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Research Article

The Impact of Integrated and Balanced Fertilization on the Productivity of Olive Crop and its Quality in New Land

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Abstract

Olive is one of the agricultural incomes in Egypt. The total area of olive in old, new and republic lands ranged between (25, 173, 198) thousand feddans respectively as average for the period (2006-2019). Where the search values showed that the olive total area in old lands decreased to 3.37 thousand feddans and the exchange rate represents about 13.05%, the reverse was true with olive total area in new and republic were increased to (14.74 , 11.37) thousand feddans respectively. Moreover, the results indicated that the annual average of olive fruit area in old, new and republic lands gained (22, 129, 150) thousand feddans respectively. In addition, the olive total area in old lands reached to 3.45 thousand feddans with exchange rate about 15.10%. In contrary, olive fruit area in new and republic enhanced by about (12.86, 9.41) thousand feddans respectively. On the other side, the values showed that the annual average of olive total production in old, new and republic lands recorded (102, 557, 659) thousand tons respectively. Meanwhile, the olive total production in old lands decreased to 17.59 thousand tons with exchange rate about 16.62%, where, the olive total production in new and Republic lands reached (66.28 and 48.68) thousand tons respectively. From another point, the values presented that the annual average of olive productivity in old, new and republic lands showed to (4.58, 4.24, 4.31) ton /fed.Respectively. Furthermore, these values pointed to a relative stability of the productivity for both types of lands during the search period. Concerning geographical distribution of olive fruit area in Egypt, the information of annual average in outside the valley amounted to 83.6 thousand feddans during the period (2006-2019) by represent about 64.90% from total republic mounted to 128.8 thousand feddans. In this connection, Matrouh Governorate occupied the first arrangement of olive fruit area followed by Noubaria sector represented by 25 and 24,8 thousand feddans respectively, at the outside the valley with representing an area of the total cultivated land of the Republic by 19.41 %, 19,25% respectively. However, the productivity average of both gained 79.2, 165.7 thousand tons with representing 14.2, 29.70 % from the total cultivated land of republic. As for applying Integrated and balanced fertilization program (IBF), the results showed that using the program led to increase olive yield over the normal farm fertilization (NFF).Where Picual cultivar achieved the maximum yield which amounted to 28.9 kg/tree, while amounted to 23 kg/tree with applying (NFF) program. Regarding olive oil percent, Picual cultivar recorded the maximum oil percent which represents about 20.7% with applying (IBF), however, with applying (NFF) the oil percent showed 17.6%. From another point, the correlation between leaf nutrient contents of olive and yield showed a positive correlation where (K) recorded the maximum with for all cases. Furthermore, a positive correlation between leaf nutrient contents of olive and oil percent obtained with N,Cu,Ca,P,Zn,Fe While, the negative correlation gained with N ,Mg,Mn. As for chemical fertilizer units (nitrate, phosphate and potassium) which were used in production of olive in new lands, the results of production functions for units cleared that these fertilizer units

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were used well and achieved the maximum of productivity, according to drip irrigation system and Integrated Balanced Fertilization Program (IBF).Meanwhile, the search results showed that the revenue and net return from the four olive cultivars (Picual, Manzanello, Coratina, Egazy) increased with using Integrated Balanced Fertilization Program (IBF) and drip irrigation system compared to Normal Farm Fertilization (NFF), where the total revenue amounted to (9472, 8784, 7997, 6752) pound/fed. for the four olive cultivars respectively. Whereas, total revenue amounted to (7538, 7145, 6424, 5178) pound /fed. for the four cultivars respectively using (NFF). It is worth to observe that the net return amounted to (2850, 2162, 1375, 130) pound/fed. for the four olive cultivars respectively using (IBF) and drip irrigation system compared to (NFF) which amounted to (916, 523, -198,-1444) pound/fed. for the four olive cultivars (Picual, Manzanello, Coratina, Egazy) respectively.

Keywords: *Olive,varieties,fertilization,new land,production,quality.*

Introduction

The olive tree is considered a national wealth, and it is one of the important crops in the Mediterranean region, the United States of America, Argentina, Mexico and South Africa. In Egypt, the olive tree is one of the most important crops for cultivation in newly reclaimed lands to bear drought and salinity. Olive oil named the green gold in some countries where olive oil and saved oil are considered one of the most important forms of manufactured products from olive crop, in addition to its many economic, health, and environmental benefits. However, consumer patterns for each of these products in each country are the largest specified in guidance olive agricultures and its types and its output used in manufacture any of these products.

Research Problem

Increased agricultural production in new lands is one of the most important priorities of scientific researches that apply scientific methods that lead to increased efficiency of limited economic resources, where olive crop in Egypt is concentrated in those areas, where the fruit area amounted about 65% of total fruit olive area in Egypt. Integrated Balanced Fertilization (IBF) for olive crop is one of the important means for Increasing production of this crop, therefore, the Research problem is that when a nutritional system is applied as lower than crop needs, this may lead to decrease the productivity of olive oil, while, the use of a nutritional system that exceeds the needs of the crop causes a decrease in the quality of the fruit as well as an increase in environmental pollution. So research problem is how to apply Integrated Balanced Fertilization (IBF) to estimate the nutritional status of olive trees and reflect that on economic efficiency to use fertilizers in olive production in general and in new lands in particular.

Aim of the Research

This Research Targets Many of the Following Points

1. Recognize the current position for some economic indicators (area, productivity, production, production cost, return, net return), and develop them by using some statistical methods for olives in Egypt.
2. Geographical distribution of fruit area and production of olive in Egypt.
3. Evaluation of four cultivars of fruit olives age 10 years (Picual, Manzanello, Coratina, Egazy), under drip irrigation system and Integrated Balanced Fertilization system (IBF) compared to Normal Farm Fertilization system (NFF).
4. Study the effect of both Integrated Balanced Fertilization program (IBF) and Normal Farm Fertilization program (NFF) on yield of search cultivars.
5. Evaluation of correlation coefficients between leaf nutrient contents of olive and yield and oil of olive, under Inte-

grated Balanced Fertilization system (IBF).

6. Economic evaluation for olive cultivars in new lands under Integrated Balanced Fertilization system (IBF), compared with Normal Farm Fertilization system (NFF) for sample search.

Materials and Methods

The research used both quantities and descriptive methods in new lands at Wadi Al Natroun Region in Egypt, under Integrated Balanced Fertilization system (IBF), compared with Normal Farm Fertilization system (NFF) for the data from the experiment conducted on four cultivars of fruit olives (Picual, Manzanello, Coratina, Egazy), and secondary data published by Economic Affairs sector at Ministry of Agriculture and land reclamation, also search use some statistical measures such as public time trend equations and the correlation for economic variables.

Results and Discussion

Economic Variables for Olives during the Period (2006-2019)

Results of old , new and total land in Table(1) revealed that there were a decline in values for both total area , fruitful area and total production of olives for old and new land but the opposite with the total land in the period of (2006-2019). In this context, the time factor showed a clear impact on all these changes for old, new and total land. On the other hand, the data obtained in the same table for the productivity of olive indicated that there were a relative stability within the research period of (2006-2019) for all cases of lands.

It is worth to mention for the trend equation of old lands in Table (2) that there were a decrease in total area, fruit area and the total production but the reverse were true with new and total land for the same items. With respect to the productivity of olive in the same table, the data showed the stability for all types of lands during the research period.

Table 1: Area and production of olive in new and old Lands in Egypt during (2006-2019)
Area: thousand Feddans / Thousand Productions: ton

Year	Total area			fruitl area			Production			Productivity		
	Old land	New land	Total land	Old land	New Land	Total land	Old land	New Land	Total land	Old land	New land	Total land
2006	60.64	64.73	125.37	55.89	52.41	108.30	307.44	237.20	544.64	5.50	4.53	5.03
2007	59.81	75.88	135.69	55.93	54.83	110.76	277.91	229.14	507.05	4.97	4.18	4.58
2008	59.61	90.71	150.32	51.70	58.25	109.95	205.86	274.21	480.07	3.98	4.71	4.37
2009	14.04	144.02	158.06	13.64	96.54	110.18	55.99	393.02	449.01	4.11	4.07	4.08
2010	14.94	148.33	163.27	14.21	105.22	119.43	54.91	336.02	390.93	3.86	3.19	3.27
2011	14.98	140.84	155.82	13.92	111.48	125.40	57.93	401.72	459.65	4.16	3.60	3.67
2012	14.35	188.39	202.74	13.64	123.39	137.03	76.02	487.05	563.07	5.57	3.95	4.11
2013	13.71	226.74	240.45	12.89	134.04	146.93	55.00	486.79	541.79	4.27	3.63	3.69
2014	13.40	224.05	237.45	12.50	132.35	144.85	55.98	509.69	565.67	4.48	3.85	3.91

2015	14.51	213.17	227.68	12.57	153.33	165.90	51.57	647.36	698.93	4.10	4.22	4.21
2016	14.49	228.69	243.18	12.78	175.16	187.94	66.31	808.44	874.75	5.19	4.62	4.65
2017	14.64	224.56	239.20	13.21	202.80	216.01	61.02	1019.19	1080.21	4.62	5.03	5.001
2018	26.64	221.80	248.44	14.00	200.09	214.09	49.97	1033.80	1083.77	3.57	5.17	5.06
2019	12.74	232.41	245.14	8.33	200.27	208.60	48.32	933.13	981.45	5.80	4.66	4.71
Aver-age	**24.89**	**173.17**	**198.06**	**21.80**	**128.58**	**150.38**	**101.73**	**556.91**	**658.64**	**4.58**	**4.24**	**4.31**

Source: Ministry of Agriculture and land reclamation, Economic Affairs sector, Agricultural statistical Bulletin, different numbers.

Table 2: Trend for development of olive total and fruit area, production, productivity during (2006-2019)

Item		**A**	**B**	**Average**	**R^2**	**T**	**F**	**Annual change rate %**
Total area	Old lands	49.42	- 3.37	25.83	0.44	** (-2.94)	8.64	13.05
	New lands	65.43	14.74	168.61	0.87	** (8.44)	71.23	8.74
	Total	114.85	11.37	194.44	0.89	** (9.50)	90.35	5.85
Fruit area	Old lands	47.001	- 3.45	22.84	0.55	** (-3.68)	13.57	15.10
	New lands	33.04	12.86	123.07	0.97	** (17.95)	322.37	10.45
	Total	80.04	9.41	145.91	0.89	** (9.32)	86.96	6.45
Production	Old lands	228.97	- 17.59	105.84	0.55	** (-3.63)	13.21	16.62
	New lands	64.04	66.28	527.97	0.88	** (9.21)	84.89	12.55
	Total	293.01	48.68	633.81	0.66	** (4.62)	21.38	7.68
Productivity	Old lands	4.77	- 0.04	4.49	0.06	(- 0.82)	0.68	-
	New lands	3.84	0.05	4.21	0.12	(1.24)	1.53	-
	Total	4.08	0.03	4.28	0.04	(0.65)	0.42	-

(**) significant at level 0.01

Source: collected and calculated from Table (1)

Geographical Distribution of Fruit Area and Production of Olive in Egypt

Geographical Distribution of Fruit Area of Olive in Egypt

It is evident from the data of Table (3) that the annual average of the fruitful area of olive outside the valley amounted to about 83.6 thousand feddans during the period (2006-2019), representing about 64.90% from total of Republic that amounted to about 128.8 thousand feddans. The table also showed that Matrouh Governorate was ranked first at the level of both the outside and the Republic where the area of fruitful olive in Matrouh Governorate reached about level of outside the 25 thousand feddans representing about 29.90% ,19.41% at the level of both

outside the valley and Republic respectively followed by Noubaria, North Sinia, South Sinia and New Valley with an annual average for the study period amounted to about 24.8, 21,6, 9,4, 2,8 thousand feddans respectively, at a rate of about 29.67%, 25.84%, 11,24%, 3,.35% at the level of outside the valley and about 19.25%, 16.77%, 7.30%, 2.17% at the level of Republic. Furthermore, the data in the same table showed that the Red Sea Governorate came in the last place with an area estimated at 0.1thousand feddans representing about 0.12%, 0.08% at the level of both outside the valley and the total of Republic, respectively.

Geographical Distribution of Production of Olive in the Egypt

As for the data presented in Table (3) that the annual average of production of olives in outside the valley valued as 342.3 thousand tons during the period (2006-2019), representing about 61.36% from total of Republic which amounted to about 557.9 thousand tons. In this connection, the results indicated that Noubaria took the first arrangement of production of olive at the level of outside the valley and Republic with recording about 165.7 thousand tons represents about 48.41% 29.70% at the level of outside the valley and republic respectively during (2006-2019), followed by Matrouh, North Sinai, South Sinai, and New Valley, where the annual average for research period showed the values 79.2, 61.8, 23.7, 11.7 thousand tons representing about 23.14%, 18.05%, 6.92%, 3.42 at the level of outside the valley respectively, and about 14.20%, 11.08%, 4.25%, 2.10% at the level of the Republic respectively. Moreover, the data in the same table cleared that the Red Sea Governorate came in the last place in terms of the fruitful area of olives on the level of both the valley and the Republic where it was estimated at about 0.3 thousand tons representing about 0.09%, 0.05% at the level of outside the valley and Republic respectively.

Table 3: Geographical distribution of olive area and production in the new land according to the most important governorates during (2006-2019)

Governorate	Area average (thousand feddan)	% fm Outside valley	% from Total	Production average(thousand ton)	% from Outside valley	% from Total
New Valley	2.8	3.35	2.17	11.7	3.42	2.10
Matrouh	25	29.90	19.41	79.2	23.14	14.20
Red Sea	0.1	0.12	0.08	0.3	0.09	0.05
North Sinai	21.6	25.84	16.77	61.8	18.05	11.08
South Sinai	9.4	11.24	7.30	23.7	6.92	4.25
Noubaria	24.8	29.67	19.25	165.7	48.41	29.70
Outside the valley	**83.6**	**100.00**	**64.91**	**342.3**	**100.00**	**61.36**
Total	**128.8**	**-**	**100.0**	**557.9**	**-**	**100.00**

Source: Ministry of Agriculture and land reclamation, Economic Affairs sector, Agricultural statistical Bulletin, different numbers.

Effect of Integrated Balanced Fertilization (IBF) on Olives Yield and its Oil Percent

It is clearly seen from Table (4) the increase or decrease in olive productivity and the percentage of olive as a result of using the integrated and balanced fertilization program (IBF) compared to the regular fertilization (NFF).

Olive Production

Results in Table (4)showed that the application of integrated Balanced Fertilization program(IBF), led to an increase in productivity of olive compared the Normal Farm fertilization program (NFF), where Picual cultivar achieved the best result with applying (IBF)program recording 28.9 Kg/tree however, the same cultivar obtained about 23kg/tree with applying (NFF) program, while, Manzanello, Coratina and Egazy came later with (26.8, 24.4, 20.6) Kg/tree respectively with using(IBF) program and(21.8, 19.6, 15.8) Kg/tree respectively when applying the control.

Oil Percentage

It is visible from Table (4) that the percentage of olive oil increased with application of (IBF) than the treatment of (NFF) program where, Picual was the superior reaching about 20.7% with applying (IBF) program and about 17.6% compared applying (NFF) program. However, the Egazy ranked last variety where the percentage of oil reached about 7.75 with applying (IBF) program where, it reached about 6.1% with applying (NFF) program.

Table 4: Yield and oil of olive cultivars of as affected by farm and integrated balanced fertilizations

Cultivars	Treatment	Olive yield(Kg/tree)	(%) Increasing	Oil (%)	(%) Increasing
Picual	NFF	23.0	-	17.6	-
	IBF	28.9	26	20.7	18
Mean		25.95a	-	19.15a	-
Manzanello	NFF	21.8	-	15.5	-
	IBF	26.8	23	18.9	22
Mean		24.30a	-	17.20a	-
Coratina	NFF	19.6	-	17.5	-
	IBF	24.4	24	19.7	13
Mean		22.00b	-	18.60a	-
Egazy	NFF	15.8	-	6.1	-
	IBF	20.6	30	7.7	26
Mean		18.20c	-	6.90b	-
L.S.D $_{0.05}$ between cultivars		1.9	-	2.3	-
Mean	NFF	20.05b	-	14.18b	-
	IBF	25.18a	0.20	16.75a	0.15
L.S.D $_{0.05}$ between treatments		1.5	-	2.1	-

* Mean followed by the same letter (s) are not significantly different at 0.05 level.

NFF = Normal Farm Fertilization

IBF = Integrated Balanced Fertilization

Correlation Coefficients between Leaf Nutrient Contents of Olive and Yield and Oil of Olive

It can be seen from Table (5) that there were a positive correlation between leaf nutrient contents and yield of olive for the studied cultivars, where (k) nutrient recorded the maximum correlation for all cases. However, (Mn) nutrient showed the minimum. Furthermore, in the same table, the results cleared that the leaf nutrient contents correlated positively with oil percent for N, Cu, Ca, P, Zn, Fe nutrients and correlated negatively with N, Mg, Mn for all cultivars of study. For another point, the correlation coefficient between olive yield and oil percentage showed a positive relation with all cultivars.

Table 5: the correlation coefficients between leaf nutrient contents of olive and Yield and oil of olive of as affected by integrated balanced fertilizations

	Picual									
	N %	**P %**	**K %**	**Ca %**	**Mg %**	**Fe (ppm)**	**Mn(ppm)**	**Zn(ppm)**	**Cu (ppm)**	
yield of Olive (Kg/tree)	0.62 NS	0.39 *	0.66 NS	0.49 NS	0.28 NS	0.21 NS	0.09 NS	0.27 NS	0.52 *	0.26 NS
Oil of Olive (%)	-0.57 NS	0.37 * *	0.61 *	0.43 NS	-0.21 NS	0.16 NS	- 0.03 NS	0.19 NS	0.48 NS	
	Manzanello									
yield of Olive (Kg/tree)	0.57 NS	0.43 NS	0.63 NS	0.53 NS	0.36 NS	0.25 * *	0.11 NS	0.31 NS	0.55 NS	
Oil of Olive (%)	-0.55 NS	0.39 NS	0.59 NS	0.51 NS	-0.32 NS	0.21 NS	- 0.07 NS	0.26 NS	0.53 NS	0.22 * *
	Coratina									
yield of Olive (Kg/tree)	0.59 * *	0.34 NS	0.63 NS	0.48 NS	0.22 NS	0.18 NS	0.07	0.23 NS	0.49 NS	
Oil of Olive (%)	-0.52 NS	0.29 *	0.56 NS	0.42 NS	-0.17 NS	0.11 NS	- 0.01 NS	0.21 NS	0.43 NS	0.31 NS
	Egazy									
yield of Olive (Kg/tree)	0.68 *	0.51 NS	0.71 *	0.53 NS	0.32 NS	0.23 NS	0.14 *	0.29 NS	0.59 * *	
Oil of Olive (%)	-0.60 NS	0.44 NS	0.65 NS	0.47 NS	-0.27 NS	0.19 NS	- 0.11 NS	0.20 NS	0.51 *	0.21 *

NS: Non significant, * significant at 0.05 probability level, ** significant at 0.01probability level

Source: collected and calculated from data of sample search.

Production Functions for Chemical Fertilizer Units for Olive Crop According to Integrated Balanced Fertilization Program (IBF)

The relationship between chemical fertilizer units and production of olive estimated in the form of olive production functions, and measuring relationship between productivity of olive and added units for this crop (nitrate, phosphate, and potassium), where the average amount added to the feddan was estimated from previous units amounted to 0.282, 0.193, 0.214 Kg effective unit from (nitrate, phosphate, and potassium) respectively, according to Integrated Balanced Fertilization program (IBF)

Production Function for Effective Chemical Fertilizer Units for Olive Crop

The search aims to estimate the impact of effective units of chemical fertilizer units (nitrate, phosphate, and potassium) productivity of olive in the new land, according to Integrated Balanced Fertilization program (IBF), where an equation could be obtained as follows-

$P_o = 4.6 + 2.8N - 3.8N^2 + 22.6P - 371.2P^2 + 1.4K - 4.9K^2$

$(12.3)^* (6.1)^* (-2.6)^* (5.7)^* (-4.7)^* (0.8) (-0.3)$

R^2=0.86 F=5.3*

Where
P_o = productivity of olive (ton).
N = nitrate fertilizer units.
P = phosphate fertilizer units.
K = potassium fertilizer units.
*Significantly different at 5% level.

Previous function indicates that change in effective units from (nitrate, phosphate, and potassium) fertilizer estimated to about 86% from changes in productivity of olive in new lands, and this model is significantly, where value of calculated (F) amounted to 5.3, it's also shows that all signals of regression coefficient are consistent with economic logic.

The Production Function for Nitrate Fertilizer Units
It was estimated that the production function for nitrate fertilizer after installing units of phosphate and potassium fertilizers for olive at average, both of them amounted to 0.193, 0.214 Kg/feddan from units of phosphorus and potassium respectively, according to Integrated Balanced Fertilization program (IBF), where production function for nitrate fertilizer was estimated as follows-

P_o= 5.1 + 20.7N - 23.6N2
(31.2)* (8.7)*(- 4.8)*
R^2=0.73 F=9.7*

Where
P_o = productivity of olive (ton).
N = nitrate fertilizer units.

The constant part in function (5.1): the remaining of nitrate fertilizer in a previous period of agricultural of olive in new lands, the function indicates that this coefficient has a positive effect on production of olive in these lands.
*Significantly different at 1% level.

Pervious function indicates that change in effective units from nitrate fertilizer represents about 73% from the changes in a production of olive in new lands; this model is significantly, where value of calculated (F) amounted to 9.7. It also shows that all signals of regression coefficient are consistent with economic logic. It was estimated productivity elasticity for nitrate element when using in the production of olive in new lands from the following relationship:(marginal production/average production), where amounted to 0.23 meaning that increase in effective units from nitrate fertilizer in soil by about 1% leads to increase in total production of olive by about 0.23%, this element when used in an economic stage, nitrate fertilizer element was significantly at 1% level.

R^2=0.73 F=9.7*

The Production Function for Phosphate Fertilizer Units
It was estimated Production function for phosphate fertilizer after installed units both of nitrate and potassium fertilizer for olive at average both of them amounted to 0.282, 0.214 Kg/feddan from units of nitrogen and potassium respectively, according to Integrated Balanced Fertilization program (IBF), where production function for phosphate fertilizer was estimated as follows

P_o = 5.3 + 210.7P - 412.5P^2
(27.4)* (6.1)* (- 2.7)* *
R^2=0.67 F=4.2*

Where
P_o = productivity of olive (ton).
P = phosphate fertilizer units.
The constant part in function (5.3): the remaining of phosphate fertilizer in a previous period of agricultural of olive in new lands, the function indicates that this coefficient has a positive effect on production of olive in these lands.
* Significantly different at 1% level, ** Significantly different at 5% level.

Previous function indicates that change in effective units from phosphate fertilizer represent about 67% from the changes in a production of olive in new lands, this model is significantly, where value of calculated (F) amounted to 4.2, it also shows that all signals of regression coefficient are consistent with economic logic. It was es-

timated productivity elasticity for phosphate element when used in the production of olive in new lands from the following relationship: (marginal production/average production), were amounted to 0.27 meaning that increase in effective units from phosphate fertilizer in soil by about 1% lead to increase in total production of olive by about 0.27%, this element is using in a economic stage, phosphate fertilizer element was Significantly at 1% level.

The Production Functions for Potassium Fertilizer Units

It was estimated Production function for potassium fertilizer after installed units both of nitrate and phosphate fertilizer for olive at average both of them amounted to 0.282, 0.193 Kg/feddan from units of nitrogen and phosphorus respectively, according to Integrated Balanced Fertilization program (IBF), where Production function for potassium fertilizer was estimated as follows

$P_o = 5.7 + 7.5\ K - 8.1\ K^2$
$(27.4)^{*}(2.1)^{**}(-1.7)$
$R^2=0.36\ F=0.56$

Where

P_o = productivity of olive (ton).
K = potassium fertilizer units.

The constant part in function (5.7): the remaining of potassium fertilizer in a previous period of agricultural of olive in new lands, the function indicates that this coefficient has a positive effect on production of olive in these lands.

* Significantly different at 1% level, ** Significantly different at 5% level.

Previous function indicates that change in effective units from potassium fertilizer represents about 36% from the changes in a production of olive in new lands, this model is not significant, where value of calculated (F) amounted to 0.56, it also shows that all signals of regression coefficient are consistent with economic logic. It was estimated productivity elasticity for potassium element while using in the production of olive in new lands from the following relationship: (marginal production/average production), where amounted to 0.12 meaning that increase in effective units from potassium fertilizer in soil by about 1% lead to increase in total production of olive by about 0.12%, this element is used in an economic stage, while phosphate fertilizer element was not significant.

It shows from the production functions for units of chemical fertilizer units (nitrate, phosphate, and potassium) while using in production of olive in new lands, this fertilizer is using well, where achieved the maximum of productivity, according to drip irrigation system and Integrated Balanced Fertilization program (IBF).

Economic evaluation for using Integrated Balanced Fertilization program (IBF), compared with Normal Farm Fertilization (NFF) for sample search-

It shows from data of sample search, while using Integrated Balanced Fertilization program (IBF) for the four olive cultivars (Picual, Manzanello, Coratina, Egazy), compared with Normal Farm Fertilization (NFF), where was used (Nitrate, Phosphoric acid, Potassium sulfate, Magnesium sulfate, Copper sulfate, Burax (Buron), chelated iron (EDTA), chelated Manganese (EDTA), chelated zink(EDTA)), at a cost amounted to (5.936, 12.768, 10.752, 3.696, 41.44, 19.04, 80,80,80) pound/ Kg respectively.

The Table(6) shows revenue and Net return from the four olive cultivars (Picual, Manzanello, Coratina, Egazy), according to Integrated Balanced Fertilization program (IBF) and drip irrigation system compared to Normal Farm Fertilization (NFF), the results show that using Integrated Balanced Fertilization program (IBF) and drip irrigation system lead to increase revenue and Net return from the four olive cultivars compared to Normal Farm Fertilization (NFF), where total revenue amounted to (9472, 8784, 7997, 6752) pound/feddan for the four olive cultivars

(Picual, Manzanello, Coratina, Egazy) respectively using Integrated Balanced Fertilization program (IBF) and drip irrigation system, while total revenue amounted to (7538, 7145, 6424, 5178) pound/feddan for the four olive cultivars (Picual, Manzanello, Coratina, Egazy) respectively using Normal Farm Fertilization (NFF), as such Net return amounted to (2850, 2162, 1375, 130) pound/feddan for the four olive cultivars(Picual, Manzanello, Coratina, Egazy) respectively using Integrated Balanced Fertilization program (IBF) and drip irrigation system compared to Normal Farm Fertilization (NFF) which amounted to (916, 523, - 198, - 1444) pound/feddan for the four olive cultivars(Picual, Manzanello, Coratina, Egazy) respectively.

Table 6: Total revenue and Net return (pound/feddan) in new land, Wadi Al Nitroun Region, Egypt

	IBF		NFF	
	Total revenue	**Net return**	**Total revenue**	**Net return**
Picual	9472	2850	7538	916
Manzanello	8784	2162	7145	523
Coratina	7997	1375	6424	-198
Egazy	6752	130	5178	-1444

Source: collected and calculated from: 1- data of sample search. 2- Ministry of Agriculture and land reclamation, Economic Affairs sector, Agricultural statistical Bulletin, different numbers

Conclusion

It can be concluded that using the Integrated and Balanced Fertilization Program had positive effects on olive varieties grown in the new lands under drip irrigation system, especially the Picual variety in terms of yield and oil productivity as well as economic return.

Recommendations

1. Expansion of using Integrated Balanced Fertilization system (IBF) for fruit olive in new lands, where it led to an increase productivity of olive for studied cultivars, as well as productivity of oil of olive which leads to increase return and net return from olive in these lands in Egypt.
2. Encourage olive farmers in new lands on expansion in using Integrated Balanced Fertilization system (IBF), where it led to an increase productivity of olive and an increase return.

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