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Evaluation of agricultural extension services for date farmers in Anbar Province, Iraq

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Abstract

This study aims to evaluate the level of agricultural extension services provided to date farmers in Anbar Province, focusing on the effectiveness of these services in promoting the adoption of modern agricultural practices. The study relied on a questionnaire to collect data from a sample of 345 farmers distributed across different areas of the province. The results showed significant relationships between age and some agricultural practices such as cultivation methods, number of pollinations, pesticide use, and insect diagnosis time, while no significant relationship was found between age and other techniques such as palm variety selection or pollination method. The results also showed a significant relationship between educational level and the appropriate time for grafting, while no significant relationship was found with the correct method of insect diagnosis or sources of information. As for orchard size, the study revealed a notable deficiency in the provision of agricultural extension services in vital areas such as timely pollination, pollination, fruit thinning, and pest and disease control. The study recommended developing agricultural extension programs, intensifying training courses, and promoting the adoption of modern agricultural practices to ensure the sustainability of date production in the province.

Keywords: Extension services, calendar, date palm cultivation

Introduction

Introduction and research problem

The agricultural sector in Iraq is one of the important economic and social sectors that form a fundamental pillar for the country's stability and development, given its prominent role in achieving food security and self-sufficiency, as it accounts for about 20% of the gross domestic product [1]. Iraq has historically been known as one of the oldest agricultural regions in the world thanks to its diverse crops, which include grains, vegetables, fruits, and palm trees. Date palm trees [2] are considered one of the oldest and most important types of fruit trees, and are believed to have originated in Mesopotamia more than 6,000 years ago [3]. Dates are characterized by their high nutritional value and low production costs compared to other crops [4], making them one of the most strategic crops in arid and semi-arid environments between latitudes 15-30 north of the equator [5].

Iraq ranks high in global date production, with about 32 million palm trees [6]. Anbar Governorate is one of the agricultural regions rich in natural resources, where palm cultivation is an integral part of the governorate's agricultural and economic heritage. Dates contribute to supporting the local economy and providing employment opportunities in rural communities [7]. However, the palm cultivation sector faces significant challenges that have been reflected in a decline in date production in recent years. The most prominent of these challenges are: the spread of pests and diseases such as the red palm weevil, water scarcity and irregular irrigation [8], climate change such as rising temperatures and increased drought, as well as poor agricultural management and continued reliance on traditional methods [9]. Economic factors such as high farming costs, weak marketing, and lack of government support also contribute to reducing farmers' ability to invest in improving production [10].

These challenges lead to declining productivity and quality, threatening Iraq's position as one of the world's leading date producers [11]. This highlights the pivotal role of agricultural extension as a key tool for providing farmers with the knowledge and technical services that help them address these issues, through guidance on modern techniques and improved agricultural practices [12]. However, current indicators reflect disparities in the level of agricultural extension services in the province in terms of coverage and efficiency, as well as shortcomings in vital areas such as marketing, financing, and specialized technical support. Hence, the problem of the study is defined by the main question:

What is the level of agricultural extension services provided to date farmers in Anbar province? How effective are they in meeting their agricultural, technical, and production needs?

Area of the study

Anbar province was chosen as the study area due to the diversity of its regions, which extend from Fallujah in the east to Rutba in the west, and from Rawa in the north to Al-Nukhayb in the south. It is bordered by Nineveh province to the north, Najaf province to the south, Baghdad, Babil, and

Karbala provinces to the east, and the Kingdom of Jordan to the west. As shown in the administrative map [13], the total area suitable for agriculture in the province is approximately 138,288 dunams, of which 27,196 dunams are planted with palm trees, equivalent to about 20% of the total agricultural area in the province.

Research community

All palm grove owners within the agricultural divisions affiliated with the Anbar Agriculture Directorate, numbering 12,842 farmers distributed across the agricultural divisions in Anbar Province, were included. For the purpose of calculating a research sample representative of the total population, the Stegson-Thompson equation was used, with a sample size of 345 respondents representing 2.68% of the study population.

Data collection tool

A questionnaire was used to collect data for the study. The questionnaire was prepared and distributed to farmers in Anbar province and included a set of questions addressing the main topics related to the research topic. These topics were: orchard planning, including tree distribution methods and space organization; methods of planting seedlings and the extent to which farmers adhere to scientific recommendations; horticultural services, including grafting, pollination, fruit thinning, pruning, as well as traditional and modern irrigation methods, organic and chemical fertilization, pest and disease control, especially red palm weevil, and finally harvesting and production, which was related to harvesting methods and crop quality. The questionnaire questions were designed to cover these areas, as they represent the basic variables used to measure the level of farmers' adoption of palm cultivation techniques.

Statistical methods

A set of statistical methods was used to analyze the study data, relying on descriptive statistics through frequencies, percentages, means, and standard deviation to present the general characteristics of the respondents. The Chi-Square test was also used to measure the relationship between demographic characteristics and agricultural practices and the level of extension services provided. In addition, some supporting statistical indicators were used to accurately interpret the results and reach sound scientific conclusions.

Results and Discussion

1. Chi-square test for the relationship between age and the cultivation of the most suitable commercial palm species

Table 1: Chi-square test for the relationship between age and the cultivation of the most suitable commercial palm species

Age	Most suitable commercial palm species		Total	Significance
	Known	Unknown		
21-38	47	66	113	0.006
39-56	44	106	150	
57-75	41	41	82	
Total	132	213	345	

Table 4.58 shows that there is no significant relationship between age and the cultivation of the most suitable commercial palm species.

2. Chi-square test for the relationship between age and knowledge of the importance of irrigation

Table 2: Chi-square test for the relationship between age and knowledge of the importance of irrigation

Age	Importance of irrigation			Total	Meaningful
	Known	Don't know	To some extent		
21-38	23	13	77	113	0.001
39-56	26	10	114	150	
57-75	32	10	40	82	
Total	81	33	131	345	

Table No. (4.59) shows that there is a significant relationship between age and knowledge of the importance of irrigation.

3. Chi-square test for the relationship between age and farming method

Table 3: Chi-square test for the relationship between age and farming method

Age	Farming method			Total	Significance
	Seeds	Seedlings	Other		
21-38	15	93	5	113	0.000
39-56	17	124	9	150	
57-75	9	51	22	82	
Total	41	268	36	345	

Table 3 shows that there is a significant relationship between age and farming method.

4. Chi-square test for the relationship between age and number of pollinations

Table 4: Chi-square test for the relationship between age and number of inseminations

Age	Number of inseminations		Total	Significance
	Once	Number of times		
21-38	49	64	113	0.000
39-56	78	72	150	
57-75	59	23	82	
Total	186	159	345	

Table 461. shows that there is a significant relationship between age and number of inseminations.

5. Chi-square test for the relationship between age and type of fertilizer used

Table 5: Chi-square test for the relationship between age and type of fertilizer used

Age	Type of fertilizer used		Total	Significance
	Urea	Dab		
21-38	56	57	113	0.008
39-56	80	70	150	
57-75	58	24	82	
Total	194	151	345	

Table 5 shows that there is no significant relationship between age and the type of fertilizer used.

6. Chi-square test for the relationship between age and the use of recommended pesticides for palm weevils

Table 6: Chi-square test for the relationship between age and the use of recommended pesticides for palm weevils

Age	Use of recommended pesticides for palm weevils			Total	Significance
	Not approved	Agree	To some extent		
21-38	22	1	90	113	0.004
39-56	23	1	126	150	
57-75	29	2	51	82	
Total	74	4	267	345	

Table 6 shows that there is a significant relationship between age and the use of recommended pesticides for palm weevils.

7. Chi-square test for the relationship between age and the most appropriate method of fruit thinning

Table 7: Chi-square test for the relationship between age and the most appropriate method of fruit thinning

Age	Most appropriate method of fruit thinning		Total	Significance
	By hand	By machine		
21-38	90	23	113	0.040
39-56	116	34	150	
57-75	53	29	82	
Total	259	86	345	

Table 7 shows that there is no significant relationship between age and the most appropriate method of fruit thinning.

8. Chi-square test for the relationship between age and the appropriate time to diagnose chorea

Table 8: Chi-square test for the relationship between age and the appropriate time for diagnosing xerosis

Age	Appropriate time for diagnosis of xerosis		Total	Significance
	Not applicable	Applicable		
21-38	46	67	113	0.00
39-56	63	87	150	
57-75	14	68	82	
Total	123	222	345	

Table 8 shows that there is a significant relationship between age and the appropriate time for diagnosing chorea.

9. Chi-square test for the relationship between age and the most appropriate method of vaccination

Table 9: Chi-square test for the relationship between age and the most appropriate method of vaccination

Age	Most appropriate method of vaccination		Total	Significance
	Yes	Manual		
21-38	89	24	113	0.516
39-56	116	34	150	
57-75	59	23	82	
Total	264	81	345	

Table 9 shows that there is no significant relationship between age and the most appropriate method of contraception.

10. Chi-square test for the relationship between age and the procedure of gradual progression

Table 10: Chi-square test for the relationship between age and the gradual process

Age	Graduation procedure			Total	Significance
	Disagree	Agree	To some extent		
21-38	53	44	16	113	0.798
39-56	76	57	17	150	
57-75	43	32	7	82	
Total	172	133	40	345	

Table 10 shows that there is no significant relationship between age and the timing of the procedure.

11. Chi-square test for the relationship between education level and the appropriate time for performing the grafting procedure

Table 11: Chi-square test for the relationship between education level and the appropriate time for the grafting procedure

Level of education	Appropriate time for the procedure			Total	Moral
	Winter	Autumn	Spring		
Mother	6	0	12	18	0.002
Elementary	35	0	29	64	
Average	31	0	33	64	
Preparatory	27	0	30	57	
Institute	22	0	20	42	
Faculty	44	0	28	72	
Graduate Studies	17	2	9	28	
Total	182	2	161	345	

Table 11 shows that there is a significant relationship between the level of education and the appropriate time to perform the procedure.

12. Chi-square test for the relationship between the level of education and the correct method of diagnosing the insect

Table 12: Chi-square test for the relationship between education level and the correct method

Level of education	correct method for diagnosing scale insects		Total	Significant
	Presence of small gray or white scales on the wicker and branches	Yellowing and stiffening of all fronds		
Mother	14	4	18	0.029
Elementary	43	21	64	
Average	36	28	64	
Preparatory	29	28	57	
Institute	17	25	42	
College	33	39	72	
Graduate Studies	16	12	28	
Total	188	157	345	

Table 12 shows that there is no significant relationship between the level of education and the correct method of diagnosing scabies.

Chi-square test for the relationship between education level and sources of information

Table 13: Chi-square test for the relationship between education level and sources of information

Level of education	Sources of information		Total	Significance
	Agricultural guidance	Other		
Mother	4	14	18	0.041
Elementary	37	27	64	
Average	24	40	64	
Preparatory	19	38	57	
Institute	19	23	42	
College	26	46	72	
Graduate Studies	13	15	28	
Total	142	203	345	

Table 13 shows that there is no significant relationship between the level of education and sources of information on palm cultivation techniques.

14. Chi-square test for the relationship between farm size and the appropriate time for grafting

Table 14: Chi-square test for the relationship between farm size and the appropriate time for grafting

Farm area	Appropriate time for grafting			Total	Significance
	Winter	Autumn	Spring		
1 – 9	163	0	124	289	0.035
10 – 18	16	0	30	46	
19 – 28	3	0	7	10	
Total	182	2	161	345	

Table 14 shows that there is no significant relationship between farm size and the optimal time for planting.

15. Chi-square test for the relationship between farm size and the appropriate time to control insects:

Table 15: Chi-square test for the relationship between farm size and the optimal time for controlling insects

Farm area	Appropriate time for insect control		Total	Significance
	Applicable	Not applied		
1 – 9	148	141	289	0.009
10 – 18	31	15	46	
19 – 28	9	1	10	
Total	188	157	345	

Table 15 shows that there is no significant relationship between farm size and the optimal time for pest control.

16. Chi-square test for the relationship between farm size and The appropriate method of pollination

Table 16: Chi-square test for the relationship between farm size and the appropriate method of pollination

Farm area	The appropriate method of pollination		Total	Significance
	Applied	Not applicable		
1 – 9	63	226	289	0.007
10 – 18	18	28	46	
19	10	10	10	
Total	81	264	345	

Table 16 shows that there is no significant relationship between farm size and the appropriate method of pollination.

17. Chi-square test for the relationship between farm size and the use of gradation

Table 17: Chi-square test for the relationship between farm size and the use of gradation

Farm size	Gradation use			Total	Significance
	Not approved	Sometimes	Approved		
1 – 9	145	28	116	289	0.012
10 – 18	22	12	12	46	
19 – 28	5	0	5	10	
Total	172	40	133	345	

Table 17 shows that there is no significant relationship between farm size and use and grading.

Conclusions and Recommendations

From this study, we conclude that date farmers in Anbar province are mostly middle-aged, with varying levels of education between primary and preparatory school, which is reflected in their varying knowledge of agricultural techniques. The results showed that there is partial adherence to some practices, such as choosing the method of cultivation and irrigation at critical times, while there are shortcomings in important areas such as pollination, grafting, and fruit thinning, as well as continued reliance on traditional methods of irrigation and chemical fertilization. It also showed that agricultural extension services suffer from weak planning and inadequate field coverage, which limits their effectiveness in improving palm productivity. The study therefore recommends the development of agricultural extension programs through the intensification of practical training courses for farmers, the expansion of field coverage, and the adoption of modern strategies in irrigation, fertilization, and pest control, in addition to strengthening government and technical support, thereby ensuring the improvement of agricultural practices and the sustainability of date production in the governorate.

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