-value of the variable parameters is greater than the tabular t-value at the 5% level, which indicates that the estimated parameters are statistically significant. We also confirmed the significance of the model as a whole through the (F) test, where the calculated was greater than the tabular (F), as it was confirmed through the (DW) test that there are no autocorrelation problems between the values of the random variable, and the problem of multiple linear correlation did not appear between the independent variables according to the Klein test.

The parameter of local production of wheat (X1) came with a positive and significant sign at the 5% level, as its value was (0.398), and this is consistent with what the economic theory assumes, that is, the higher the consumption, the higher the price of the crop.

As for the parameter of the local wheat consumption variable (X2) with a positive and significant sign at the 5% level, its value was (0.666), and this agrees with what the economic theory assumes, that is, the higher the consumption, the higher the price of the crop.

The parameter of the cultivated area variable (X3), it was positive and significant at the 5% level and its value was (0.701), that is, the greater the cultivated area, the higher the crop price, and this is consistent with the economic logic.

As for the parameter of the variable price of barley crop (competing crop) (X4), it was negative and significant at the 5% level and its value was (-0.123), which indicates the inverse relationship between the price of the barley crop and the price of wheat, and this is consistent with the economic logic and the competitive nature between the wheat crop. And that crop.

While (X5) the support policy variable was also positive and significant at the level of 5% with a value of (0.198), and this is consistent with the economic theory of increasing the purchase prices of wheat centrally.

The global price variable (X6) in dollars, its impact was negative and significant at 5%, with a value of (-1.120), and this confirms the relationship between the global price and its impact on the local price through smuggling operations taking place from outside the borders, because there is a difference between the dollar prices of wheat and the prices of the local product.

Estimated Elasticities

In order to measure the response of the wheat crop price to the variable of local production, consumption, cultivated area and the price of the competing

crop, as well as the nominal protection coefficient and the world price in Iraq. These flexibilities were calculated for the variables concerned during the study period.

The elasticity in relation to local production was (0.398), which means that an increase in local wheat production by 10% leads to an increase in its price by (3.9%). The elasticity in relation to domestic consumption was (0.666), which means that an increase in wheat consumption by 10% leads to an increase in its price by (6.6%).

The flexibility of the cultivated area (0.701), which means that an increase in the cultivated area by 10% leads to an increase in its price by (7.0%). The elasticity of the price of barley (the competing crop) was (-0.121), which means that a decrease in the price of barley (the competing crop) by 10% leads to a decrease in the price of wheat by (1.2%).

In order to know the response of the wheat crop price to the nominal protection coefficient variable (0.198%). Increasing the nominal protection factor variable by 10% leads to an increase in the local price by (1.9%). The global price elasticity also reached (-1.120), which means that a decrease in the world price of wheat by 10% leads to a decrease in the price of local wheat by (-11.2%).

Flexibility has important applications for agricultural policy purposes. Increasing wheat production by 10%, its relative price increases by (25.12%), increasing wheat consumption by 10%, its relative price increases by (15.02%), and increasing the cultivated area by 10% leads to increasing the relative price by (14.26%). The percentage increase in the price of wheat can also be obtained by reducing the price ratio of barley by (81.30%) or by increasing the subsidy policy by (50.50%), as well as by reducing the percentage of the world price by (8.92%).

CONCLUSIONS

1- The agricultural price policy is one of the important economic issues because it contributes to stimulating agricultural production in Iraq through its impact on a number of economic variables and the incomes of both producers and consumers, and the most important of these variables are (local production, local consumption, cultivated area, prices, subsidy policy) Nominal coefficient of protection (global price dollars).

2- The strategic wheat crop is one of the essential commodities that cannot be dispensed with, meaning that the increase in prices does not lead to a decrease in the quantities consumed of this crop and vice versa if its price decreases.

3- We found out that the world price of wheat had a negative and significant impact on its domestic price

4- It also became clear that the subsidy policy (the nominal protection factor) had a positive and significant effect on the price of wheat, and this indicates that the protection was remunerative in favor of prices throughout the study period.

- 5- The cultivated area variable has a positive and significant effect on the local price of wheat.
- 6- Also production and consumption variables has a positive and significant impact on the local price of wheat.
- 7- The variable of the price of the competing crop (the price of the barley crop) has a negative and significant effect on the local price of wheat.

RECOMMENDATIONS

The necessity of coordination between agricultural price policy and other policies affecting agricultural production such as (taxes, agricultural credit, financial subsidies and agricultural loans).

The cultivated areas of this crop should be expanded and more attention should be given to increasing its productivity and production because of its great importance. Expansion of the support provided by the state, because of the government support of a large and important role in encouraging farmers and motivating them in order to increase local production in terms of quantity and quality.

The import of this crop must be reduced by supporting it in order to upgrade the production process and increase it in quantity and quality by fixing remunerative and encouraging purchase prices for farmers in order to increase agricultural production and improve its quality.

It is necessary to price the strategic crop more than the cost of importing from abroad to maintain local production. Activating the role of the agricultural extension departments of the Ministry of Agriculture in the areas famous for the cultivation of this crop is necessary in order to increase the productivity and agricultural production of this crop.

It is necessary to work on the integration of agricultural price policies for this strategic crop and other strategic crops with the foreign trade policy and the exchange rate policy.

REFERENCES

- Abdullah, N. Z. H., 2007. An economic study of the impact of government support on the growth of agricultural output for some agricultural crops in Iraq for the period (1990-2003)", a master's thesis submitted to the College of Agriculture and Forestry, University of Mosul.
- Al-Khawlani, A. A. M., 2005. The Economic Effects of the Crises on the International Prices of Grains for the Period from (1961-2002), PhD thesis, College of Administration and Economics, University of Mosul.
- Al-Obaidi, M. S., 2010. Estimation of the wheat crop supply response function in Iraq", a master's thesis, College of Agriculture, University of Baghdad.
- Al-Saadi, M. A., 1983. Grain Technology", Mosul University Press.
- Al-Waeli, S. A. H., 2004. An economic analysis of the effect of price policy on the production and consumption of chicken meat in Iraq for the period (1980-2000), Master's thesis, College of Agriculture, University of Baghdad.

- Chang , A., 1988. Fundamental methods of mathematic economic , third edition MC GREW – Hill , Singapore .
- Ghazal, Q. N., 2003. The Impact of Globalization on Agricultural Performance in Selected Developing Countries, PhD thesis, College of Administration and Economics, University of Mosul.
- Gujarati, N., 2003. Basic Econometrics,(4th ed) MC Graw Hill. Book. new York p (350).
- Koutsoyiannis, A., 1979. Modern microeconomics, Second edition, ST-Martins Press, New York p (121).
- Pindyck, R.S.R. & D.L R., 1976. Econometrics Model and Economic Forecasts, MC Graw-Hill, Kogakusha Ltd, Tokyo.
- Republic of Iraq . Ministry of Planning and Development Cooperation - Department of Planning and Follow-up - Department of Agricultural Statistics - for years (1995 - 2020).
- Republic of Iraq, Central Agency for Prices, "Price Studies", Quarterly Bulletin, No. (1), December, Baghdad (1978).
- Republic of Iraq, Central Bank of Iraq, Statistics and Research Department, various bulletins for the years (1995-2020).
- Republic of Iraq, Ministry of Planning and Development Cooperation, Central Agency for Statistics and Information Technology, Directorate of Agricultural Statistics, Field price reports, for the period from (1995-2020).
- Salvatore, Ph.D., 1982. Theory and Problems of Statistics and Econometrics ,p (147).
- The Republic of Iraq . Ministry of Planning and Development Cooperation - Department of Planning and Follow-up and Department of Commodity Scales - Department of Agricultural Statistics - for years (1995-2020).