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Econometric Estimating for Response Supply of Maize Cultivated Area in Egypt

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Abstract : Maize is considered one of the most important cereal crops in Egypt. After adoption of economic reform policy, farmers became responsive to many variables in making their farm decision especially in long run. The main research problem is based on the assumption that farmers of maize are positively responsive to the economic incentives. In contrast to that the governmental interventions in price policy, i.e., the procurement prices and quotas system, adversely affected farmer's response. This study aimed to test the reliability of the stated assumptions, to determine the most variables affecting the acreage response, annual and full time period response for maize farmers. To achieve that objective, distributed lag models have been applied, by using Marc Nerlove's model for estimating maize acreage supply response in Egypt, through period (1993- 2013).The results of Marc Nerlove's partial adjustment model for maize supply response functions indicated that, there was a negative response to the farm costs of maize, and farm prices of peanut, where the full time period that make the farmer reach the complete response reached about 1.82, 1.89 years respectively. Also there was a positive response to the net revenue of sesame, where the full time period that make the farmer reach the complete response reached about 2.13 years. Also there was a positive response to the productivity of maize, where the full time period that make the farmer reach the complete response reached about 2.33 years. The study recommended effectiveness the role of technical change in increasing the cultivated area of maize, therefore, the role of agricultural extension should be emphasized to increase productivity and net return of maize as an incentive to expand maize area.
Key words : Marc Nerlove, cultivation of maize crop, agricultural crops.

Introduction

Summer corn crops is one of the important food grain strategic crops in Egypt, which contributes about 30%, 14.2% of the grain crops area respectively during the average period (1993-2013), and after application of the Egyptian economic reform policies, serious steps began about direction to the rule of market mechanisms, where he was taking various measures, including the abolition of pricing systems and compulsory delivery of agricultural crops and the abolition of input subsidies, as well as the abolition of crop installation compulsory, and I have those economic changes led to leave the freedom for farmers to choose the quality of the crop that is willing to be planted. Therefore we can say that the economic changes brought about no doubt they raised directly on the Egyptian agricultural sector, in particular the impacts on agricultural productivity of maize crop decisions maize summer represented the growers and producers that crop response to these variables

Research problem

The problem with research in the economic effects of the application of economic reform policies and setting prices according to the interaction of supply and demand forces, the growers farms in response to the expansion in the cultivation of summer maize crop.

Aim of the research

The main objective of the research in estimating response Display farms to harvest summer maize in Egypt, to determine the most important variables that can affect the corn response summer maize planted next to estimate the response degree of these variables in the short and long term, and the amount of annual responding to corn growers Summer maize and thus lead to elapse time period necessary to achieve a full response

Materials and Methods

Research on the use of model "Marc Nerlove" as a dynamic economic models of the most famous in the estimating functions supply response adopted, due to the possible introduction of a number of independent variables in the model, which takes the following formulas

$Y^*_t = \alpha + \beta X_{t-1} + \mu_t$ (1)

Y * t = summer maize planting cultivated we need to farm it in the current year (t)
Xt-1 = independent variables in the previous year (t-1)
μt = random error term

instead of area cultivated which need to planet this year () is a non-scenes variable, it cannot estimate the equation (1), so Nerlove suppose in usually really area (Yt) less than the desirable area cultivated(Y_t^*)this year, and also the change in real area (Yt-Yt-1) is usually less than the change in the desired area not least due to the presence of a technological or economic restrictions that prevent are not equal , so, Nerlove on that assumption so- model called "Partial adjustment Model" as follows:-

$Y_t - Y_{t-1} = \lambda (Y_t^* - Y_{t-1})$

$\therefore Y_t = \lambda Y_t^* + (1- \lambda) Y_{t-1}$ (2)

And substituting equation (2) into the equation (1) is obtained following supply response function:-

$Y_t = \alpha\lambda + \beta\lambda X_{t-1} + (1 - \lambda) Y_{t-1} + \mu_t^*$ (3)

Where
Yt = actual crop cultivated area in this year (t)
Yt-1 = actual crop cultivated area in the previous year (t-1)
$(0 \leq \lambda \leq 1)$ (coefficient of Adjustment)λ =
Random error term,), $\mu_t^* = \lambda\mu_t (= \mu_t^*$

You can account the function transactions display in response equation (3), by imposing the following function :-

$Yt = \hat{\beta}_o + \hat{\beta}_1 X_{t-1} + \hat{\beta}_2 Y_{t-1} + \mu_t^*$ (4)

under regression equations each of the transactions (3), (4) we can account the following Conversion:-

$\beta = \hat{\beta}_1 / \lambda\lambda\alpha = \hat{\beta}_o / \lambda\lambda\lambda = 1 - \hat{\beta}_2$

the farmers have annual response coefficient (λ), and the period of time necessary to achieve full elapse response is (λ / 1) the beginning of the next world of planting.

As it is the elasticity's of supply response account in both the short and long term as follows:-

Short Run Elasticity: SRE = $\hat{\beta}_o \overline{X}_{t-1} / \overline{Y}_t$ (5)

Long Run Elasticity:LRE= $\hat{\beta}_o \overline{X}_{t-1} / [(1 - \hat{\beta}_2) \overline{Y}_t]$ (6)

It is possible detect autocorrelation curb the problem of error in the supply response functions using the test (Durbin's h Test), which fits the dynamic nature of late distribution models that include the dependent variable as an independent variable period of delay (Yt-1) are as follows:-

$$h = \rho \sqrt{\frac{T}{1 - T.V}}$$

Where:-

ρ = (Autoregressive coefficient)
T = Number of Views
V = standard error of regression coefficient of variation variable, $V=(\beta/t)^2$, (Y_{t-1})
And it is detected by comparing the value of the autocorrelation (h) counterpart (z) spreadsheet

It has been steep gradient method of application (Stepwise Regression) to treat the problem of double taxation paced between the independent variables on the one hand and a better knowledge of the economic variables influence on the dependent variable (summer maize area) on the other hand, as patron of the statistical analysis that there should be the period of delay variable (YT 1) within the model to offer safety response model characterization.

It was dependence on economic affairs sector data of the Ministry of Agriculture and Land Reclamation and the Central Agency for Public Mobilization and castration during the period (1993 - 2013) it was all pricing variables index year to the wholesale price adjustment, so as the base year (2000 = 100).

Comment on the outcomes data:-

Was estimated functions supply response sorghum summer corn in Egypt during the period (1993 - 2013) and using Marc Nerlove Dynamic model and the study is supposed that:-

summer maize crop area in response to this year, are affected many economic variables in the previous year, represented in the farm price of maize, the net return acre maize summer, productivity acre of maize summer, as well as affected both prices, acre Productivity, production costs, and net absolute and relative yield of the crops compete for planting maize summer, and therefore represented those crops in both, the summer rice, cotton, sugar cane, sesame, peanuts, soybeans, summer tomatoes, summer and potatoes, so as to The most important crop competition of maize summer, this side of the area planted with maize Summer in the previous year, according to the Nerlove model.

Some attempts have been conducted to gain access to the most powerful variables impact on farms in response to the expansion in the cultivation of maize summer which included the following:-

1. Response to the variables of farm prices in absolute and relative measurement of the image as a table (1)
2. Responding to the productivity acres in absolute and relative measurement of the image as the table (2)
3. The costs of responding to the absolute and relative measurement of productivity as a table (3)
4. Response measure for net earnings per acre in absolute and relative image as a table using the least squares regression Self if we found it by we can also solve autocorrelation problem method, "Autoregressive Least Squares". standard analysis for supply functions for maize summer crop Responding following results:

Discussion

Supply response for maize Price farm absolute and relative:

To show the extent of Responding Display farmers maize summer of prices of farm absolute and relative, and then estimate the impact of the farm price of maize summer Responding to area alone, and the all competition crops for Maize entry in the absolute and relative image as follows:-

Clarify the equation (1) in table (1) the cultivated area responding maize summer farm to him for the price in the previous year, and shows coefficient of determination that about 84% of the changes in the maize an area of Summer due to the change in price farm and the area planted with maize summer in the previous year,

and the rest of the changes are due to factors other than the function as measured by, it has been shown statistically significant function at a level of 0.01, and the results show that the Maize farm price increase by one pound consequent increase in planted Maize area of about 0.47 thousand acres, assuming other factors firming at a certain level, as was the flexibility in both the short and long term about 0.12, 0.26, respectively, and this shows that a change of 1% in farm price for maize summer leads to increased planted area by 0.12%, 0.26%, respectively, and have annual response coefficient was also necessary to achieve full with corn growers response time period Summer around 0.46, 2.17 in the beginning of the following year for farming and equation (2) in table (1) describes maize farmers response Summer absolute prices for the crops compete for maize, where it was found for the price of farm peanuts area Responding, and shows the coefficient of determination that about 0.93 of the changes in the maize an area of summer due to the change in price farm peanuts and maize area planted to summer in the previous year.

Table 1: Functions response Display maize crop summer, according to the price of the absolute and relative farm using a form Marc Nerlove in Egypt during the period (1993-2013)

No	Functions supply response	R^2	R^2	F Test	H Test
1	$\hat{Y}_t = 847.5 + 0.54\,Y_{t-1} + 0.47\,P1_{t-1}$ $(0.17)\quad (2.87)^{**}\quad (3.11)^{**}$ $[0.12]$	0.84	0.82	$(42.0)^{**}$	0.96
2	$\hat{Y}_t = 654.0 + 0.68\,Y_{t-1} - 63.1\,D6_{t-1}$ $(1.12)\quad (3.55)^{**}\quad (-2.29)^{*}$ $[-0.08]$	0.93	0.92	$(106)^{**}$	-2.74
3	$\hat{Y}_t = 365.4 + 0.63\,Y_{t-1} + 52.5\,P16_{t-1} + 8.2\,P17_{t-1}$ $(0.25)\quad (3.05)^{**}\quad (2.88)^{**}\quad (2.27)^{*}$ $[-0.17]\qquad [0.24]$	0.87	0.84	$(33.5)^{**}$	-3.23

Where:

Estimated planted area maize summer thousand acres in the current year ($t\hat{Y}_t = \hat{Y}_t$).

Yt-1 = cultivated summer maize thousand-acre area in the previous year (t-1).

P1t-1 = Price farm for summer Maize in pounds per ton in the previous year (t-1).

P6t-1 = Price farm peanuts in pounds per ton in the previous year (t-1).

$P16_{t-1}$ = Price farm relative (summer Maize / peanuts) in the previous year (t-1).

$P17_{t-1}$= Farm price relative (summer Maize / soybean) in the previous year (t-1).

Numbers in brackets () and the bottom of the regression coefficients indicate that the value of (t) calculated

Numbers in brackets [ ] indicate to the Elasticity's of the short run.

Indicated a significant at the level of 0.05, 0.01, respectively(*) ,(**)

Source: added and Calculated from sources (1), (2), (4), (5), (6).

Results, Discussion,

The rest of the changes due to other factors than as measured by the function, and has been shown significant statistical function of the level of 0.01 and the results show that the peanuts farm price increase one pound per ton leads to reduced planted maize summer maize area of about 0.63 thousand acres, assuming other factors measured the stability in the function at a certain level, has reached the flexibility in both the short and long term by about -0.18 - 0.34, respectively. this indicates that a change of 1% in peanuts farm price to leading to decrease in summer maize by 0.18%, 0.34%, respectively, and have average annual response coefficient as well as the time required to achieve a full response to the farms around 0.53, 1.89 in the beginning of the following year for farming. And equation (3) in table (1) clarify that Farmers of summer maize Assent of relative prices for crops compete for maize-, where it was found for the peanuts relative farm price, soybean

area in response, and explains coefficient of determination that about 87% of the changes in the maize area summer due to the change in these two variables and the cultivated area maize summer in the previous year, and the rest of the changes due to other factors than as measured by the function, t has been shown significantly statistically function of the level of 0.01, and the results show that the relative increase in price between summer maize and all of peanuts, soybeans, by one unit will increase the cultivated area with maize approximately 52.5, 8.2 thousand acres, assuming other factors measured the stability in the function at the level of I have a certain flexibility was displayed cultivated maize area in response Summer Maize.

In the short term and long term for each of them about (0.15, 0.41), (0.24, 0.65), respectively, as the annual response factor of, and the time period necessary to achieve the full response to the farm approximately 0.37, 2.70 in the beginning of next year for agriculture, and it turns out The farms more responsive to the price of farm peanuts towards the situation in the cultivated area with maize summer, according to the coefficient of annual response of about 0.53 years, and this means that farms responds complete response after 1.89 years after the beginning of the following year for farming.

Showing response maize summer Productivity per acre absolute and relative:-

Showing the extent of the response maize Farmers summer Productivity per acre absolute and relative, has been assessing the impact of space in response to the productivity for summer maize separately, then crop yields for maize competition summer in absolute and relative image as follows.

equation (1) in table (2) describes the planted with summer Maize acre productivity area in response to the previous year, and illustrates the coefficient of determination that about 95% of the changes in the corn space Summer due to the change in both Productivity per acre and cultivated area corn Summer in the previous year, and the rest of the changes are attributable to factors other than as measured by the function, I have a moral statistically function was found at a level of 0.01, and the results show that the increase in Productivity per acre corn by one ton arrange it increased the cultivated area increased by 22.6 thousand acres, assuming other factors firming at particular, which amounted flexibility in both the short and long term towards 0.13, 0.23, respectively, and this shows that a change of 1%.

Table (2): Display functions in response maize crop summer, according to the price of the absolute and relative productivity using Marc Nerlove model in Egypt during the period(1993-2013)

No	Functions supply response	R^2	R^2	F Test	H Test
1	$\hat{Y}_t = 485.1 + 0.57\,Y_{t-1} + 22.6\,D1_{t-1}$ (1.11) (3.54)** (2.18)* [0.13]	0.95	0.94	(152)**	-2.88
2	$\hat{Y}_t = 654.0 + 0.68\,Y_{t-1} + 63.1\,D6_{t-1}$ (0.22) (4.45)** (-2.46)* [-0.08]	0.97	0.97	(259)**	0.69
3	$\hat{Y}_t = 456.2 + 0.71\,Y_{t-1} - 26.4\,D15_{t-1}$ (0.32) (3.96)** (2.82)** [0.14]	0.89	0.88	(64.7)**	0.42

where:-

$\hat{Y}_t$ = Estimated area planted with Summer maize per thousand acres in the current year (t).
Yt-1= Cultivated Summer maize per thousand-acre area in the previous year (t-1)
D1t-1= Productivity per acre of summer Maize per ton in the previous year (t-1).
D6t-1= Productivity per acre peanuts in tons in the previous year (t-1).
$D5_{t-1}$= relative productivity per acre (summer maize/sesame) in the previous year (t-1).
Numbers in brackets () and the bottom of the regression coefficients indicate that the value of (t) calculated
Numbers in brackets [] refers to the short-term elasticity.

(*),(**) indicated a significant at regression coefficients of the model at a level of 0.05, 0.01, respectively.
Source: added and Calculated from sources (1), (2), (4), (5), (6).

Results and Discussion,

In productivity per acre summer maize leads to increased planted area by 0.13%, 0.23%, respectively, and have average annual response coefficient and necessary to achieve full with corn growers response time period summer about 0:43, 2:33 in the beginning of next year for farming, it should be us It noted that farmers of maize summer in response to the productivity per acre Summer maize is a reflection of technological progress in maize planting summer relating to devise and deploy high-yield varieties and replace the traditional varieties low productivity, as well as national guidelines for the education of farmers campaigns the best means of developing agriculture.

The equation (2) in table (2) describes that summer maize farmers in response to the absolute productivity of a crop of competition for corn-, was found productivity per acre peanut area in response, and illustrates the coefficient of determination that about 97% of the changes in the corn space summer due to the change in productivity per acre peanuts and the area planted with maize Summer in the previous year, and the rest of the changes are attributable to factors other than as measured by the function, may show a significant statistical function of the level of 0.01 and the results show that productivity increased acre peanuts by one ton leads to a reduction of cultivated corn Daylight Saving space about 63,100 acres, assuming other factors firming at a certain level, has reached the flexibility in both the short and long term about - 0.08 - 0.14, respectively.

This shows that a change of 1% in productivity per acre peanuts leads to decreased summer maize area by 0.08%, 0.14%, respectively.

And it has reached annual response coefficient as well as the period of time necessary to achieve full at the farmer about 0:32 responsiveness, 3.13 years from the beginning of next year for farming the equation (3) in table (2) explain that maize farmers response Summer productivity relative per acre crops compete for maize where show the coefficient of determination that about 89% of the changes in area maize of the summer due to the change in productivity per acre relative Sesame and cultivated area corn Summer in the previous year, and the rest of the changes are attributable to factors other than measured the function, it has been shown significant statistical function of the level of 0.01, and the results show that increasing the productivity ratio per acre between maize and summer sesame unity of one leads to an increase of cultivated corn summer area of about 26,400 thousand acres, assuming fixed of other factors at a certain level, and I've reached flexible response in the short term and long term towards 0.14, 0.48, respectively, as the average annual response coefficient necessary to achieve full response to the corn growers summer about 0.29 from 3.45 in the beginning of the following year for planting and the time period, and it turns out that:-

Farmers more responsive to the productivity of the absolute per acre summer maize about the expansion of the area planted this crop, according to the annual coefficient of responsiveness, of about 0.43 years and the farmer responds complete response after 2.33 years after the beginning of the following year farming.

Explain the responding absolute and relative costs per acre of summer maize:-

To indicate how response Show absolute and relative costs per acre of summer maize and then estimate the impact of area in response to the costs per acre summer maize separately and then the competition for corn crops summer maize costs in absolute image and the ratio is as follows:-

Table 3: Show functions response summer maize crop absolute productivity, according to the relative costs and using a form Marc Nerlove in Egypt during the period (1993-2013).

NO	Supply response function	R^2	$\overline{R}^2$	FTest	HTest
1	$\hat{Y}_t = 453.2 + 0.45\ Y_{t-1} - 0.27\ K1_{t-1}$ (0.40) (4.85) (-2.32)* [-0.09]	0.76	0.73	(25.3)**	-2.97
2	$\hat{Y}_t = 301.2 + 0.63\ Y_{t-1} + 0.56\ K5_{t-1}$ (1.93) (2.99)** (2.15)* [0.12]	0.88	0.87	(58.7)**	-1.15
3	$\hat{Y}_t = 563.1 + 0.66\ Y_{t-1} - 133.5\ K15_{t-1}$ (1.12) (3.02)** (-4.55)** [-0.17]	0.82	0.80	(36.4)**	-4.22

Source: added and Calculated from sources (1), (2), (4), (5), (6).

$\hat{Y}_t$ = Estimated area planted with Summer maize per thousand acres in the current year (t).
Yt-1= Cultivated Summer maize per thousand-acre area in the previous year (t-1)
$K1_{t-1}$ = production costs per acres for summer maize by pound in the previous year (t-1).
$K5_{t-1}$ = production costs per acre for sesame by pounds in the previous year (t-1).
$K15_{t-1}$=Relative productivity costs per acre (summer Maize / sesame) in the previous year (t-1)
Numbers in brackets () and the bottom of the regression coefficients indicate that the value of (t) calculated
Numbers in brackets [] refers to the short-term elasticity.
(*),(**) indicated a significant at regression coefficients of the model at a level of 0.05, 0.01, respectively.

Results and Discussion,

Equation No. 1 table (3) describes maize planted area per acre costs in the previous year in response, and the coefficient of determination shows that about 76% of the changes occurring in the maize area due to the change in cost per acre and the cultivated maize area for Summer maize in the previous year, and the rest of the changes due to other factors than as measured by the function, and has been shown significant statistical function of the level of 0.01, and the results show that the increase in costs per acre of maize with a Pound one arranges it reduced the cultivated area increased by 0.27 thousand acres, assuming other factors Stability at particular, as in both the short and long term total flexibility approximately - 0.9 - 0.12, respectively.

This indicates that a change of 1% in the cost per acre of summer maize leads to a reduction planted area increased by 0.09%, 0.16%, respectively, and have annual response factor of, as well as the period of time necessary to achieve full with the peasants maize response summer maize approximately 0.55, 1.82 years the beginning of the following year for farming

And the equation (2) in table (3) describes the response summer maize farmers absolute costs per acre maize competition of maize where the show cost per The coefficient of determination shows that about 88% of the changes occurring in the area summer maize due to the change in the cost per acre of sesame and maize cultivated area Summer in the previous year, and the rest of the changes due to other factors than the function measured.

Also has been shown significantly statistically function of the level of 0.1 and the results show that the increase in the cost per acre of sesame to the amount of one pound leads to increase the area planted summer maize by about 0.56 thousand acres assuming other variables held constant at a certain level, it has reached the flexibility in both short-term and long-term at about 12:12 , 0:32, respectively, this explains that a change of 1% of the cost per acre of sesame lead to increased summer maize area by 0.12%, 0.32%, respectively, and have annual response factor of, as well as necessary to achieve full at the farm approximately 0:37 responsiveness, 2.70 in the beginning of the following year for planting time.

Which is equation (3), in the table (3) describes maize Farmers response for relative costs acre for competition crop for summer maize, It was found area in response to the costs relative acre of sesame, and explains coefficient of determination that about 82% of the changes in maize area of the summer due to the change in the relative cost per acre of sesame cultivated corn area in the previous year, and the rest of the changes due to other factors than measured by the function.

It has been shown statistically significant function of the level of 0.01. The results show that the increase in costs acre ratio between summer maize and sesame, one unit lead to a reduction planted summer maize area of about 133.59 thousand acres, assuming other factors firming at a certain level, and reached the flexibility to respond in the short term and long term about - 0.17, - 0.50, respectively, and this shows that the change in the cost per acre of maize ratio and sesame by about 1% leads to a decrease summer maize area by 0.17%, 0.50%, respectively.

The average annual response coefficient as well as the period of time necessary to achieve full at the farmer about 0:34 responsiveness, 2.94 in the beginning of the following year for agriculture, and it turns out that farmers more responsive to the cost of production per acre of summer maize towards the expansion of planted summer maize area, according to the coefficient of response annual of about 0.55 years. this means that farmer responds complete response after 1.82 years after the beginning of the following year for farming.

Supply response for maize summer to the absolute and relative net benefit per acre:-

o indicate the extent supply maize Farmers maize summer net benefit per acre response

Absolute and relative, has been assessing the impact of the farm area in response summer maize benefit per acre for corn summermaize in absolute and relative image as follows:-

Equation (1) in the table (4) Describes planted summer maize Shami net benefit per acre area in response to the atom in the previous year, and explains coefficient of determination that about 76% of the changes in maize area of the summer due to the change in net acres yield and the area planted Summermaize in the previous year, and the rest of the changes are attributable to other factors than the function measured, and I have a statistically significant function was found at a level of 0.01.

The results show that the increase in net return per acre of maize Pound and a one consequent increase in planted area by 0.12 acres assuming other variables held constant at a certain level, as was the flexibility in both the short and long term toward 0.03, 0.12, respectively.

This explains that a change of 1% in net return per acre for summermaize leads to increased planted area by 0.03%, 0.12%, respectively, and have annual response factor of as well as the time required to investigate the full response to the maize Farmers summermaize about 0.26, 3.85 years the beginning of the following year for agriculture, and equation (2) in table (4) describes that maize Farmers response summermaize net yield absolute acre crop competition of maize-, where it was found the net benefit per acre for Sesame area in response, and explains coefficient of determination that about 87% of the changes in the maize space maize due to the change in net return per acre of sesame and maize area planted Summer maize in the previous year, and the rest of the changes are due to other factors than the function measured. It has been shown statistically significant function of the level of 0.01. The results show that the increase in net return per acre for Sesame by one pound leads to a reduction planted maize summer maize area of about 0840 acres, assuming other factors constancy at a certain level, and I've reached the flexibility in both the short and long term about - 0.15 - 0.32 respectively.

This indicates that a change of 1% in net return per acre for Sesame lead to decreased summer maize area by 0.15%, 0.32%, respectively.

Table (4): View functions in response corn crop summermaize , according to Net absolute and relative yield using Marc Nerlove model in Egypt during the period (1993-2013)

No	Supply response function	R^2	$\overline{R}^2$	FTest	HTest
1	$\hat{Y}_t = 453.2 + 0.74Y_{t-1} + 0.12\ N1_{t-1}$ (0.22) $(3.21)^{**}$ $(2.17)^{*}$ [0.03]	0.76	0.73	$(25.3)^{**}$	0.95
2	$\hat{Y}_t = 874.5 + 0.53\ Y_{t-1} - 0.84\ N5_{t-1}$ (1.58) $(2.63)^{*}$ $(-3.88)^{**}$ [-0.15]	0.87	0.85	$(53.5)^{**}$	3.55
3	$\hat{Y}_t = 541.1 + 0.64\ Y_{t-1} + 6.2\ N12_{t-1} + 4.7\ N17_{t-1}$ (0.55) $(4.07)^{**}$ $(2.58)^{*}$ $(2.15)^{*}$ [0.04] [0.03]	0.84	0.81	$(26.3)^{**}$	-0.59

Source: added and Calculated from sources (1), (2), (4), (5), (6).

Estimated area planted maize summer thousand acres this year(t-1). $= \hat{Y}_t$
Yt-1 = planted summer maize area by thousand-acre in the previous year (t-1)
N1t-1 = Net revenue from corn acres Summer pounds in the previous year (t-1)
N5t-1 = Net revenue from an acre sesame by pounds in the previous year (t-1)
N12t-1 = Net relative yield per acre (summer maize / rice) in the previous year (t-1)
N17t-1 = Net relative yield per acre (summer maize / soybean) in the previous year (t-1)
Numbers in brackets () and the bottom of the regression coefficients indicate that the value of (t) calculated
Numbers in brackets [] refers to the short-term elasticity.
(*),(**) indicated a significant at regression coefficients of the model at a level of 0.05, 0.01, respectively.
The annual coefficient of response as well as the period of time needed to achieve full at the farmer toward 0:47 responsiveness, 2.13 years from the beginning of next year for farming.

Results and Discussion:-

Equation (3) in table (4) show that maize farmers response for net yield per acre of crops compete of summermaize, where it was found area in response to the net return per acre of rice which planet in summer and soybeans, explains renewal coefficient that 84% of the changes in maize area summer due to change in net yield relative acre rice, soybeans and maize planted are a maize in the previous year, and the rest of the changes are attributable to other factors than the function measured.

It has been shown statistically significant function of the level of 0.01 and the results show that increasing the ratio of net return per acre of summer rice, soybeans, one unit will increase planted area Summer maize by about 6.2 0.4700 acres, assuming other variables held constant at a particular level.

It has reached the flexibility to respond in the short term and long term, each toward (0.04, 0.11), (0.03, 0.08), respectively. The annual coefficient of response amounted required to achieve the full maize Farmers respond Summer maize toward 0.36, 2.78 in the beginning of the following year for planting and the time period, And it turns out that the farmer is more responsive to a net return per acre for Sesame toward the expansion of the area planted maize summermaize, according to the coefficient of annual response of about 0.47 years, and this means that farmer responds complete response after 2.13 years after the beginning of the following year for farming.

And get rid of the search results that farmer most affected by the change in the per acre production costs summermaize towards a reduction in planted summermaize area, where responds complete response after 1.82 years from the beginning of the following year for planting later, followed by a change in peanut prices, where the time period required amounted to elapse to achieve a full response toward 1.89 years from the beginning of the next factor for farming.

Then the change in net return per acre of sesame, where farmer responds complete response after 2.13 years from the beginning of next year for agriculture password. Finally, the change in productivity per acre of summermaize, and the farmer full response respond after 2.32 years after the beginning of the following year for farming.

Conclusion

we can say that the Farmers maize for summer rates and the relative returns response may reflect the effectiveness of the impact of economic reform policies in terms of leaving the freedom of the farms in the trade-off between the quality of agricultural crops, which wants to be grown according to the price and the net relative yield of each crop to another.

Therefore, the study recommends the need to activate the role of agricultural extension and national campaigns to promote the productivity of summer maize crop, working to encourage farmers to adopt high-yield varieties, and to move forward in the provision of agricultural information and guidance on the production and marketing to ensure the farmer for a price appropriately stimulated by the expansion of agriculture maize summer

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