

Factors Affecting Farmers' Knowledge on Post-Harvest Practices of the *Chamomile* in Fayoum Governorate, Egypt

Abrar A. Saad¹, Samia A. Mahros¹, Heba N. Mohamed¹, Ahmed N. Abdelhameed²

¹Department of Rural Sociology and Agricultural Extension, Faculty of Agriculture, Ain Shams University, Cairo, Egypt.

²Department of Horticulture, Faculty of Agriculture, Ain Shams University, Cairo, Egypt.

ABSTRACT

This research aimed to 1) know about farmers' knowledge of post-harvest practices of Chamomile crop in Fayoum Governorate, 2) Determine factors affecting respondents' knowledge of post-harvest practices of Chamomile crop, 3) Identify farmers' sources of information related to post-harvest practices of the studies, and 4) Determine problems facing farmers concerning extension services and post-harvesting of the Chamomile crop in the study area. Data were collected via questionnaire forms through personal interviews with a sample of 250 respondents belonging to Al-Jilani, Shakshuk, and Kafr About villages of the Ibshway district in Fayoum governorate during the period of Dec. 2021 to Jan. 2022. Frequencies, percentages, compare means "t" test, Pearson's simple correlation coefficient, stepwise regression analysis, and relative weight used for data analysis and presentation. Findings reveal that most of the respondents (82.3%) are in the highest category of knowledge of post-harvest practices of Chamomile crop. Results also show that there are eleven variables significantly correlated with farmers' knowledge of post-harvest practices of Chamomile crop: Four of them are significantly affecting farmers' knowledge, they are exporting of the production (explains 27.4% of the variance in the dependent variable), farmers' attitudes towards the private agricultural extension (explains 8.4%), farmers' social participation (explains 6%), and frequently visiting centers of agricultural services (explains 4.3%). The most used sources of farmers' information are family members, friends, and neighbors (89.5%), followed by traders (37%). Lack of extension programs for the Chamomile crop and lack of trained labor was the most frequent problems, as indicated by 87.2% and 64.8% of respondents, respectively.

Key words: Post-harvest practices, Knowledge level, Chamomile, Medicinal and aromatic plants, Fayoum governorate.

INTRODUCTION

Agriculture in Egypt is the mainstay of the economic and social structure, as it contributes a large share to the overall development and advancement of society, and its importance is increasing as a profession associated with it and its various activities, more than half of the population, whether in the productive, marketing or manufacturing activity of Agriculture (Fayed and Harhash, 2019).

Egypt strives to promote agriculture as one of the most important sectors of the Egyptian economy in terms of its dependence on it in providing food and clothing to its population, and sources of raw materials for many manufacturing industries, and absorbs about a quarter of the human workforce, and contributes to improving the trade balance through Egypt's exports of agricultural crops, especially vegetables, fruits, medicinal and aromatic plants, and other agricultural products (El Kholly, 2018).

Egypt is one of the oldest countries that produce medicinal and aromatic plants, and it has a comparative advantage in the production and export of these plants with high quality because they are produced at different dates from competing countries. These plants are considered important non-traditional crops with multiple uses, the most

important of which are: the preparation of some medicines, such as medicines to relieve joint pain, rheumatic infections, medicines for hypertension and atherosclerosis, as an antiseptic and increases the body's immunity. The production of fixed oils is contained the seeds of some of these plants is also included in the composition of most medical preparations and food processing for the treatment of angina and atherosclerosis, such as jojoba and castor seed oil, The preparation of cosmetic powders, hair creams and soaps, and used in the perfume industry for these plants Jasmine and Rose. Furthermore, the manufacture of insecticides, which are based on the presence of medicinal and aromatic plants of deadly poisons, whether for insects or fungi, among these plants are Deuce, pedithum, henna and smoke, and are used as spices or drinks, and are also included in some food industries as preservatives, taste enhancers and appetizers (Ibrahim, 2005).

Since medicinal and aromatic plants are one of the most important agricultural commodities that can be relied on to develop and increase Egyptian exports in general and agriculture in particular, they provide the necessary foreign exchange to achieve the Comprehensive Economic Development of the country, especially in light of new global developments such as the establishment of the

World Trade Organization and the emergence of various economic blocs, and great hopes are pinned on medicinal and aromatic plants to increase Egyptian agricultural exports, especially in light of the growing global demand for them as a result of the development in the manufacture of medicines that are safer for human health (Muslim, 2014).

Despite the economic and industrial importance of medicinal and aromatic plants, the multiplicity of their types and higher economic return from them, in addition to Egypt's enjoyment of providing the environmental conditions and the necessary elements for the production of these plants; they do not receive enough attention at the local level (Radwan, 2019).

The cultivated area of medicinal and aromatic plants in Egypt is about 77.623 thousand Feddan, representing about 88% of the total cultivated area in Egypt, amounting to 87.784 million Feddan, during the period (2005-2018), and the average value of exports of medicinal and aromatic plants in Egypt amounted to about 87.084 million dollars, representing 3.85% of the average value of Egyptian agricultural exports of about 2429.5 million dollars, during that period (central agency for public mobilization and statistics, 2021).

It also turns out that the area of medicinal and aromatic plants in Egypt is increasing annually by about 1704 Feddan, representing about 2.2% of its annual average of about 77.622.79 Feddan, of which 69.9% of the area is in the old lands and 30.04% of the area in the new lands, where the area of medicinal and aromatic plants in Egypt concentrate in the governors of central Egypt about 57.11%, then the governors of Upper Egypt about 26.05%, and the governors of the sea face about 12.38%, and the most important importing countries for Egyptian exports of medicinal and aromatic plants are: USA, Germany, Russia, Poland, France, Spain, Brazil, Britain, Netherlands, Canada, with a percentage of about 74.6 % of Egypt's exports, respectively (El-Sayed, 2020).

The Chamomile crop is one of the important medicinal and aromatic crops due to its multiple uses, as it uses in the field of food, medical and cosmetic industries, and chamomile ranks third in terms of relative importance in the cultivated area among medicinal and aromatic plants at the level of the Republic, where the relative importance of the cultivated area was estimated at about 14.91% of the total area cultivated with medicinal and aromatic plants during the average period (2000-2017), the average area planted with chamomile crop is about 9.68 thousand Feddan during the same period, and its cultivated area has developed by an increase of about 87.7 thousand Feddan, or about 109.31% from 2017. (Ministry of Agriculture and land reclamation,

economic affairs sector, Agricultural Economics bulletin, various issues).

Agricultural extension efforts based on providing extension services to farmers in the field of technologies and developments relate to production transactions, but the farmer rarely received extension services in performing post-harvest operations or crop circulation (Al-Qahtani and Adel, 2008). In order for agricultural extension to be able to bring about the desired changes in farmers' knowledge, implement the recommended technical practices and modify their attitudes towards them, its message should be directed to meet their needs, as it begins by determining the level of knowledge of farmers and their ability to implement the practices (Raslan, 2016).

Proper extension work stems only from the reality of existing conditions from the level at which people are located, and that successful extension programs are developed on the basis of people's problems, needs and real concerns, Moreover the human element is a key factor in the success of agricultural development programs aimed at enhancing the optimal trading methods for post-harvest practices for the chamomile crop, farmers need to gain various knowledge, improve their in the field of optimal handling of agricultural crops in general, and the Chamomile crop in particular, the research problem is answering the following questions:

1. What is the level of knowledge of post-harvest practices of Chamomile crop in the study area?
2. What are the factors affecting respondents' knowledge of post-harvest practices of chamomile crop in the study area?
3. What are the most important sources of information related to post-harvest practices of chamomile crop?
4. What are the problems facing the farmers in the field of extension services and post-harvesting of the Chamomile crop in the study area?

OBJECTIVES

Based on the previous quick introduction, the current research aimed to:

1. Understand about farmers' knowledge of post-harvest practices of *Chamomile* crop in the study area.
2. Determine factors affecting respondents' knowledge of post-harvest practices of chamomile crop in the study area.
3. Identify farmers' sources of information related to post-harvest practices of chamomile crop.
4. Determine problems facing farmers in the field of extension services and post-harvesting of the *Chamomile* crop in the study area.

METHODOLOGY

- Sampling

Fayoum Governorate is one of the governors of Central Egypt, located in the North Upper Egypt region. It is in the first place all over the nation in the production of medicinal and aromatic plants. The cultivated area reached about 17.617 thousand Feddan during 2019-2020 season. The chamomile crop is one of the most important export crops in Fayoum Governorate; the cultivated area with such crop reaches 10.167 Feddan during the same season, representing 57.7% of the total cultivated area in the governor. (Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Agricultural Statistics Bulletin, 2020).

Ibshaway district was randomly selected to be the place of the empirical study; then Al-Jelani, Shakshuk, and Kafr Aboud villages have been randomly selected to carry out the study, the total number of Chamomile growers in the three studied villages reached about 698 farmers. Based on the lists of farm holdings, a regular random sample of 250 respondents was responding from the selected villages (135, 58, and 57 respondents, respectively). Data were collected through personal interview of respondents using a pre-tested questionnaire form from December 2021 to January 2022.

- Measurements

The questionnaire also included sets of questions to measure about 24 variables related to farmers' socioeconomic status, as follows:

- 1) **Age:** measured by years old at data collection time.
- 2) **Education:** (1) for Illiterate; (2) to read and write; (3) for basic education, (4) for intermediate education, (5) for university education, and (6) for postgraduate education.
- 3) **Average of monthly income:** measured respondents' indication about the monthly income of the family in pounds.
- 4) **Type of agricultural holding:** measured by (1) for sharing, (2) for renting, and (3) for owning.
- 5) **Farmland ownership:** measured by the number of Karats owned by the respondent.
- 6) **The farm area cultivated Chamomile crop:** measured by respondent indication about the area cultivated with the chamomile crop by Feddan.
- 7) **The Chamomile production per Feddan:** measured by respondents' indication of the quantity of production for Feddan per Kilograms.
- 8) **The revenue of the Chamomile crop:** measured by respondent's statement of the revenue generated from *Chamomile* cultivation in pounds per year.

- 9) **Satisfaction with Chamomile revenue:** measured by respondents' opinions on the extent of satisfaction, (1) for "It makes a big loss", (2) for "It makes the loss", (3) for "covers its costs", (4) for "It makes profits", and (5) for "It makes big profits".
- 10) **Farming experience:** measured by number of years the respondents practice the agriculture as a profession.
- 11) **Chamomile cultivation experiences:** measured by the number of years the respondents practice the cultivation of the *Chamomile*.
- 12) **Amount of handling loses of the Chamomile:** measured by the respondent expression on the loss of the production during the handling process by Kilograms.
- 13) **Exporting the production:** measured by asking respondents whether they export their products or not, (2) for yes and (1) for no.
- 14) **Membership in rural organizations:** measured by asking respondents about their level of membership in rural organizations, (4) for membership in the board of directors, (3) for the committee's membership, (2) for ordinary members, and (1) for non-member.
- 15) **Social Participation:** measured by the degree of respondents' social participation, (4) for always, (3) for sometimes, (2) for rarely, (1) one for none.
- 16) **Type of social participation:** measured by (3) for participate by money, (2) for participate by effort, and (1) for participate by opinion.
- 17) **Exposure to agricultural information sources:** respondents asked to determine their opinion in his exposure to nine sources of information on a three Likert scale (1) for none, (2) for rarely, (3) for sometimes, and (4) for always.
- 18) **Frequently visiting the agricultural service centers:** measured by respondents' indication on the repetitiveness of visiting of seven centers by using a scale compose of (1) for none, (2) for rarely, (3) for sometimes and (4) for always.
- 19) **The degree of leadership:** respondents asked to determine their opinion of nine leadership-related statements, (2) for yes and (1) for no.
- 20) **Openness to the outside world:** respondents asked to determine their repetitiveness of visiting 11 places by using a scale compose of (1) for none, (2) for rarely, (3) for sometimes and (4) for always.
- 21) **Attitudes towards the agricultural extension:** respondents asked to determine their opinion on 15 statements by using a scale compose of (1) for disagree, (2) for neutral, (3) for agree.
- 22) **Attitudes towards the private agricultural extension:** respondents asked to determine their opinion on five statements by using a scale

composition of (1) for disagree, (2) for neutral, (3) for agree.

- 23) **Attitudes towards the agricultural innovations:** respondents asked to determine their opinion on 10 statements by using a scale composition of (1) for disagree, (2) for neutral, (3) for agree.
- 24) **Respondents' degree of dependence on the extension agent:** respondents were asked to determine their opinion on ten statements by using a scale composition of (1) for disagree, (2) for neutral, (3) for agree).
- 25) **Farmers' Knowledge of post-harvest practices of the Chamomile:** respondent were asked to determine their knowledge on 15 post-harvest practices related-statements, on a scale of (1) for not knew, (2) for false, and (3) for true.

- hypotheses

In order to achieve the second objective of the study, one theoretical hypothesis could be formulated as follows: there is a significant relationship between farmers' knowledge of post-harvest practices of Chamomile crop and the studied independent variables. Based on the theoretical hypothesis, 25 statistical hypotheses were formulated.

The statements of 24 statistical hypotheses were "there are no significant relationship between farmers' knowledge of post-harvest practices of *Chamomile* crop and the following studied variables": 1) age, 2) educational status, 3) average monthly income, 4) type of agricultural holding, 5) Farmland ownership, 6) The farm area cultivated *Chamomile* crop, 7) Feddan's quantity of *Chamomile* production, 8) The revenue of the *Chamomile* crop, 9) Satisfaction with *Chamomile* revenue, 10) Farming experience, 11) *Chamomile* cultivation experiences, 12) Amount of handling loses of the *Chamomile*, 13) Exporting the production, 14) Membership in rural organizations, 15) Social Participation, 16) Type of social participation, 17) Exposure to agricultural information sources, 18) Frequently visiting the agricultural services centers, 19) The degree of leadership, 20) Openness to the outsider places, 21) Attitudes towards the agricultural extension, 22)

Attitudes towards the private agricultural extension, 23) Attitudes towards the agricultural innovations, and 24) Respondents' degree of dependence on the extension agent.

The Twenty-fifth statistical hypothesis relates to the combined effect of independent variables on farmers' knowledge of post-harvest practices of *Chamomile* crop, it was formulated as "farmers' knowledge of post-harvest practices of *Chamomile* crop does not affect by the combined independent variables".

- Statistical Analysis

Frequencies, percentages, compare means "F" test, Pearson's simple correlation coefficient, Stepwise regression analysis, and relative weight use to data analysis and presentation.

RESULTS AND DISCUSSION

1. Farmers' Characteristics

Figures in Table 2 represent the main characteristics of the respondents, among the main findings is that the majority (80.8%) matured (40 years and more), 37.4% have a secondary degree of education. On the economic aspects, the majority of respondents, 58.8%, have an income less than 3000 Egyptian pounds, 48% have less than three Feddan cultivated by *Chamomile*, 98% produce about 1.6 ton *Chamomile* per Feddan per year, and 89% of them gain about 35.5 thousand Egyptian pounds per year.

On social aspects the majority of respondents, (58.2%) have over 20+ years of experian in agriculture, (60.4%) have less than 17 years of experian in *Chamomile* cultivation. Most of the respondents (91%) are low, social participants, low exposures to agricultural information sources (69.2%). Findings also show that the majority of respondents have low frequently visiting the agricultural service centers (80%), and have a low openness degree (60.4%). With regard to attitudes, the majority of respondents, (76.8%), have negative attitudes towards the public agricultural extension and positive attitudes towards private agricultural extension, (49.6%) of them have positive attitudes towards the agricultural innovations, with low degree of dependence on the extension agent (45.6%).

Table 1: research sample from farmers of the Chamomile crop in Ibshaway District, Fayoum Governorate.

Selected villages	Population		Sample	
	Number	%	Number	%
Al-Jelani	377	54.1	135	54.1
Shakshuk	162	23.2	58	23.2
Kafr Aboud	159	22.7	57	22.7
Total	698	100	250	100

Source: Directorate of Agriculture, Fayoum Governorate, 2020.

- Measurements

Table 2: Characteristics of respondents

No.	Variables	Frequency	Percentages
1	Age:		
	Younger age (20- 38 years old)	48	19.20
	Middle age (39-57 years old)	151	60.40
	Old age (57-74 years old)	51	20.40
2	Education:		
	Illiterate	61	24.40
	reads and writes	72	28.80
	primary education	1	0.40
	secondary education	94	37.60
	university education	22	8.80
	postgraduate education	0	0
3	Average of monthly income:		
	low (500-3000 pounds)	147	58.80
	medium (3000-5500 pounds)	76	30.40
	high (5500-8000 pounds)	27	10.80
4	Type of agricultural holding:		
	Owning	9	3.60
	Renting	94	37.60
	Sharing	147	58.80
5	Farmland ownership:		
	low (less than 224 Karats)	247	98.80
	medium (224 - 447 Karats)	3	1.20
	high (more than 448 karats)	0	0
6	Farm area cultivated by Chamomile crop:		
	low (less than 64 Karats)	244	97.60
	medium (64 - 127 Karats)	3	1.20
	high (more than 128 karats)	3	1.20
7	The Chamomile production per Feddan:		
	low (less than 1666 Kg\year)	120	48
	medium (1666-2834 Kg\year)	98	39.2
	high (more than 2834 Kg\year)	32	12.8
8	The revenue of the Chamomile crop:		
	low (less than 35667 pound\year)	223	89.20
	medium (35667-67833 pound \year)	12	4.80
	high (more than 67833 pound \year)	15	6.00
9	Satisfaction with Chamomile revenue:		
	It makes a big loss	0	0
	It makes loss	18	7.20
	Covers its costs	164	65.60
	It makes profits	64	25.6
	It makes big profits	4	1.60
10	Farming experience:		
	low (less than 20 years)	82	32.80
	medium (21 - 38 years)	123	49.20
	high (more than 38 years)	45	18.00
11	Chamomile cultivation experiences:		
	low (less than 17 years)	151	60.40
	medium (17 - 33 years)	90	36.00
	high (more than 33 years)	9	3.60

Cont. Table 2: Characteristics of respondents

No.	Variables	Frequency	Percentages
12	Amount of handling loses of the Chamomile:		
	low (less than 20 Kg\Feddan)	202	80.80
	medium (21-38 Kg\ Feddan)	44	17.60
	high (more than 38 Kg\ Feddan)	4	1.60
13	Exporting the production:		
	Export	185	74.00
	Not export	65	26.00
14	Membership in rural organizations:		
	low (less than 8 degrees)	250	100.00
	medium (8-12 degrees)	0	0
	high (more than 12 degrees)	0	0
15	Social Participation:		
	low (less than 8 degrees)	228	91.20
	medium (8-12 degrees)	22	8.80
	high (more than 12 degrees)	0	0
16	Type of social participation:		
	by opinion (less than 7 degrees)	221	88.40
	by effort (7-10 degrees)	29	11.60
	by money (more than 10 degrees)	0	0
17	Exposure to agricultural information sources:		
	low (less than 18 degrees)	173	69.20
	medium (18-27 degrees)	57	22.80
	high (more than 27 degrees)	20	8.00
18	Frequently visiting the agricultural services centers:		
	low (less than 14 degrees)	200	80.00
	medium (14-21 degrees)	28	11.20
	high (more than 21 degrees)	22	8.80
19	The degree of leadership:		
	low (less than 12 degrees)	17	6.80
	medium (13-15 degrees)	53	21.20
	high (more than 16 degrees)	180	72.00
20	Openness to the outside world:		
	low (less than 22 degrees)	151	60.40
	medium (22-33 degrees)	63	25.20
	high (more than 33 degrees)	36	14.40
21	Attitudes towards the agricultural extension:		
	negative (less than 25 degrees)	192	76.80
	neutral (25-35 degrees)	13	5.20
	positive (more than 35 degrees)	45	18.00
22	Attitudes towards the private agricultural extension:		
	negative (less than 8 degrees)	45	18.00
	neutral (9-12 degrees)	13	5.20
	positive (more than 12 degrees)	192	76.80
23	Attitudes towards the agricultural innovations:		
	negative (less than 17 degrees)	17	6.80
	neutral (17-23 degrees)	109	43.60
	positive (more than 23 degrees)	124	49.60
24	Respondents' degree of dependence on the extension agent:		
	low (less than 17 degrees)	114	45.60
	medium (17-23 degrees)	97	38.80
	high (more than 23 degrees)	39	15.60

Source: study's findings.

2. Farmers' knowledge on post-harvest practices of chamomile crop in the study area

In order to investigate the mean differences in farmers' knowledge of post-harvest practices of chamomile crop within the three studied villages, compare means "f" test (more than two-independent samples) was used. Findings in Table 3 revealed that the "f" value reached 167.814, such value is not significant at any probability level; this indicated that there are no mean differences in farmers' knowledge of post-harvest practices of chamomile crops within the three studied villages, which resulted in the combination of the three study's samples into one sample.

Results presented in Table 4 show that the actual range of farmers' responses on post-harvest practices of chamomile crop ranged between a maximum of 45 degrees and a minimum of 15 degrees. The arithmetic mean reached about 2.76 degrees with a standard deviation of 54 degrees.

By dividing respondents into three categories according to their scores, it became clear that most of the respondents (82.3%) are in the highest

category of knowledge, only one tens of respondents (11.8%) are located in the medium category of knowledge, and 5.9% of the sample are falling into the category of low level of knowledge.

3. Factors affecting respondents' knowledge on post-harvest practices of Chamomile crop in the study area

Pearson's correlation coefficient was used to determine the direction, strength, and the significance of the bivariate relationships of the variable in the study. The value of correlation coefficient closer to one indicates the existence of the strong relationship. Findings in table 5 show that there are eleven variables were significantly correlated with farmers' knowledge of post-harvest practices of *Chamomile* crop (Y) at both 0.01 and 0.05 levels of probability. These variables are Educational status (X2), Satisfaction with Chamomile revenue (X9), Farmers' experiences on *Chamomile* cultivation (X11), Exporting the production (13), Membership in rural organizations (X14), Social Participation (X15),

Table 3: f test of mean differences of farmers' knowledge on post-harvest practices of chamomile crop in within the three studied villages

Contrast source	Sum of squares	Degrees of freedom	Mean square	Calculated "F"
Between groups	534.380	1	534.380	
Within groups	803.020	249	3.238	167.814
Total	1346.400	250		

Source: study's findings

Table 4: Results of the statistical analysis of the knowledge level of the chamomile growers of the total post-harvest treatments

Range		Mean	Standard Deviation	knowledge level					
Minimum	Maximum			Low 15 – 25 degree		Medium 25 – 35 degree		High 35 – 45 degree	
				Frequency	%	Frequency	%	Frequency	%
15	45	2.76	0.54	13	5.9	26	11.8	181	82.3

Source: study's findings.

Table 5. Values of Pearson's correlation coefficients between level of farmers' knowledge on post-harvest practices of chamomile crop and the studied variables

Hypothesis Number	Independent Variables	Pearson's correlation coefficient
2	The educational status	0.205*
9	The Satisfaction with Chamomile revenue	0.241*
11	Farmers' experiences on <i>Chamomile</i> cultivation	0.202*
13	Exporting of the production	0.524**
14	Membership in rural organizations	-0.321**
15	Farmers' Social Participation	-0.203*
16	Type of social participation	-0.203*
18	Frequently visiting the agricultural services centers	0.196*
20	Openness to the outsider places	0.317**
22	Farmers' attitudes towards the private agricultural extension	0.264**
24	Farmers' degree of dependence on the extension agent	-0.220*

Source: study's findings

Type of social participation (X16), Frequently visiting the agricultural services centers (X18), Openness to the outsider places (X20), Attitudes towards private agricultural extension (X22), and Respondents' degree of dependence on the extension agent (X24).

In order to investigate in percent, the contribution of the studied independent variables in the interpretation of variance in the studied dependent variables (farmers' knowledge of post-harvest practices of *Chamomile* crop), Step-Wise Regression Analysis was used.

The model presented in Table 6 reports the result of regression analysis based on four independent variables namely exporting of the production (X13), farmers' Social Participation (X15), frequently visiting the agricultural services centers (X18), and farmers' attitudes towards the private agricultural extension (X22), indicate the positive relationship and statistically significant relationship ($P\ 0.000 < 0.01$) with the dependent variable (Y) (farmers' knowledge on post-harvest practices of *Chamomile* crop). The independent variables accounted for 46.1 percent (adjusted $R^2 = 0.461$) of variance independent variable.

The ANOVA tests the acceptability of the model from a statistical perspective; the significance value of the F-statistic is less than 0.01, which means that the variation explained by the model is not due to chance. The results in Table 6 revealed that the most significant factor influencing the dependent variable farmers' knowledge on post-harvest practices of *Chamomile* crop (Y) including Exporting of the production (X13) (explains about 27.4%) followed by farmers' attitudes towards the private agricultural extension, X22, (explains about 8.4%), farmers' Social Participation, X15, (explains about 6%), In addition, frequently visiting the agricultural services centers, X18, (explains about 4.3%), in summary, there was sufficient statistical evidence to support H13, H15, H18, and H22 hypotheses.

4. Farmers' sources of information related to post-harvest practices of *Chamomile* crop

The third objective of the research was to

identify the sources of agricultural information used by farmers for acquiring the post-harvest practices for the *Chamomile* crop. Results presented in table (7) showed that the actual range of farmers' responses in this variable ranged between 9 and 36 degrees, with a mean of 16.6 and 6.05 scores of the standard deviation. Findings also show that the majority of respondents (69.2%) are in the low category, while 22.8 of them are in the medium one, while the remaining percentage (8%) is in the highest category of information sources as indicated by respondents.

To identify the importance of agricultural information sources from the viewpoint of farmers, results in table 8 show the descending ranking of the studied information sources as indicated by farmers. Findings indicated that the most sources from which the respondents obtain their information on post-harvest practices for the *Chamomile* crop is family members, friends and neighbors as relative weight about 89.5%, followed by Traders with relative weight about 37%. Results also show that associations belonging to export companies (the relative weight is 28%) were located in the third place as sources of information on farmers' knowledge of post-harvest practices for the *Chamomile* crop, while the Social media was in the fourth rank as the relative weigh reaches 21.6%.

In the other hand, findings show that the governmental extension services provided by extension agent or extension publications or provided by the directorate of agriculture at the governorate level have late ranks as their relative weighs less than 17%.

5. Problems facing farmers in the field of extension services and post-harvesting of the *Chamomile* crop in the study area

The results in Table (9) Show that the most important problems related to the agricultural extension were; the lack of extension programs for the *Chamomile* crop (as indicated by 87.2% of respondents), the lack of extension meetings and workshops at district level to educate farmers (as indicated by 86.4% of respondents).

Table 6: Accumulative effect of the studied variables in farmers' knowledge on post-harvest practices of *Chamomile* crop

Model	Variables	R ²	Adjusted R ²	% of explained variance	F
1 st	Exporting of the production (X13)	0.524	0.274	27.40	37.04**
2 nd	Farmers' Social Participation (X15)	0.578	0.334	6.00	24.3**
3 rd	Frequently visiting the agricultural services centers (X18)	0.614	0.377	4.30	19.3**
4 th	Farmers' attitudes towards the private agricultural extension (X22)	0.679	0.461	8.40	20.3**

Source: study's findings.

Table 7: Farmers' degree of exposure to sources of information related to post-harvest practices of *Chamomile* crop

Range		Mean	standard deviation	Exposure to agricultural information sources					
				Low		Medium		High	
Minimum	Maximum			9- 18 degree	18 – 27 degree	27 – 36 degree			
				Frequency	%	Frequency	%	Frequency	%
9	36	16.6	6.05	173	69.2	57	22.8	20	8

Source: study's findings.

Table 8: Farmers' sources of information related to post-harvest practices of *Chamomile* crop

Information Sources	Always		Sometimes		Scarcely		Relative Weight (%)
	Freq,	%	Freq,	%	Freq,	%	
1. Family members, friends, and neighbors	190	76	46	18.4	9	3.6	89.47
2. Traders	55	22	42	16.8	28	11.2	36.93
3. Associations belonging to export companies	29	11.6	50	20	23	9.2	28.00
4. Social media	25	10	25	10	37	14.8	21.60
5. Agricultural Cooperative	26	10.4	16	6.4	22	8.8	17.60
6. Agricultural extension agent	23	9.2	12	4.8	34	13.6	16.93
7. Agricultural bulletins	17	6.8	9	3.6	52	20.8	16.13
8. Agricultural Extension Magazine	8	3.2	29	11.6	24	9.6	14.13
9. Directorate of Agriculture	6	2.4	27	10.8	23	9.2	12.67

Source: study's findings.

Table 9: Problems facing farmers in the field of agricultural extension and post-harvesting of the *Chamomile* crop as mentioned by respondents

The problems and difficulties	Always	%
Agricultural extension problems		
1. Lack of extension programs for the chamomile crop	218	87.2%
2. lack of extension meetings and workshops at district level to educate farmers	216	86.4%
3. Lack of access to agricultural extension magazines for farmers	209	83.6%
4. The scarcity of the guide's visits to the chamomile farmers in the fields and houses	204	81.6%
5. Failure to provide a specialized agricultural guide in the field of post-harvest transactions for the chamomile crop	203	81.2%
6. Lack of a guide when you need it	201	80.4%
7. Poor knowledge of the agricultural extension guide with sufficient information about the post-harvest transactions of the chamomile crop	195	78%
8. Lack of radio programs directed to farmers	195	78%
9. Lack of Agricultural bulletins for the chamomile crop	170	68%
10. The agricultural guide does not have a specific place in which he is located	151	60.4%
11. Lack of extension fields for the chamomile crop	127	50.8%
12. Lack of TV programs directed at farmers	114	45.6%
Post-harvest transactions problems		
1. Lack of trained labor	162	64.8%
2. Lack of dryers	144	57.6%
3. Lack of proper packaging	137	54.8%
4. High prices for packaging	137	54.8%
5. High transportation costs	60	24%
6. High crop losses	42	16.8%
7. High collection costs	39	15.6%

Source: study's findings.

While the most important problems related to post-harvesting of the *Chamomile* crop were, lack of trained labor (as reported by 64.8% of respondents) followed by lack of dryers (57.6%), lack of suitable

packaging and high prices of packaging as mentioned by 54.8% of respondents.

CONCLUSIONS & RECOMMENDATIONS

It became clear that most of the respondents are in the highest category of knowledge of post-harvest practices of *Chamomile* crops. Moreover, the most significant factors influencing farmers' knowledge of post-harvest practices of Chamomile crop exported of the production, followed by farmers' attitudes towards the private agricultural extension, their social participation, and frequently visiting the agricultural service centers.

The most sources from which the respondents obtain their information of post-harvest practices for the *Chamomile* crop are family members, friends and neighbors, followed by traders of such crop. It concluded that the most important problems facing the producers of the *Chamomile* crop include the lack of extension programs for the *Chamomile* crop and the lack of trained labor.

Based on the obtained results, the below recommendations could draw:

- 1-More efforts should be made to enhance the capabilities of public extension agents on post-harvest practices of *Chamomile* crop, as well as other medicinal and aromatic plants.
- 2-Planning and implementing training programs to teach farmers post-harvest practices of medicinal and aromatic plants especially the *Chamomile* crop.
- 3-More efforts should be made for strengthen the official sources of agricultural information concerning the post-harvest practices of medicinal and aromatic plants and the *Chamomile* crop in particular.
- 4-More studies should be conducted to enrich the knowledge on factors affecting farmers' knowledge of the production and marketing of medicinal and aromatic plants.

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الملخص العربي

دراسة لبعض العوامل المؤثرة علي المستوي المعرفي للتوصيات الفنية لمعاملات ما بعد الحصاد لزراع محصول شيح البابونج بمحافظة الفيوم

أبرار أحمد سعد محمود¹، سامية عبد العظيم محروس¹، هبة نور الدين محمد¹، أحمد نظمي عبد الحميد²
¹قسم المجتمع الريفي والإرشاد الزراعي، كلية الزراعة، جامعة عين شمس، القاهرة، مصر.
²قسم البساتين، كلية الزراعة، جامعة عين شمس، القاهرة، مصر.

استهدف البحث الحالي: (1) التعرف على معارف المزارعين حول معاملات ما بعد الحصاد لمحصول شيح البابونج بمنطقة الدراسة، (2) تحديد العوامل المؤثرة في معارف الزراع حول معاملات ما بعد الحصاد لمحصول شيح البابونج، (3) التعرف على مصادر معلومات المزارعين حول معاملات ما بعد الحصاد لمحصول شيح البابونج، و(4) تحديد المشكلات التي تواجه المزارعين في مجال الإرشاد الزراعي ومعاملات ما بعد الحصاد لمحصول شيح البابونج بمنطقة الدراسة. ولتحقيق أهداف البحث تم اختيار عينة عشوائية منتظمة من زراع شيح البابونج بثلاث قري بمحافظة الفيوم بلغ قوامها 250 مبحوثاً، وبما يمثل نحو 35.7% من إجمالي الزراع بالقري الثلاث، وتم تصميم استمارة استبيان جمعت بالمقابلة الشخصية خلال الفترة من شهر ديسمبر 2021 وحتى شهر يناير 2022، واستخدم في تحليل البيانات إحصائياً التكرارات والنسب المئوية ومعامل الارتباط البسيط بيرسون، وتحليل الانحدار المتعدد المتدرج Step wise Regression لتحليل بيانات الدراسة. وقد تمثلت أهم النتائج في: إرتفاع المستوي المعرفي للزراع للتوصيات الفنية لمعاملات ما بعد الحصاد لمحصول شيح البابونج إذ تبين أن الغالبية العظمي من المبحوثين (82.3%) من فئة المستوي المعرفي المرتفعة، وبيّنت النتائج وجود علاقة إرتباطية معنوية بين مستوي معرفة الزراع المبحوثين بالتوصيات الفنية لشيخ البابونج وبين كل من المتغيرات المستقلة التالية: "الحالة التعليمية، درجة الرضا عن العائد من محصول شيح البابونج، عدد سنوات الخبرة في زراعة شيح البابونج، التصدير، العضوية في المنظمات الريفية، المشاركة في المنظمات الريفية، نوع المشاركة في المنظمات الريفية، التردد علي مراكز الخدمات الزراعية، الإنفتاح علي العالم الخارجي، درجة الإعتماد علي الإرشاد الغير حكومي"، كما تبين أن هناك أربعة متغيرات مستقلة يفسر نحو 45.9% من التباين الحاصل في المتغير التابع وهم "التصدير، والمشاركة في المنظمات الريفية، والتردد علي مراكز الخدمات الزراعية، ودرجة الإعتماد علي الإرشاد الغير حكومي"، وأوضحت النتائج أن أهم المشكلات الإرشادية التي تواجه المزارعين كانت: قلة البرامج الإرشادية الخاصة ب محصول شيح البابونج بنسبة 87.2%، وكانت أهم المشكلات التسويقية: نقص العمالة المدربة بنسبة 64.8% .

الكلمات المفتاحية: معاملات ما بعد الحصاد، المستوي المعرفي، شيح البابونج، النباتات الطبية والعطرية، محافظة الفيوم.