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Geographical Analysis of Palm Tree Production in Dhi Qar Governorate

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Abstract

Dhi Qar Governorate is one of the most important agricultural regions, especially in palm cultivation. Despite environmental and economic challenges, palm cultivation remains an important sector in supporting food security and providing sources of income for many local residents. Palm cultivation is an important source of income for many farmers in the governorate and contributes to supporting the local economy by exporting dates to domestic and foreign markets. Thousands of farmers and families depend on this activity, which enhances the stability of rural communities and reduces unemployment. Palm trees also play an important role in combating desertification, providing shade, and protecting soil from erosion. The most important commercial date varieties in the study area are Al-Zahdi, Al-Khastawi, Wasitat Omran, Al-Maktoum, Al-Khadrawi, Al-Buraim, and Al-Shukr. These varieties are characterized by their high quality, nutritional value, and growing demand in Iraqi and Arab markets. Palm trees in the governorate face several obstacles, including natural factors such as climate factors such as extreme heat and declining water supplies, human problems such as the shortage of agricultural labor, and life-threatening problems such as diseases and pests. Dhi Qar Governorate has promising potential in The field of palm cultivation and date production. Despite the challenges, developing this sector requires the combined efforts of the government and private sectors to advance it and increase its returns, thus contributing to achieving sustainable development.

Introduction

The palm tree has been known since ancient times, and peoples of all civilizations have accorded it a special status, as it is a blessed tree. It is mentioned in many divine books, including nineteen verses in the Holy Quran, as well as in the noble hadiths of the Prophet. Its presence in Iraq is historical, and the history of the palm tree in Iraq is very old. Historians have differed over the origin of the palm tree, but they agree on its antiquity and that Iraq is the oldest place where palm trees were found, if not its original homeland. The palm tree was mentioned on the Sumerian tablets as a sacred tree. In addition to methods of growing grains and the art of gardening, the Semites and Sumerians mastered the principles of planting and growing palm trees. They used palm trees as shade to protect vegetables and other plants from direct sunlight in the summer and cold waves in the winter, as farmers practice today in Iraq. Dhi Qar Governorate is one of the governorates that produces dates and is distinguished at the national level by producing various varieties. Accordingly, the study of palm trees and their date products in the study area came to reveal the factors related to its distribution and to clarify the agricultural reality of this important strategic crop as one of the most important components of the Iraqi food basket.

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First: Research Problem

1. Is there a spatial and temporal variation in the distribution and production of palm trees in Dhi Qar Governorate?

Second: Research Hypothesis

1. There is a spatial and temporal variation in the distribution and production of palm trees in Dhi Qar Governorate.

Third: Research Methodology

1. **Crop-Based Approach**: This approach focused on studying palm trees in terms of their numbers, production levels, and geographical distribution.

2. **Analytical Approach**: This approach was used to analyze data in order to derive information and achieve the most accurate results.

Fourth: Spatial and Temporal Boundaries of the Study

A. **Spatial Boundaries**: The spatial scope of the study is represented by Dhi Qar Governorate, which is located in the south-central part of Iraq, bounded between latitudes $(30^{\circ}33'-32^{\circ}N)$ and longitudes $(45^{\circ}48'-47^{\circ}10'E)$, as shown in Map (1).

B. **Temporal Boundaries**: The temporal scope of the study extends over the period from 2013 to 2023.



UTM.WGS.84

Map (1) Administrative Divisions in Dhi Qar Governorate for the Year 2023

Source: General Authority for Survey, Administrative Map of Dhi Qar Governorate, Baghdad, Survey Printing Press, 2023.

First: Date Palm Varieties in Dhi Qar Governorate

Each region in the world known for cultivating date palms is typically associated with specific

varieties. The most widely recognized varieties are often commercial in nature and may not always be of the highest quality. In fact, some lesser-known varieties surpass them in quality, but their numbers are limited, and their distribution remains relatively restricted. Iraq is home to approximately 454 distinct varieties of dates, each identifiable by its own unique characteristics and names. Among the most well-known Iraqi varieties are Halawi, Zahidi, Khadrawi, Sayer, Deiri, As-Sitah Imran, and Khistawi, among others.

In addition, there exists a large number of unidentified date varieties whose names and origins are unknown. These are referred to by local terms such as "*Degla*", a generic name given to any unknown date variety—for example, *Deglet Al-Jabal, Deglet Noor, Deglet Hijran*, etc. ⁽¹⁾

Dates are classified into three main categories based on texture:

- 1. Soft Dates
- 2. Semi-soft Dates
- 3. Dry Dates

They are also categorized according to their ability to withstand rain and humidity damage. Notable among the resistant varieties are:

Deiri, Khadrawi, Khistawi, Sayer, and Halawi.

Furthermore, date varieties differ in their resistance to low temperatures. For instance, Zahidi, Khistawi, Ashrasi, and Sayer are less affected by cold weather. Moderately tolerant varieties include Gharsi, Barim, and Halawi, while others can withstand extremely high temperatures—up to 50°C.

Each region in the world typically boasts a range of distinctive and unique date palm varieties.

In Dhi Qar Governorate, as shown in Table (1) and Figure (1), the total number of date palm trees reached approximately 1,830,703. These are distributed among ten main varieties. The most dominant variety in the study area is As-Sitah Imran, comprising 25.2% of the total, with 460,990 trees.

Following this, a collective group of varieties—including Sayer, Habsi, Ashrasi, Jabjab, Majhool, Degl, Kantar, Deiri, Barhi, Umm al-Dahan, Umm al-Balaleez, Bint al-Sawda, and others—rank second, making up 24.5% with 449,220 trees.

Khadrawi ranks third with 24.4%, totaling 446,563 trees, while Zahidi holds the fourth position at 9.1% with 167,509 trees in the governorate.

Subsequently, the varieties Shuwaithi, Khistawi, Shukr, Tabrazel, and Barim follow with respective shares of 6.7% (123,190 trees), 3% (55,165 trees), 2.8% (51,950 trees), 2.1% (38,889 trees), and 1.4% (25,162 trees).

Finally, Maktoum ranks tenth and last with 0.7%, comprising 12,065 trees among the varieties found in Dhi Qar Governorate.

Variety	Percentage (%)	Number
Zahidi	9.1%	167,509

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Khistawi	3.0%	55,165
Barim	1.4%	25,162
Maktoum	0.7%	12,065
Tabrazel	2.1%	38,889
Khadrawi	24.4%	446,563
Asstah Imran	25.2%	460,990
Shuwaithi	6.7%	123,190
Shukr	2.8%	51,950
Others	24.5%	449,220
Total	100%	1,830,703

Table (1) Date Palm Varieties in Dhi Qar Governorate for the Year 2023

Source: The researcher based on the Dhi Qar Governorate Agriculture Directorate, Statistics Department, unpublished data, 2023.



Figure (1) Palm varieties in Dhi Qar Governorate for the year 2023

Source: The researcher based on Table (1).

Second: The Geographical Distribution of Date Palm Numbers in Dhi Qar Governorate

Natural and human factors have played a significant role in the widespread presence of date palm trees in Dhi Qar Governorate, where the total number of date palms reached 1,830,703. Table (2), Map (2), and Figure (2) illustrate the variation among administrative units. The mean

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value was found to be 107,688.41, which is lower than the standard deviation value of 170,293.43. Accordingly, the administrative units were classified into four categories:

1. Administrative units with a standard score of (+0.50 or higher)

This category includes three administrative units: Sooq Al-Shuyoukh, Karma Bani Saeed, and Al-Chibayish, with respective standard scores of 3.83, 1.03, and 0.80. The number of date palms varied among these units:

• The district center of Sooq Al-Shuyoukh ranked first with a total of 683,841 date palms, accounting for 37.4% of the total.

- The sub-district of Karma Bani Saeed followed with 283,132 palms, forming 15.5%.
- The district center of Al-Chibayish came third with 243,575 palms, representing 13.3%.

The spatial pattern of this category appears as a zone extending from the south to the southeast of the study area, encompassing the administrative units classified within this group.

2. Administrative units with a standard score ranging between (+0.49 and 0.00)

This category includes only one administrative unit: the district center of Al-Nasiriyah, with a standard score of 0.37. It contains 171,544 date palms, accounting for 9.4% of the total number of date palms in Dhi Qar Governorate. The spatial structure of this category is represented by a distinct area, limited to this single administrative unit located in the southern part of the study area.

Agricultural Division	Number of Date Palms	Percentage (%)	Standard Score	
Al-Fajr	28,000	1.5%	-0.47	
Qalat Sukkar	62,000	3.4%	-0.27	
Al-Rifai	45,260	2.5%	-0.37	
Al-Nasr	24,714	1.3%	-0.49	
Al-Shatra	91,769	5.0%	-0.09	
Al-Dawayah	20,105	1.1%	-0.51	
Al-Gharraf	79,785 4.4%		-0.16	
Al-Nasiriyah	171,544	9.4%	0.37	
Al-Batha	31,930	1.7%	-0.44	
Al-Islah	6,950	0.4%	-0.59	
Al-Fuhud	15,150	0.8%	-0.54	
Sayyid Dakhil	22,244	1.2%	-0.50	
Sooq Al-Shuyoukh	683,841	37.4%	3.38	
Karma Bani Saeed	283,132	15.5%	1.03	

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Al-Chibayish	243,575	13.3%	0.80
Al-Manar	3,293	0.2%	-0.61
Al-Tar	17,411	1.0%	-0.53
Total	1,830,703	100.0%	
Arithmetic Mean	107,688.41	1	

Table (2) Geographical Distribution of Palm Trees in Dhi Qar Governorate for the Year 2023

Source: The researcher based on the Directorate of Agriculture of Dhi Qar Governorate, Statistics Department, unpublished data, 2023.



Map (2) Geographical Distribution of Palm Trees in Dhi Qar Governorate for the Year 2023 Source: The researcher based on Table (2).

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Figure (2) Geographical Distribution of Palm Trees in Dhi Qar Governorate for the Year 2023

Source: The researcher based on Table (2).

3. Administrative Units with Standard Scores Ranging from (0.49 to -0.01)

This category includes seven administrative units: (Al-Fajr, Qalat Sukkar, Al-Rifai, Al-Nasr, Al-Shatra, Al-Gharraf, and Al-Batha). The highest standard score within this group was recorded in the district center of Al-Shatra with a value of (-0.09), totaling (91,769) date palms, which constitutes (5%) of the total number of palm trees in the study area. The lowest standard score was recorded in the sub-district of Al-Nasr at (-0.49), with (24,714) palms, representing (1.3%) of the total. The spatial pattern of this category appears as a wide zone extending transversely from the far north of the study area, through its center, and towards the southwest, encompassing the administrative units in this group.

4. Administrative Units with Standard Scores of (-0.50 or Less)

This category comprises the administrative units of (Al-Dawayah, Al-Islah, Al-Fuhud, Sayyid Dakhil, Al-Manar, and Al-Tar) with respective standard scores of (-0.51), (-0.59), (-0.54), (-0.50), (-0.61), and (-0.51). The highest standard score in this category was found in the district center of Sayyid Dakhil, with (22,244) palm trees, accounting for (1.2%) of the total number of palms in the study area. The lowest score was recorded in the sub-district of Al-Manar, with (3,293) palms, representing (0.2%). The spatial configuration of this group appears as a zone located in the central part of the governorate, extending from the east to the southeast and incorporating the administrative units within this category.

Third: Agricultural Change Trends in Date Palm Numbers in Dhi Qar Governorate Monitoring the development of date palm cultivation in Dhi Qar Governorate helps to identify the variations experienced by palm trees across administrative units, and to predict the future of palm cultivation and production in the governorate. As observed by the researcher, based on Table (3) and Figure (3), the agricultural changes in date palm numbers between the years (2013–2023), according to administrative divisions in Dhi Qar, followed two trends: one positive and the other negative.

In terms of **positive changes**, the district of Al-Chibayish ranked first with an index result of (11,735.5), due to a remarkable increase in the number of date palms from (2,058) in 2013 to

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(243,575) in 2023. Al-Fajr ranked second with an index result of (365.4).

On the other hand, **negative changes** were recorded in fifteen administrative units within the study area, namely: (Qalat Sukkar, Al-Rifai, Al-Nasr, Al-Shatra, Al-Dawayah, Al-Gharraf, Al-Nasiriyah, Al-Batha, Al-Islah, Al-Fuhud, Sayyid Dakhil, Sooq Al-Shuyoukh, Karma Bani Saeed, Al-Manar, and Al-Tar), with index values of (-24.4, -42.7, -57.2, -9.2, -55.9, -73.4, -10.5, -40.3, -60, -57.2, -36.1, -7.1, -34.3, -70.5, -37.4) respectively.

This clearly reflects the deterioration of date palm cultivation in recent years in these fifteen units, due to natural, human, and socio-economic challenges facing the sector—issues that will be addressed in detail in Chapter Five.

Agricultural	Number of	Number of	Absolute	Relative	Index	Index
Division	Palm Trees	Palm Troog	Change	Change	Number	Result
	(2013)	(2023)				
Al-Fajr	6,016	28,000	21,984	27,900	465.4	365.4
Qalat	49,845	62,000	12,155	61,900	124.4	24.4
Sukkar						
Al-Rifai	34,100	45,260	11,160	45,160	132.7	32.7
Al-Nasr	57,764	24,714	-33,050	24,614	42.8	-57.2
Al-Shatra	101,013	91,769	-9,244	91,669	90.8	-9.2
Al-Dawayah	12,893	20,105	7,212	20,005	155.9	55.9
Al-Gharraf	300,156	79,785	-220,371	79,685	26.6	-73.4
Al-	191,638	171,544	-20,094	171,444	89.5	-10.5
Nasiriyah						
Al-Batha	53,450	31,930	-21,520	31,830	59.7	-40.3
Al-Islah	17,585	6,950	-10,635	6,850	39.5	-60.5
Al-Fuhud	35,409	15,150	-20,259	15,050	42.8	-57.2
Sayyid	34,803	22,244	-12,559	22,144	63.9	-36.1
Dakhil						
Suq Al- Shuvoukh	638,315	683,841	45,526	683,741	107.1	7.1
Karma Bani Saeed	210,879	283,132	72,253	283,032	134.3	34.3
Al- Chibayish	2,058	243,575	241,517	243,475	11,835.5	11,735.5
Al-Manar	1,931	3,293	1,362	3,193	170.5	70.5
Al-Tar	27,810	17,411	-10,399	17,311	62.6	-37.4
Total	1,775,665	1,830,703	55,038	1,830,603	103.1	3.1

Table (3) Trends in Agricultural Change in The Number of Palm Trees in Dhi Qar Governorate for The Year 2023

Source: Researcher based on data from the Directorate of Agriculture in Dhi Qar Governorate, Statistics Department, unpublished data, 2023.

160 Geographical Analysis of Palm Tree Production in Dhi Qar(*) Absolute change = comparison year - base year

- Relative change = (comparison year - base year) \div base year x 100

- Index number = (comparison year \div base year) x 100

- (100) is subtracted from the index equation to determine whether the index result is positive or negative. If the result exceeds (100), it is a positive indicator, and if it falls below it, it is a negative indicator.

Source: Muhammad Subhi Abu Saleh, Adnan Muhammad Awad, Introduction to Statistics, Yarmouk University, Jordan, 1982, p. 45





Source: The researcher based on Table (3).

Fourth: Palm Production in Dhi Qar Governorate

Palm production varies across the administrative units within the study area. This variation is evidenced by the mean value of production (4,564.04 tons), which is lower than the standard deviation (9,616.99 tons). This disparity is clearly illustrated in Table (4), Map (3), and Figure (4), where the administrative units are categorized into four groups as follows:

1. Administrative Units with a Standard Score of (+0.50 or Higher) This category includes only one administrative unit: the center of Suq Al-Shuyoukh District, which recorded a standard score of (3.79). The production volume reached (41,013.58) tons, accounting for (52.9%) of the total palm production in the study area—thus exceeding half of the entire production. The spatial distribution of this category appears as a single concentrated area, limited to the administrative unit of Suq Al-Shuyoukh District, located in the southern part of the study area.

2. Administrative Units with a Standard Score Ranging from (+0.49 to 0.00) This group comprises three administrative units: Al-Shatra, Al-Nasiriyah, and Karma Bani Saeed, with respective standard scores of (0.10), (0.04), and (0.32). The highest standard score within this category was recorded in Karma Bani Saeed, where production reached (7,657.58) tons, accounting for (9.9%) of the total output. Al-Shatra District ranked second with a production volume of (5,505.6) tons, forming (7.1%) of the total, followed by Al-Nasiriyah District in third place, which produced (4,928) tons, representing (6.4%) of the total palm production the in study area. The spatial distribution of this category is represented by two patterns: one is a concentrated area limited to Al-Shatra District in the central part of the study area, while the other forms a belt in the southern region encompassing Al-Nasirivah District and Karma Bani Saeed.

Agricultural Division	Production (tons)	Percentage (%)	Standard Score
Al-Fajr	1,450.5	1.9	-0.32
Qal'at Sukkar	2,386.86	3.1	-0.23
Al-Rifai	2,715.6	3.5	-0.19
Al-Nasr	1,433.4	1.8	-0.33
Al-Shatrah	5,505.6	7.1	0.10
Al-Dawayah	974.64	1.3	-0.37
Al-Gharraf	3,409.2	4.4	-0.12
Al-Nasiriyah	4,928	6.4	0.04
Al-Batha	1,915.8	2.5	-0.28
Al-Islah	388.8	0.5	-0.43
Al-Fuhud	335.46	0.4	-0.44
Sayyid Dakhil	1,463.94	1.9	-0.32
Suq Al-Shuyoukh	41,013.58	52.9	3.79
Karma Bani Saeed	7,657.58	9.9	0.32
Al-Chibayish	207.24	0.3	-0.45
Al-Manar	191.82	0.2	-0.45
Al-Tar	1,610.76	2.1	-0.31
Total	77,588.12	100.0	
Arithmetic Mean	4,564.04		
Standard Deviation	9,616.99		

Table (4) Geographical Distribution of Palm Production (Tons) In Dhi Qar Governorate for the Year2023

Source: The researcher based on the Directorate of Agriculture of Dhi Qar Governorate, Statistics Department, unpublished data, 2023.

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Map (3) Geographical Distribution of Palm Production (Tons) In Dhi Qar Governorate for the Year 2023

Source: The researcher based on Table (4).



Figure (4) Geographical Distribution of Palm Production (Tons) In Dhi Qar Governorate for the Year 2023

Source: The researcher based on Table (4).

3. Administrative Units with Standard Scores Ranging from (-0.49 to -0.01): This category expanded to include the administrative units of (Al-Fajr, Qal'at Sukkar, Al-Rifai, Al-Nasr, Al-Dawayah, Al-Gharraf, Al-Batha, Al-Islah, Al-Fuhud, Sayyid Dakhil, Al-Chibayish, Al-Manar, and Al-Tar). The highest standard score within this group was recorded in the district center of Al-Rifai at (-0.19), with a production volume of (2,715.6 tons), representing (3.5%) of the total production in the study area. The lowest standard score was recorded in the subdistrict of Al-Manar at (-0.45), with a production volume of (191.82 tons), constituting (0.2%) of the region's total date production. The spatial pattern of this category forms a continuous zone extending from the northernmost part of the study area through its center and into the southeastern part, shifting from a vertical to a horizontal alignment, encompassing all the administrative units within this category.

4. Administrative Units with Standard Scores of (-0.50 or Lower):

This category included no administrative units.

The Relative Importance of Dhi Qar Governorate in Date Palm Cultivation and Production:

Date palm cultivation holds significant importance in the Iraqi economy, as dates represent a vital component of the country's agricultural sector. It serves as a value-added resource to bolster Iraq's non-oil revenues. Table (5) and Figure (5) illustrate the variation in the number and production of date palms across different governorates. These variations are attributed to the diverse natural, human, and socio-economic factors that influence the growth and distribution

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Governora	Number	Relative	Rank	Date	Relative	Rank
te	of Date	Importan		Productio	Importan	
	Palms	ce (%)		n (tons)	ce (%)	
Diyala	2,615,993	14.84%	First	88,025	11.32%	Fourth
Al-Anbar	1,156,036	6.56%	Ninth	35,697	4.59%	Tenth
Baghdad	2,212,334	12.55%	Second	122,612	15.77%	First
Babylon	2,049,239	11.63%	Third	120,249	15.46%	Second
Karbala	1,609,049	9.13%	Fifth	90,959	11.70%	Third
Wasit	899,235	5.10%	Tenth	47,387	6.09%	Seventh
Salah al-	697,152	3.96%	Eleventh	25,325	3.26%	Twelfth
Din						
Al-Najaf	580,440	3.29%	Twelfth	31,023	3.99%	Eleventh
Al-	1,349,388	7.66%	Sixth	47,604	6.12%	Sixth
Qadisiyyah						
Al-	1,218,643	6.91%	Seventh	38,565	4.96%	Ninth
Muthanna						
Dhi Qar	1,830,703	10.39%	Fourth	77,588	9.98%	Fifth
Maysan	206,848	1.17%	Thirteent	9,937	1.28%	Thirteent
			h			h
Basra	1,199,489	6.81%	Eighth	42,764	5.50%	Eighth
Total	17,624,54	100%		734,971	100%	
	9					

Table (5) Relative Distribution of the Numbers and Production of Palm Trees in the Governorates ofIraq for the Year 2023

Source: Researcher accredited by the Republic of Iraq, Ministry of Agriculture, Statistics Department, unpublished data, 2024.



Figure (5): Relative Distribution of Palm Tree Numbers and Production in Iraq's Governorates for the Year 2023

Source: The researcher based on Table (5).

Iraqi statistics indicate that the total number of date palms in the country has reached 17,624,549. Dhi Qar Governorate ranked fourth, accounting for 10.39% of the national total, with 1,830,703 date palms. This prominence is attributed to the compatibility of date palm cultivation with the governorate's natural conditions.

As for national date production, it amounted to 777,735 tons. Dhi Qar Governorate ranked fifth, contributing 9.98% of the total national output, with a production volume of 77,588 tons. This is due to the economic importance of date palms to the local population, as well as strong consumer demand, given their significant nutritional value.

Conclusions

1. The date palm is regarded as one of the most significant symbols of early civilizations in Mesopotamia and the Nile Valley. While historians differ in their views regarding the original habitat of the date palm, there is a general consensus that its native origin lies in Mesopotamia.

2. The study revealed the existence of several varieties of dates in Dhi Qar Governorate, including *Zahdi, Khastawi, Buraim, Maktoom, Tabrzal, Khadrawi, Asitah Omran, Al-Shuwaithi, Al-Shukr*, and other types, with a total of 1,830,703 date palms. The *Asitah Omran* variety ranked first, constituting 25.2% of the total, with 460,990 date palms.

3. The research indicated spatial variation among the administrative units of Dhi Qar Governorate in the distribution and production of date palms. The district center of Suq al-Shuyoukh ranked first, accounting for 37.4% of the total number of date palms in the governorate (683,841 palms) and also leading in production with 52.9% of the total output (41,013.58 tons).

4. The study showed a decline in date palm cultivation. Agricultural changes between 2013 and 2023 followed two directions: a positive trend limited to only two administrative units—Al-Chibayish District Center and Al-Fajr Subdistrict—while a negative trend was observed in fifteen administrative units, including Qalat Sukkar, Al-Rifai, Al-Nasr, Al-Shatrah, Al-Dawaya, Al-Gharraf, Nasiriyah, Al-Batha, Al-Islah, Al-Fuhud, Sayyid Dakhil, Suq al-Shuyoukh, Karma

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5. The study confirmed that the total number of date palms in Iraq amounts to 17,624,549, with Dhi Qar Governorate ranking fourth at 10.39%, totaling 1,830,703 date palms. In terms of total date production, which reached 777,735 tons, Dhi Qar ranked fifth with a contribution of 9.98% (equivalent to 77,588 tons).

Recommendations

1. Expand date palm cultivation in Dhi Qar Governorate in collaboration with the Directorate of Agriculture by providing loans and financial advances to orchard owners and minimizing the procedures associated with lending, to support farmers in developing date palm groves.

2. Enact laws and regulations and impose penalties to limit the impact of urban encroachment on date palm orchards.

3. Increase government support in providing pesticides at appropriate times of infestation, ensure sufficient quantities of fertilizers to meet farmers' needs, and supply agricultural equipment and modern irrigation systems to enhance both quantity and quality.

4. Raise awareness among farmers by intensifying extension activities and clarifying the economic, nutritional, and health benefits of date palms.

5. Establish factories and processing facilities that rely on date palms and their products as raw materials for their industries.

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