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Farmers' knowledge level and related variables towards olive production and marketing recommendations in Matrouh Governorate, Egypt

Elkashef, O. M.[1], Mansour, T. G.[2] and Esleem, S. A.[3]

[1]Agricultural Extension Education Department, Faculty of Agriculture (El-Shatby), Alexandria University, Alexandria, Egypt; [2]Agricultural Economic Department, National Research Centre, Giza, Egypt; [3]Economic and Rural Development Department, Arish University, Egypt.

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Abstract The olive farmers' knowledge relative to production and marketing recommendations in Matrouh Governorate was identified from 260 respondents during October to December 2019. The results showed that 51.5 % of the farmers had a low level of knowledge related to the production and marketing recommendations for olive crop. farmer's knowledge degree was significantly associated ($P<0.01$) with all the studied independent variables. It was also found that the decline in extension services and performance, exploitation and greed of middlemen and merchants, the high cost of establishing irrigation networks, and the absence of agricultural marketing extension revealed the most important constraints affecting production and marketing practices for olive culture in the region. Therefore, it was recommended that training programs and extension services should be implemented to farmers that could contribute towards increasing olive productivity and marketing in Matrouh government, Egypt.

Keywords: Agricultural Extension, Knowledge level, Olive, Production, Marketing

Introduction

Agriculture is the cornerstone of the development process; the advancement of the agricultural sector would raise the rates of development in Egypt. In 2013, the number of agricultural sector workers in Egypt reached 6.7 million, representing 28% of the total workforce. This sector is increasingly important in view of the fact that more than half of the population is associated with agricultural production and marketing activities (World Bank, 2016). Thus, we can say that agriculture is one of the most economically viable sectors for employment in Egypt.

Rural development is a mean of achieving rural economy growth, increasing income and enhancing the management and sustainability of resources (FAO, 2000), and no one can deny the role being played by

*Corresponding Author: Tamer, G. I.; **Email:** tj.mansour@nrc.sci.eg

agriculture for economic and social development in most developing countries. The agricultural development process depends on two basic elements: the human element and the physical element. The physical component represents the outcome of scientific and technological progress in science related to agricultural production, which cannot be used efficiently unless the human element has the necessary knowledge and skills to apply these tools and advanced scientific inputs in the production process. Therefore, this can be achieved through agricultural extension services which play an important role in agricultural development and can contribute towards improving the welfare of farmers and rural people living in rural areas (Anderson, 2007; Umeh *et al.,* 2018).

The researchers agree that information of sufficient quality is a necessary condition for improving all areas of agriculture *(Zhang et al., 2016 ; Uwandu et al.,* 2018). Addison has stated that extension programs planning should be based on the examination of problems related to the tangible needs of farmers, so needs must be identified and studied in order to ensure that they are actively involved in the implementation of the recommendations (Addison, 1973) which is consistent with mentioned by Rogers (1983) that the success of the agricultural extension agent is positively correlated with the degree to which its role matches the needs of the target population. Agricultural extension programs and activities are not successful and effective unless they are based on knowledge and identification of the needs and problems of the target population.

In this context, so that the process of knowledge needs identifying for farmers is the cornerstone of building any extension program, without this step, the planning process for the construction of the extension program will be a waste of time, effort and money. Thus, this process does not take place without identifying the current knowledge of farmers (this is what the current study seeks) to determine the gap between what is and what should be started, then planning to build the extension programs on a sound basis.

Much effort has been made by the state for agricultural development in Matrouh governorate, which has a comparative advantage regarding the production of some crops, like the olive crop, that generates a distinct economic return, whether marketed locally or exported, although the fruitful area of olive in Matrouh has increased from 17100 feddan[1] in 2000 to 29180 feddan in 2019, and now Matrouh Governorate is the second-largest governorate of the Arab Egypt Republic with respect to the planted area with olives. In 2018, this area reached about 37,864 feddan (Figure 1)**.** This area represents about 15.24% of the total olive area in Egypt (Agricultural Economics Bulletin, 2018).

[1]Feddan =0.42 hectar

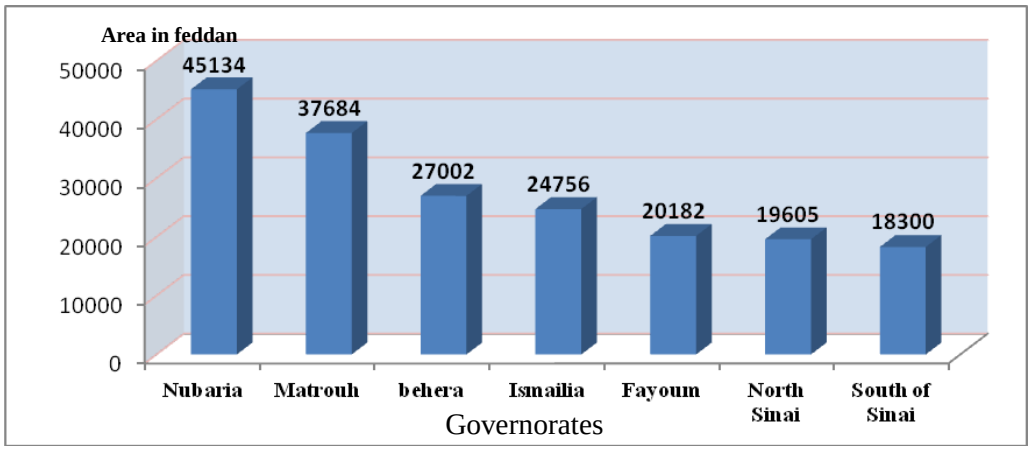

Figure 1. Egyptian Governorates and areas cultivated with olive in 2018
Source: Agricultural Economics Bulletin (2018)

In spite of the availability of the appropriate environmental conditions for olive cultivation in the Matrouh Governorate, this governorate occupies the 9th place for the productivity of this crop. The productivity average of olive in 2018 was 4.93 tons/ feddan as seen in Figure 2, It was still less than the general average of productivity at the Republic level, that reached 5.16 tons/ feddan.

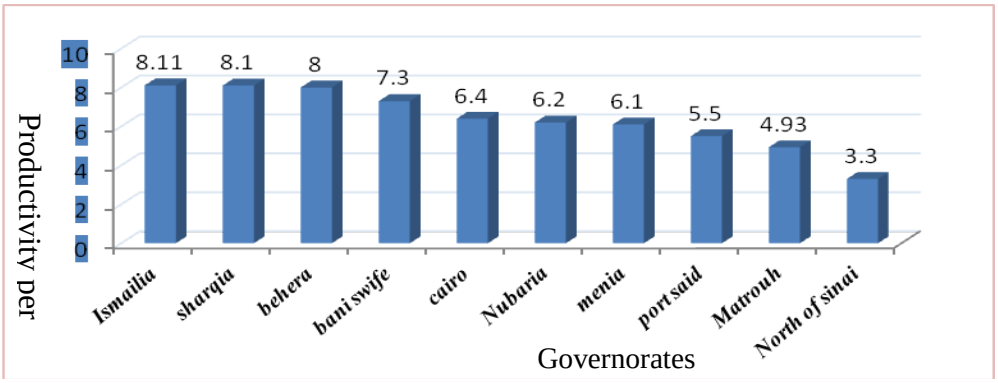

Figure 2. Olive productivity average of some Egyptian governorates in 2018
Source: Agricultural Economics Bulletin (2018)

In addition, the acre productivity of this crop in Matrouh Governorate is less than the average of feddan productivity at the Republic level for several consecutive years as presented in Figure 3.

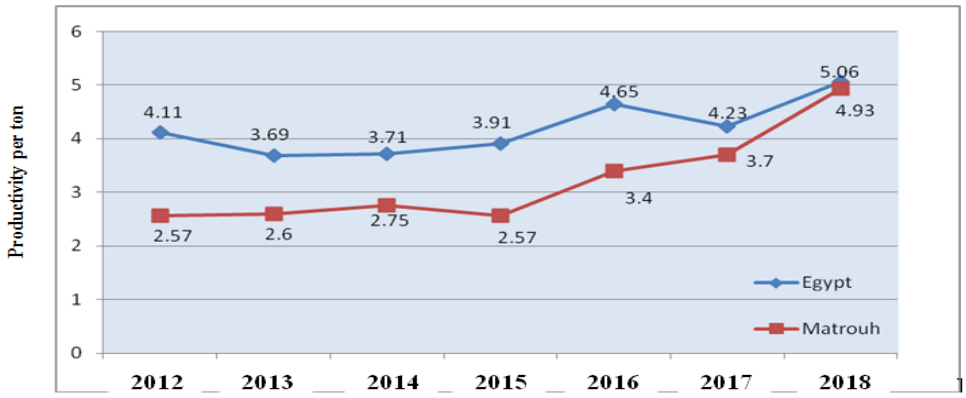

Figure 3. A comparison between the olive productivity average in Egypt generally and Matrouh Governorate 2012- 2018
Source: Agricultural Economics Bulletins (2012-2018)

This decreasing in averaged yield productivity of the olive crop due to several reasons; the lack of extension activities provided to farmers which resulted in lack of their knowledge regarding developed extension recommendations, or their inability to apply those knowledge and practices included with these recommendations, or there were other problems of farmers in the region which led to decrease in the productivity average of this crop. In addition, it is recognized that some socio-economic variables such as age, educational status, cultivation experience, productivity average and organizational participation are crucial in optimizing the utilization of these recommendation (Mansour *et al.,* 2019). Hence, the objective of current research was to study the knowledge level of respondents on the productive and marketing recommendations for the olive crop in Matrouh Governorate which described socio-economic variables of respondents, determined the sources of information acquisition, identified the knowledge levels of olive farmers in Matrouh Governorate, determined the main limiting socio-economic variables affecting the knowledge level of these recommendations, and characterized the constraints faced by the farmers concerning olive production and marketing recommendations.

Materials and methods

Study area

Matrouh is one of the largest Egyptian governorates in terms of area, with an area about 166,000 km^2 representing around 16.6% of the total area of the

Arab Egypt Republic. This governorate occupies an important location on the Egyptian map. It represents the link between Egypt and Libya, its northern border extends for a length of 450 km, and it is bordered to the east by the governorates of Al-Buhaira, Alexandria, and Giza. Also, it is bounded to the south by the New Valley Governorate, and to the west by the Egyptian-Libyan border along (400 km). The Governorate of Marsa Matrouh is divided into three main sectors, which include eight districts, namely Al-Hamam, Al-Alamein, Al-Dabaa, Matrouh, Al-Nujaila, Barani, Salloum, and Siwa (Figure 4).

Figure 4. Map of Matrouh
Source: http://www.matrouh.gov.eg/index.aspx

The governorate is classified according to the availability of water source for agriculture into three sectors: the first sector from Al-Hamam to Fukah (a small village located in the northwest of Egypt and it is affiliated to the Dabaa district), with a length of 156 km and a depth of 80 km, with rainnig water and complementary irrigation from the Hammam Canal. The second sector extends from Fukah to Salloum with a length of 285 km, a depth of 70 km, and agriculture in this sector depends on seasonal rainfall. The third sector includes the Siwa Oasis, and depends on the groundwater in agriculture (The Egyptian Olive Union, 2006). Matrouh Governorate was chosen as a study area, because it is one of the largest governorates of the Arab Egypt Republic in terms of the area being cultivated with olives. In 2018, this area reached 37,864 feddan that represents about 15.24% of the total area of olives at the Republic level (Agricultural Economics Bulletin, 2018).

This research was conducted in Matrouh district, the largest district in terms of population that reached 209,149, representing 44.1% of the governorates' population, which amounted to 474,275 in 2018 (Information and Decision

Support Center, 2019). Matrouh district is considered the second district regards as the planted area with olives (4491 feddan) after the Siwa Oasis, if the data for Barani and Salloum centers is excluded, as there was not separated data available for each of them (Table 1). The same criterion was applied for selecting the village of Ras El Hekma as the largest village in Matrouh center (Agricultural Administration in Matrouh, March 2019).

Table 1. The area of olive cultivated related Matrouh Governorate centers in 2019

Sr.	District	The cultivated area
1	El Hammam	1414
2	El Alamein	2359
3	Dabaa	4102
4	Matrouh	4491
5	Negeela	2160
6	Barani and Salloum	4837
7	Siwa	18420
	Total area	37783

Source: *Information and Decision Support Center, 2019*

Sample selection

The number of olive farmers registered with the agricultural cooperative society's statements in Ras El Hekma village reached 800 farmers. The sample size was determined using Krejcie and Morgan formula (Krejcie and Morgan, 1970) which turned out to be 260 farmers were selected randomly representing 32.5% of the total farmers in the village.

Data collection and measurement of variables

Data were collected using a structured questionnaire through personal interviews. The questionnaire included four parts which included: the first part a set of questions to measure some personal variables of the surveyed farmers like age, number of education years, olive planted area, productivity average, cultivation experience, leadership, attitude towards agricultural extension, rural organizational participation. The second part contained the most important information sources of respondents regarding the olive productive and marketing recommendations. The third section of the questionnaire was designed to measure the knowledge level of the surveyed farmers about the olive productive and marketing recommendations through 50 questions; by

giving the knowledge of these recommendations a numerical value ranging from 0 to 1; where 0 means not know and 1 means know. The maximum score per respondent was 46 while the minimum was 0. The surveyed farmers were grouped into three levels as low, medium, and high of knowledge using range and category length (Altalb and Filipek, 2016). The fourth part considered information on the most important constraints against olive production and marketing of respondents. Also, the initial test was conducted by interviewing 30 farmers from Ras El Hekma village to reach the required level regarding clarity and understanding of the questions.

Data analysis

Data were analyzed using Statistical Package of Social Science (SPSS) program, version 20 (SPSS, Inc., Chicago IL). Descriptive statistics such as frequency, percentages, means and standard deviation, were used for categorization and description of the variables. Pearson's correlation coefficient was used to determine the relationship between olive farmers' knowledge of production and marketing recommendations and quantitative independent variables. A step wise multiple regression analysis was carried out to determine the independent studied variables responsible for the interpretation of total variance in the dependent variable.

Results

Description of the research sample

The demographic characteristics of the participating farmers and their farms summarized in Table 2, showed that majority of respondents (74.6%) were young and middle-aged (under 51 years). A large proportion of respondents (63%) had an intermediate and university educational qualifications. Results indicated that the cultivated area averaging with olive among the surveyed farmers was 2.26 feddan, one third of the surveyed farmers (33.5%) stated that their olive productivity was less than 2 tons / feddan (Table 2).

The findings also revealed that only around one-third of respondents (35.4%) had a positive attitude toward agricultural extension. The obtained data showed that about three fourth (76.2%) of participants farmers had low social participation in formal organizations such as agricultural co-operative society, community development association, village local council, crop marketing association, and young's centers and charities.

Table 2. Socio-economic characteristics of respondents (N=260)

Characteristics	Categories	No.	%	Mean	Std.
Age (Years.)	Youth (< 35)	70	26.9	42.37	**11.09**
	Middle- age (35 - 51)	124	47.7		
	Old (> 51)	66	25.4		
Education (Years)	Illiterate (0)	77	29.6	7.67	**5.65**
	Basic education (< 12)	19	7.3		
	Intermediate (>12)	124	47.7		
	University (> 16)	40	15.4		
Olive planted area	low (< 4.4) Feddan	221	85	2.26	**2.16**
	Medium (4.4-8.5) Feddan	32	12.3		
	High (> 8.5 Feddan)	7	2.7		
Olive productivity average	low (less than 1 ton)	15	5.8	1.95	**0.47**
	Medium (1-2 ton)	72	27.7		
	High (2 ton and more)	173	66.5		
Olive cultivation experienc (Years)	Low (less than 14)	91	35	17.13	**8.13**
	Medium (14- less than 24)	97	37.3		
	High (more than 24)	72	27.7		
Leadership degree	Low (less than 9)	117	45	10.20	**4.44**
	moderate (9 - 14)	86	33.1		
	High (more than 14)	57	21.9		
Attitude towards agricultural extension	Negative (less than 17)	97	37.3	20.62	**6.43**
	A neutral (17-23)	71	27.3		
	Positive (more than 23)	92	35.4		
Rural organizational participation	Low (less than 3)	198	76.2	1.66	**1.00**
	Medium (3 – 4)	57	21.9		
	High (more than 4)	5	1.9		

Source: Field survey, 2019

Sources of information acquisition

The results showed that traders were one of the main sources of information used by majority the respondent's farmers (75.8%) as shown in table 3. Another important source of information was the family / neighbors jointly who were considered as traditional source by almost two thirds of participants (63%). The results also revealed that 44.4% of the sampled farmers

got their information related to olive production and marketing from extension agents as modern source of information acquisition. Internet as modern information source occupied the fourth position in the ranking order by only 35.8% of respondents. The least used sources of information were mass media sources representing newsletters, followed by television and radio.

Table 3. Frequency distribution of farmers regarding information sources on the olive crop in Matrouh Governorate (N=260)

Sources of information	F.	%
Extension agents	115	44.2
Radio	4	1.5
Television	19	7.3
Newsletters	27	10.4
Researchers	31	11.9
Traders	197	75.8
Family / neighbors	164	63.1
Personal experience	51	19.6
Internet	93	35.8

Source: Field survey, 2019, F: Frequency

The knowledge level on production and marketing recommendations

The results indicated that almost half of the surveyed farmers had a low knowledge level of the olive production and marketing recommendations (Table 4). Although the average of experience years for cultivation of this crop was 17 years, which explained the dependence of these farmers on traditional methods of agriculture.

Table 4. The farmers' knowledge level about the production and marketing recommendations of the olive crop in Matrouh Governorate (N=260)

Characteristics	Categories	No.	%	Mean	Std.
The level of farmers' knowledge of productive and marketing recommendations	Low (<20 degree)	134	51.5	24.5	**11.08**
	Medium (20- 35 degree)	58	22.3		
	High (> 35 degree)	68	26.2		

Source: Field survey, 2019

It is clearly explained that the knowledge level of olive farmers had been arranged in descending order, based on respondents' answers to each extension recommendation (Table 5). The obtained results showed that farmers' knowledge about the most important olive varieties grown in the region was

high, followed by their knowledge about the appropriate time for olive planting. Whereas, their knowledge was medium for: fertilization, preparing the land for agriculture, plowing, hoeing and irrigation. While the production recommendations were represented as low knowledge level by farmers with pruning recommendations and information on the symptoms of infection with pests and diseases, in addition grafting.

Findings also revealed that farmers' knowledge about the appropriate date for the crop harvest occupied the first sequence concerning marketing recommendations, followed by their knowledge about the maturity aspects of the crop. While the recommendation that took the last sequence according to the farmers' knowledge was the olive picking methods (Table 5). This implies that there is a need for farmers' participation in many extension activities such as workshops, training programs, and field days to fill the knowledge deficiencies with regard to some olive farming practices recommendation, whether productive or marketing in the region.

Table 5. Frequency distribution of olive farmers according to their knowledge of productive and marketing recommendations (N=260)

Extension recommendations	**F.**	**%**
Productive recommendations		
The most important varieties grown in the region	242	93.1
Proper planting date	234	90.0
Recommendations on fertilization	171	65.8
preparing the land for cultivation	163	62.7
Plowing and hoeing	158	60.8
Recommendations on irrigation	147	56.5
Recommendations for pruning	73	28.0
Recommendations on the control of olive pests and diseases	62	23.8
Recommendations on the vaccination process	55	21.2
Marketing recommendations		
The appropriate date for the crop harvest	260	100
The maturity aspects of the crop	215	82.7
Sorting and grading	127	48.8
Transport and storage	115	44.2
Crop packaging	110	42.3
Crop picking	55	21.1

Source: Field survey, 2019, F: Frequency

The correlations between the quantitative characteristics of olive farmers and their knowledge degree about production and marketing recommendations

Results showed that there was a negative significant correlation (P<0.01) between age of respondents as one of the important variables with farmers knowledge degree regards olive production and marketing recommendations as shown in Table 6. A positive significant correlation (P<0.01) between years of formal education associated with the knowledge of studied recommendations by the sample farmers. The knowledge level of olive farmers about production and marketing recommendations were positively and significantly correlated (P<0.01) with olive planted area and productivity average. Results also indicated that there was significantly positively correlation (P<0.01) between leadership degree and rural organizations participation of sampled farmers with their knowledge level of the production and marketing recommendations (Table 6). Additionally, olive farmers' attitude towards agricultural extension was considered to be positively and significantly associated with respondents' knowledge level of production and marketing recommendations.

Table 6. Correlation coefficient between some socio-economic characteristics of olive farmers and knowledge level about the production and marketing recommendations using the Pearson Product Moment Correlation (PPMC) test (N = 260)

Sr.	Characteristics (X-variables)	(r)	P-value
1	Age	- 0.209**	0.001
2	Education	0.442**	0.001
3	Olive planted area	0.471**	0.001
4	Olive productivity average	0.563**	0.001
5	Olive cultivation experience	0.189**	0.002
6	Rural organizations participation	0.542**	0.001
7	Leadership degree	0.720**	0.001
8	Attitude towards agricultural extension	0 .782**	0.001

*** r is significant at (p<0.01) level, (r) = Correlation coefficient*

A stepwise regression analysis was used to determine the independent variables responsible for the interpretation of total variance in the dependent variable, which was the farmer's knowledge degree related to the olive production and marketing recommendations. Where the strongest significant correlation with the dependent variable was with the independent variables shown in Table 7.

Table 7. Multiple Regression Analysis between knowledge degree of olive farmers about the production and marketing recommendations with the studied independent variables (N = 260)

Model	Independent variables	R	R Square	Adjusted R Square	Coefficient of determination changes	Std. Error of the Estimate
1	Degree of attitude towards agricultural extension	0.782	0.611	0.610	0.610	6.936
2	leadership Degree	0.828	0.685	0.683	0.073	6.254
3	Degree of participation in rural organizations	0.838	0.702	0.699	0.016	6.091
4	Years of formal education	0.844	0.721	0.707	0.008	6.006
5	Olive planted area	0.847	0.717	0.712	0.005	5. 962

***Significant at 0.01 level*

It was noted that the coefficient of determination concerning the first model and the value of Std were high, the error of the estimate in Model No. 5 was the least error in estimation, as it reached the value of 5.962. The results revealed that the independent variables with a significant relationship in the model were: degree of attitude towards agricultural extension, leadership degree, degree of participation in rural organizations, years of formal education, and olive planted area as these variables were involved for explaining 71.2% of the variance in the olive grower's knowledge degree about production and marketing recommendations (Table 7). With respect to 28%, it was due to other factors that were not included in the standard model.

It also emerged from the analysis that revealing the most important variable which was the degree of attitude towards agricultural extension for alone contributing the interpretation 61% of the variance occurring in the farmer's knowledge degree of olive production and marketing recommendations. This implies the importance of this variable that was firstly ranked for the extent of influence. Whereas, 7.3 % was attributed to the leadership degree variable and 1.6% to the degree of participation in the rural organizations. 0.8% was attributed to the degree of education variable, with respect to olive planted area variable contributed in the interpretation 0.5% of the variance in the dependent variable. It was found that the model was significant at the level of 1%.

Constraints affecting production and marketing process

The results showed that there were many problems related to the production and marketing aspects facing olive farmers in the research area (Table 8). About 70 % of the farmers found that the decline in extension services was the most important productive constraint, this implies absence of the agricultural extension role in the region. Also, the high cost of establishing irrigation networks was represented as production constrain by 65% of the respondents. While nearly half of olive farmers (53.1%) facing the problem of high fertilizers prices which affected their production farming practices in the region. It was also observed that some marketing constraints was encountered by the surveyed farmers. Exploitation and greed of merchants and middlemen was considered as a constraint of their marketing practices by 66.5% of olive farmers (Table 8). Whereas, 58.1% of respondents mentioned that the absence of agricultural marketing extension was an obstacle to their marketing practices of olive harvest.

Table 8. The most important production and marketing constraints facing the surveyed olive farmers (N = 260)

Productivity constraints	F.	%	Marketing constraints	F.	%
Decline extension services performance	184	70.8	Exploitation and greed of middlemen and merchants	173	**66.5**
The high cost of establishing irrigation networks	169	65.0	Absence agricultural marketing extension	151	**58.1**
Increasing fertilizer prices	138	53.1	Unavailability marketing information	124	**47.7**
Labor costs	122	46.9	Lack suitable storage places	88	**33.8**
Rising soil salinity	109	41.9	Remoteness markets from production areas	79	**30.4**
High pesticides prices	99	38.1	High transportation cost	46	**17.7**
Common pests and diseases	**56**	**21.5**	**Absence associations for producers and exporters**	**33**	**12.7**

Source: Field survey, 2019, F: Frequency

Discussion

The majority of respondents were young and middle-aged. Therefore, it is expected that this category may be more vitality, and activity that reflected on their capabilities and willingness to accept various ideas and recommendations

regarding production and marketing of olive crop through extension programs. A large proportion of the respondents had intermediate and university educational qualifications, which may be positively associated to participant's capability of receiving information through different agricultural extension activities and access to information through the internet, thus reducing the lack of knowledge as reported by Tijani and Nurudeen (2012), Oduwole *et al*. (2013) and Diab (2015).

Farming experience is an essential component of acquiring knowledge and skills that can lead to efficient use of inputs, high quality of outputs, and reduced costs which reflect on increasing production of crops (Öztas *et al*., 2018). Nevertheless, the overall rate of olive production for the surveyed farmers was 1.95 tons / acre. Where it was less than the average productivity at the level of the Republic, which is 5.16 tons / acre, despite the fact that the average experience of the respondents in olive cultivation was as high as 17 years. This may reflect a deficiency in the role of agricultural extension in the region, which required more efforts to promote the olive harvest in the region. Results indicated that the average area being cultivated with olive among the surveyed farmers was 2.26 feddan, which was a large area compared to the dwarf and fragmented areas of the valley lands, and it is possible to take advantage of the rather large areas in Matrouh Governorate for implementing modern agricultural techniques that may be difficult to implement in the valley lands. The high level of leadership degree, which was not a small percentage in relation to this variable. These leaders can be relied upon to support extension work as agents of change in the study area to multiply the effects of extension work using their influence and skills in bringing farmers together to participate in extension programs to increase their knowledge on agricultural crops towards achieving development as also reported by Hameed and Sawicka (2017).

The positive attitude toward agricultural extension implies that the extension staff should play a major catalytic role through regular contact with the respondents' olive farmers to promote confidence with these farmers to change the negative and neutral attitude of olive farmers. These findings are in accordance with the finding of Mansour *et al*. (2019) who reported that only 37% of respondents' olive farmers had a positive attitude towards agricultural extension. The low social participation in formal membership organizations. So, there was a need to create awareness among farmers concerning the importance of government or non-government organizations (NGO) which support self-reliance and emphasize participation in their development activities. The latter impact positively in increasing production and marketing of agricultural crops to achieve rural development which stated by Lwanga-Ntale and Kimberly (2004).

Farmers should have the most recent information with regards to new agricultural technologies by using various sources in search of these new technologies (Bala and Sharma, 2008). In this regard, research findings confirmed that farmers' knowledge is often affected by access to information resources (Wilson, 2000; Okunade, 2007). The traders as one of the main sources of information being used by the majority of the respondent's farmers related to olive crop could refer to the importance of traders as a source of information to our knowledge, had not been reported in previous studies. This result is in a line with the finding of Elkashef *et al*. (2017) who stated that the feed suppliers were significantly the most important information sources used by majority of respondents. Another important source of information acquisition was the family/neighbors which were considered as a traditional source by 63% of participants. Similar results found that neighbor farmers and farmers' own family members represented the most preferred traditional sources of information for crops producers regarding their farming practices like input selection, product marketing, seeding techniques, pest management, irrigation, fertilizing and harvesting (Boz, 2002; Boz and Ozcatalbas, 2010). These results are also consistent with those of Chaudhry *et al*. (2008) and Edeoghon *et al*. (2008) who found that family and neighbors were the most important sources used by farmers for obtaining information about modern technologies.

The sampled farmers got their information related to olive production and marketing from extension agents. In this regard, Evenson (1998) mentioned that contact with extension agents consider a mechanism where information on new technologies, better farming practices, in addition, improved managerial skills and knowledge can be transmitted to farmers. Internet as modern information source occupied the fourth position in the ranking order by only 35.8% of respondents. This implies the paramount importance for all agricultural stakeholders, especially farmers, to make effective use of the internet as a tool in information and communication technologies (ICTs) through the dissemination of knowledge to enhance agricultural production (Haruna and Baba, 2017). The least used sources of information were mass media sources representing newsletters, followed by television and radio.

The results indicated that almost half of the surveyed farmers had a low knowledge level of olive production and marketing recommendations. This might be due to intermediate level of education for respondents' farmers, less utilization of information sources especially modern sources, weakness of extension agency regards imparting technical knowledge by training programs, low rural organizational participation, shortage of marketing and production information regarding quantities traded in the markets and production

distributing ways of olive crop. The obtained results imply that there was a need to apply agricultural extension training programs for respondents related to improve their knowledge through the dissemination of technologies and information among the farmers concerning the production and marketing recommendations for olive crop to enhance the farming performance of this important crop in the studied area. Several studies have reported the effectiveness of the extension training programs which impact directly on improving the knowledge level of the trainees (Sharma and Batra, 2003; Singh and Singh, 2006; Biswas *et al*., 2008; Sivashankar and Khedgi, 2011).

A negative significant correlation ($P<0.01$) between age of respondents and the degree of farmers knowledge means that older farmers may not have enough knowledge in using new techniques and ideas related to olive production and marketing. This is because of lack of information or inability to read government directives, in addition, most of them prefer the traditional method which reflected negatively on their production and marketing activities on olive production. These observations are in line with those of Tijani and Nurudeen (2012) who reported that old age reduces the farmers' ability for taking risk and hence their adoption of new ideas and techniques. In addition, they believe in the old methods that had been used over the years. A positive significant correlation ($P<0.01$) between years of formal education and associated with the knowledge about studied recommendations among the sampled farmers was observed. This is due to the fact that education creates awareness, imparts knowledge and curiosity to acquire new skills, moreover, understanding and adopting modern techniques of production (Patil *et al.,* 2009). The positively and significantly correlation ($P<0.01$) regarding olive planted area and productivity average could be explained by the high production of olive crop which indicates a high knowledge level with regards to the effective use and optimal application of olive production and marketing recommendations. It was noticed that olive cultivation experience of respondents was found to have a positive and significant relationship ($P<0.01$) with their knowledge level on the studied recommendations. It is expected that experience may have a positive effect on the farmers management ability (Öztas *et al*., 2018). This result agrees with Oluwasusi (2014) and *Adesope et al.* (2012) who mentioned that the accumulation of experience related to the agricultural practices had a significant impact on raising their knowledge level in farming. These previous results confirmed the findings of Eid (2017) who reported that a positive relationship between the knowledge degree of olive famers regarding safe use of agricultural pesticides with degree of education, olive cultivated area and olive farming experience. Results indicated that there was significantly positively correlation ($P<0.01$) between leadership degree and

rural organizations participation among sampled farmers with their knowledge level of the production and marketing recommendations. Similar results were mentioned by Hameed and Sawicka (2016) who stated that the high level of respondent's knowledge about the economic and production farming aspects due to their participation in many extension activities. This implies for social organizational participation which resulted in attentive awareness among the farmers for extension training programs, leading to improve their knowledge and consequently enhanced these production and marketing recommendations of olive crop in Matrouh governorate. These results are in accordance with the findings of Ingole (1990) and Umeh *et al*. (2018). The same applies to the degree of leadership. As Similar observation was stated by Pelimina and Urassa (2015) that rural leaders have more knowledge related to agriculture, which makes them the focus of attention by farmers. Additionally, olive farmers' attitude towards agricultural extension was considered to be positively and significantly associated with respondents' knowledge level of production and marketing recommendations. It means that agricultural extension activity is an important instrument for acquiring new knowledge among farmers on recommended farming practices, and makes their attitudes positive towards agricultural innovations (Altalb and Filipek, 2016). For this reason, it became necessary to recruit trained and specialized extension personnel for organizing extension programs offering information on the principles of olive crop as the most important crop in Matrouh government by the adoption of acceptable technology or any other recommended production and marketing practices.

Decline of extension services, exploitation and greed of middlemen and merchants, the high cost of establishing irrigation networks, and the absence of agricultural marketing extension were the most important constraints affecting production and marketing practices for olive culture in the region. Similar constrains were mentioned by Mansour *et al.* (2019). This indicated that there is a need for such extension training programs to provide olive farmers with the required information in the region to enhance their productive and marketing skills. Additionally, the need of efficient agricultural extension services of respondents is crucial in supporting them with production requirements such as irrigation networks, fertilizer and pesticides, as well as presenting places to facilitate the sale of products in addition to overcoming exploitation and greed of middlemen and merchants, for optimizing productivity and profit related important olive crop in the region.

Conclusion and Recommendations

Despite Matrouh Governorate is the second largest order of the Arab Egypt Republic in relation to the area being planted with olives, it is still less than the

general average of productivity at the level of the Republic. In this regard, this study highlighted the low knowledge level of respondents' olive farmers about different production and marketing recommendations in the region. Furthermore, the majority of the surveyed farmers has no positive attitude towards agricultural extension, although results indicated that it is the most important variable responsible for interpretation the variance occurring in the farmer's knowledge degree related to olive production and marketing recommendations. It was also observed that the most severe constraints affecting recommended practices of production and marketing, as mentioned by the respondents, were the decline in extension services, exploitation and greed of middlemen and merchants, the high cost of establishing irrigation networks and the absence of agricultural marketing extension. Based upon the findings of the study, the following recommendations are suggested as follows: to provide the extension system staff to change farmers negative and neutral attitude towards agricultural extension, to encourage the targeted farmers to participate in agricultural extension activities through presenting extension services. Additionally, financial facilities and technical support by governmental organizations and non-governmental organizations (NGOs) are needed, to provide training programs which include bringing knowledge and the application of modern agricultural techniques in order to overcome the main problems affecting their production practices, and to prepare specialized marketing institutions in the governorate concerned by providing basic information on the local markets to sell products thereby avoiding the greed of middlemen and traders.

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