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Spatial variation of the change in the cultivation of horticultural crops in Al-Qaim district for the period (2000 - 2020)

Abdalkader Maan Ismail Alrawi

University Of Anbar, College of Arts, Department of Geography

Email: abd20a3015@uoanbar.edu.iq

Dr. Ahmed Hilaal Hmood Alsalmi

Assist. Prof. University Of Anbar, College of Arts, Department of Geography

Email: ahmed.hellal@uoanbar.edu.iq

Abstract---The research concluded by studying and analyzing the areas planted with horticultural crops in Al-Qaim district at the level of agricultural districts for two different periods of time in order to analyze the amount of variation and change in the area planted with these crops, whether positive or negative. Therefore, the year (2000) was taken as the base year and (2020) as the target year, to determine the levels of change between them. It was found through the tables and maps of the geographical distribution that there was a significant change in the areas planted with these crops during the study period and at the level of one province, and at a rate of decline in those areas Its amount reached (507) dunums, and the number of trees decreased by (63,178), which gives a serious indication of the decline in agricultural areas and crops in general, whose effects will be reflected on the residents of the region and their economic levels.

Keywords---change, horticultural trees, land uses, variation.

Introduction

The uses of agricultural land in any region vary depending on the availability of the main requirements for agriculture and the extent to which they are related to the need of agricultural crops and the extent of this link to the needs of the population of agricultural products, as well as the impact of economic and social factors and their relationship to population growth rates, all of which were characterized by rapid change, which in turn was reflected in the areas cultivated with products Agricultural crops of all kinds, including horticultural crops, which include a large group of trees with high economic returns and high nutritional importance for the population.

Accordingly, the areas planted with these crops vary greatly between the agricultural provinces of the study area as a result of the varying population density and income levels on the one hand, as well as the variation in the area of those provinces depending on the availability of the basic ingredients for agriculture in a way that was reflected in the presence of a large difference in the cultivated areas and the number of trees during the two periods. The two times are under study.

Based on the foregoing, the research problem was identified as follows:

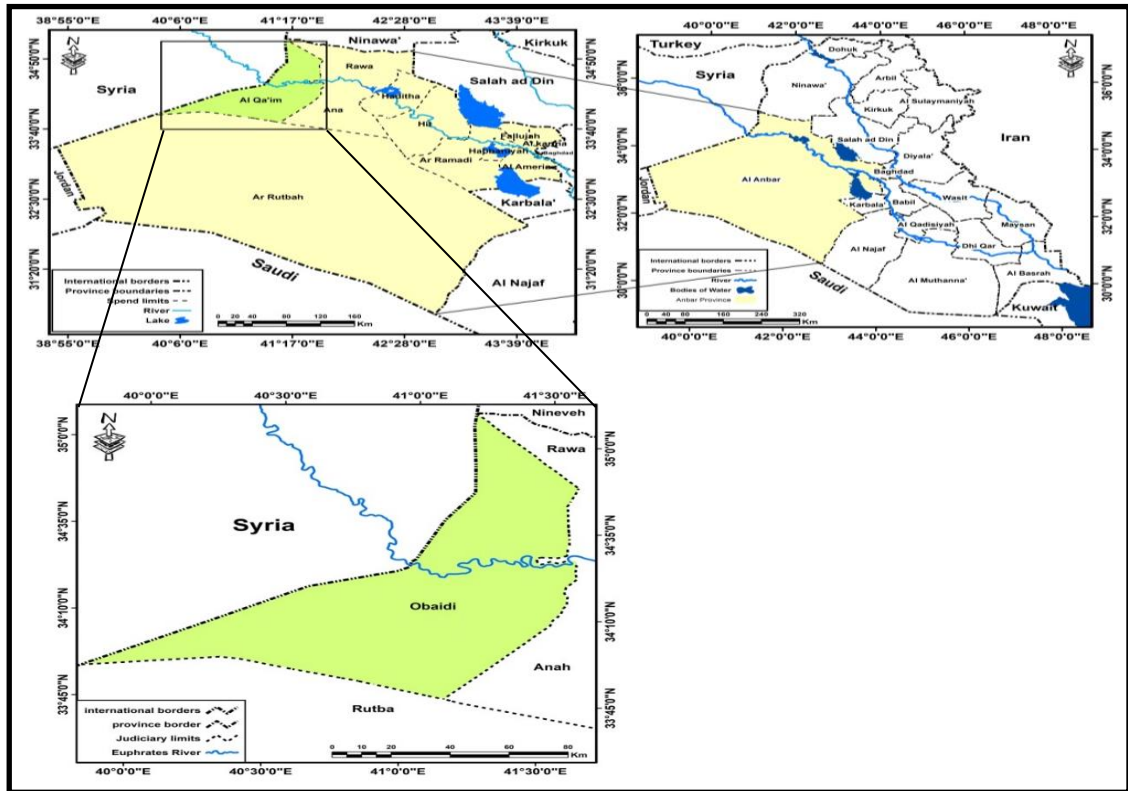
1. What are the most important factors that contributed to drawing a picture of the spatial distribution of horticultural crops?
2. Is the cultivation of these crops distributed in a balanced manner between the provinces of the study area, or is there a discrepancy in the process of their distribution?
3. As for the hypothesis of the research: it was represented in the presence of a large variation in the geographical distribution of planting horticultural trees between the provinces of the study area as a result of a group of natural and human factors so that they combined together to change the areas planted with these trees and their numbers within the study area.

Research objectives: as follows:

- Identifying the most important natural and human factors that had a significant impact on changing the area and numbers of horticultural trees.
- Giving a clear picture of the reality of cultivating horticultural crops in the study area by comparing them with previous time periods for the purpose of highlighting the amount of change and trying to explain and analyze its main causes.

Location and boundaries of the study area

Al-Qaim district is located astronomically between latitudes (40° 41' 33" - 8 10 35") in the north, and longitudes (11 46 39° - 1 38° 41") east, map (1). To the northeast is Rawa District, to the south is Al-Rutba District, and to the west and northwest is the Syrian Arab Republic, in addition to having a short distance border with Nineveh Governorate in the far northwest, and from the east and southeast it is bordered by Anah District. The district includes three administrative units (M. Al-Qada, Al-Obour and Al-Ubaidi districts), and it includes (24) districts (see map 2), with a total area of (7321 km²) or the equivalent of (2928354) dunums. This area is distributed differently between its agricultural districts, see Table (1) and its lands are part of the Upper Euphrates region, as the Euphrates River penetrates the region at an altitude of 165 m above sea level, and agricultural lands extend on both sides of the river course, creating a good opportunity for agricultural activity.

Map (1) The location of Al-Qaim district of Iraq and Anbar Governorate

Source: - Republic of Iraq, Ministry of Agriculture, Anbar Agriculture Directorate, Land Division, 2020, scale (1000000:1),
 - Arc Map 10.4.1 outputs

1. Analysis of the agricultural reality of the areas of horticultural crops by provinces for the period (2000-2020)

Table (1) shows that the total area of horticultural crops in Al-Qaim district for the year (2000) amounted to (1444 dunums) and that this area is distributed differently among the districts of Al-Qaim district as shown in map (2). The highest area was recorded in the northern province (1) Husaiba, which amounted to (368 dunums), due to the high population density in this province, which led to the availability of manpower as well as the availability of areas of arable land and the factor of desire and experience of farmers. As for the smallest area, it was represented in the canton (8) of Dayum al-Dair and al-Shaithi, due to the low concentration of the population in this county, in addition to the limited arable land.

In the year (2020), the areas planted with horticultural crops reached (937 dunums). The reason for the significant decline in the cultivated areas is due to this period compared to (2000) as a result of the deteriorating security conditions

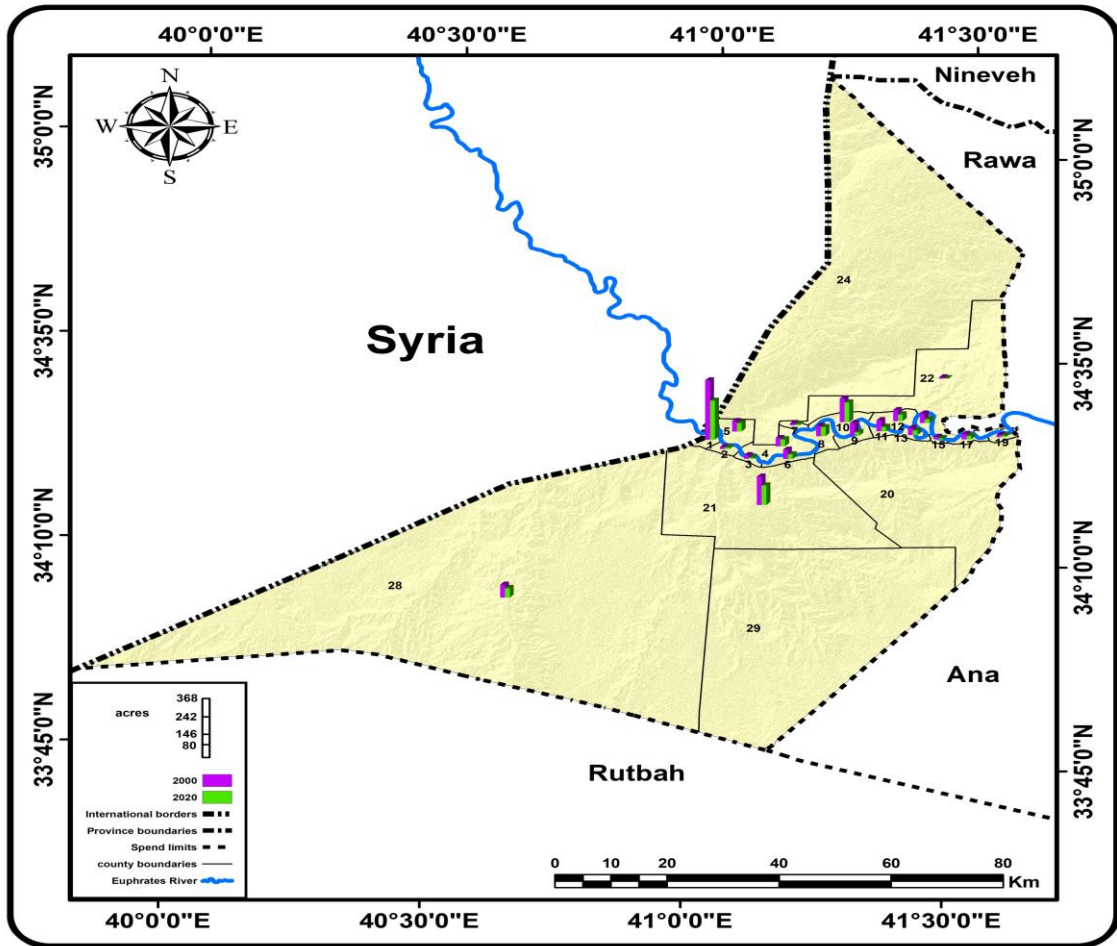
and the repeated setbacks experienced by the study area, especially after (2003) and then after (2013) in a way that led to the exposure of large areas of agricultural land to the deterioration of its production capabilities as a result of leaving it and not paying attention to it, and thus damage to the trees planted there. As for the highest level of the provinces for the year (2020), the province of (1) Husaiba North ranked first with an area of 242 dunums. As for the smallest area, it was represented in the canton (22) of Dum Al-Dair and Al-Shuaithi, which amounted to (3 dunums).

Table (1) Geographical Distribution of Gardening Areas by Provinces for the Period (2000-2020)

Category	County name	Area in the year 2000	space in 2020
1	Hassiba North	368	242
2	carpels	12	10
3	happy	22	9
4	Khatila, Al-Daghima and Hawija Al-Bouhardan	51	43
5	pomegranate	65	53
6	old stand	59	29
7	embolus	12	8
8	Al-Obaidi	64	57
9	Adversarial and skeptical	78	21
10	The egg and the milli	146	122
11	The rafter and the groin	69	27
12	Boubya and carrot jar	69	42
13	yellowness	44	28
14	Amari	59	24
15	slip	16	8
17	Zaidi	33	22
19	the end	13	9
20	Western Chebab Dayum	—	—
21	Dayum Almani	176	121
22	Dayum Al-Deir and Al-Shaiti	8	3
24	Flying dogs	—	—
28	Wadi Maan lands	80	59
29	Wadi Al Mani Lands	—	—
32	Northern Baghouz	—	—
	total	1444	937

Source: Ministry of Agriculture, Al-Qaim Agriculture Division, Planning and Follow-up Department, unpublished data, 2021

Map (2) Areas planted with horticultural crops by provinces for the period (2000-2020)



Source: Based on Table No 1

2. Analysis of the existing agricultural reality of horticultural crops according to the administrative unit of Al-Qaim district for the period (2000-2020)

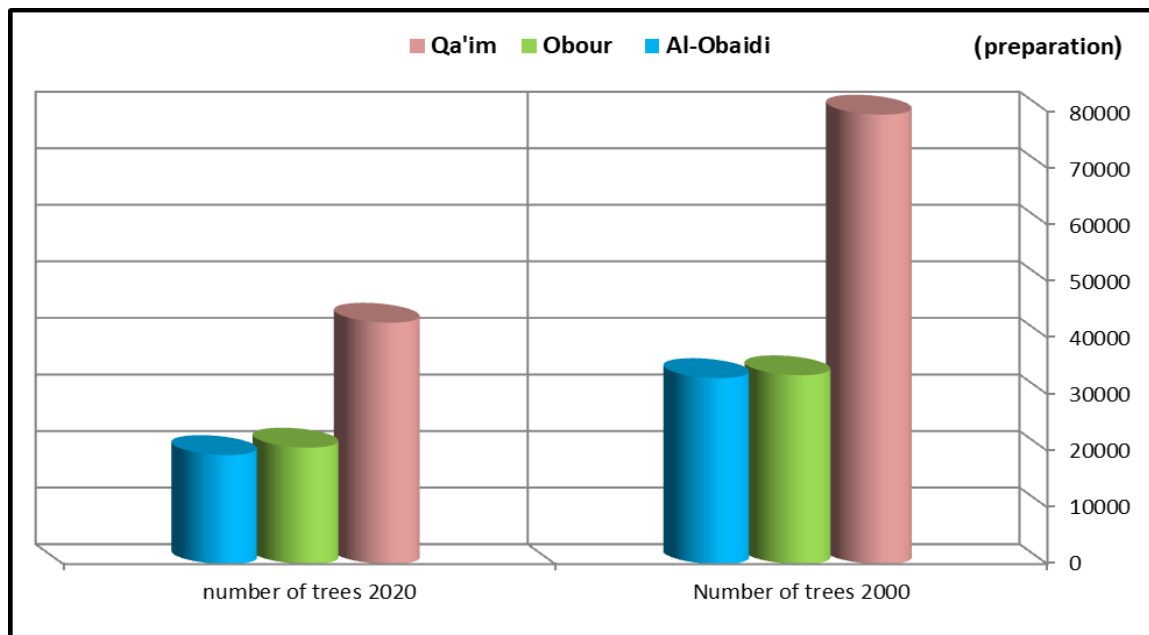
By analyzing the data of Table (2) and Figures (1-2), the total number of trees in Al-Qaim district for the year (2000) reached (145753) trees, with production quantities amounting to (6558885/kg). The administrative judiciary of the judiciary, as the Qaim district center ranked first with the number of its trees of (79,469) trees, and the quantities of production amounted to (3576105 / kg), which is equivalent to (55%) of the total production of the study area, and the reasons for this are due to the presence of a high population density, which helped to Availability of cheap labor, in addition to the large area of arable land, in addition to the factor of desire, and the availability of major central markets for

production. Added to this is the farmer's experience in growing these crops. While the second place came from the share of the transit district, as the number of its trees reached (33390) trees and the amount of production amounted to (23%) of the total number of the district. As for Al-Obaidi district, it ranked last with a rate of (22%) of the total number of trees in the district, due to the small agricultural areas as well as the low population density in it compared to the district center.

Table (2) Preparing trees and production quantities according to the administrative unit of Al-Qaim District for the period (2000-2020)

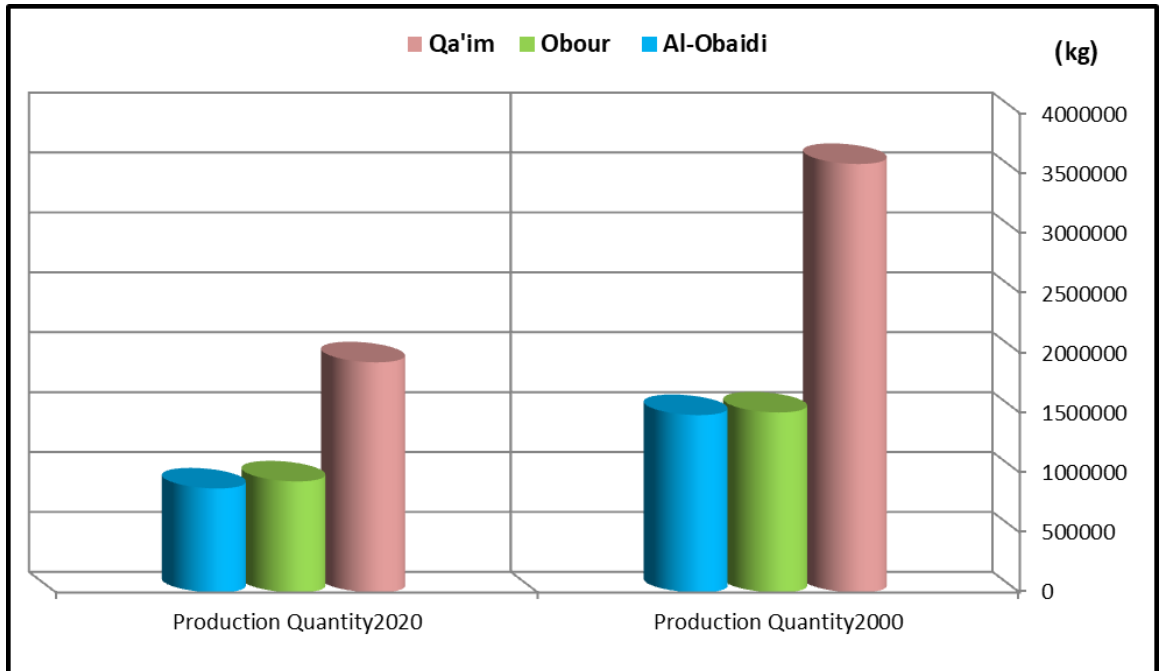
Administrative unit	2000				2020			
	number of trees	%	production quantity	%	number of trees	%	production quantity	%
M. Qa'im District	79,469	%55	3576105	%55	42686	%52	1920870	%52
Transit	33390	%23	1502550	%23	20601	%25	927045	%25
Al-Obaidi	32894	%22	1480230	%22	19288	%23	867960	%23
Total	145753	%100	6558885	%100	82575	%100	3715875	%100

Shape (1) Preparing trees in Al-Qaim district according to the administrative unit for the period (2000-2020)



Source: Based on Table No. (2)

Shape (2) Production quantities according to the administrative unit of Al-Qaim district for the period (2000-2020)



Source: Based on Table No. (2)

3. Analysis of the existing agricultural situation according to the type of horticultural crops according to the administrative unit of Al-Qaim district for the period (2000-2020)

By analyzing the data of Table (3), it was found that the number of almond trees recorded the highest number of trees in Al-Qaim district for the two years (2000-2020) in succession, as it reached in (2000) (44858) trees that issued the center of the district first rank with the number of its trees of (18112) tree and at a rate of (40%) of the total almond trees, as the concentration of the population helped to increase the demand for it in addition to other human factors, represented by the availability of cheap labor and low transportation costs to the market. The second place was represented by Al-Obaidi district, with the number of its trees amounting to (13702) trees, or (31%) of the total number of almond trees in the district, while Al-Obour district came in the last rank, as the number of its trees reached (13044) trees, or (29%) of the total number of almond trees. for the study area for the year (2000). In the year (2020), the total number of almond trees in Al-Qaim district reached (33680) trees. The Qaim District Center comes first, with the number of almond trees in it reaching (18,342) trees, at a rate of (54%) of the total number of almond trees in the study area. As for the second place, it was represented in Al-Obaidi district with the number of its trees amounting to (7675) trees, at a rate of (23%) of the total number of almond trees in the district. for the year (2020).

While citrus trees recorded the lowest yield, they were planted in the study area, due to the inappropriate climate, as citrus trees need moderate temperatures as well as closed places, so we usually plant them under palm trees to avoid high sunlight in summer and cold winds in winter. The total number of citrus trees for the year (2000) reached (1033) trees, which ranked first in the transit area, as the number of trees in it reached (612) trees, at a rate of (59%) of the number of the study area, due to the presence of large numbers of palm trees as well as the availability of fertile soil and agricultural experience. In the second place is the Al-Qaim district center, where the number of citrus trees for the same year reached (260) trees, at a rate of (25%), while Al-Obaidi district represents the third place, as the number of trees in it reached (161) trees, at a rate of (16%) of the total citrus trees in the study area.

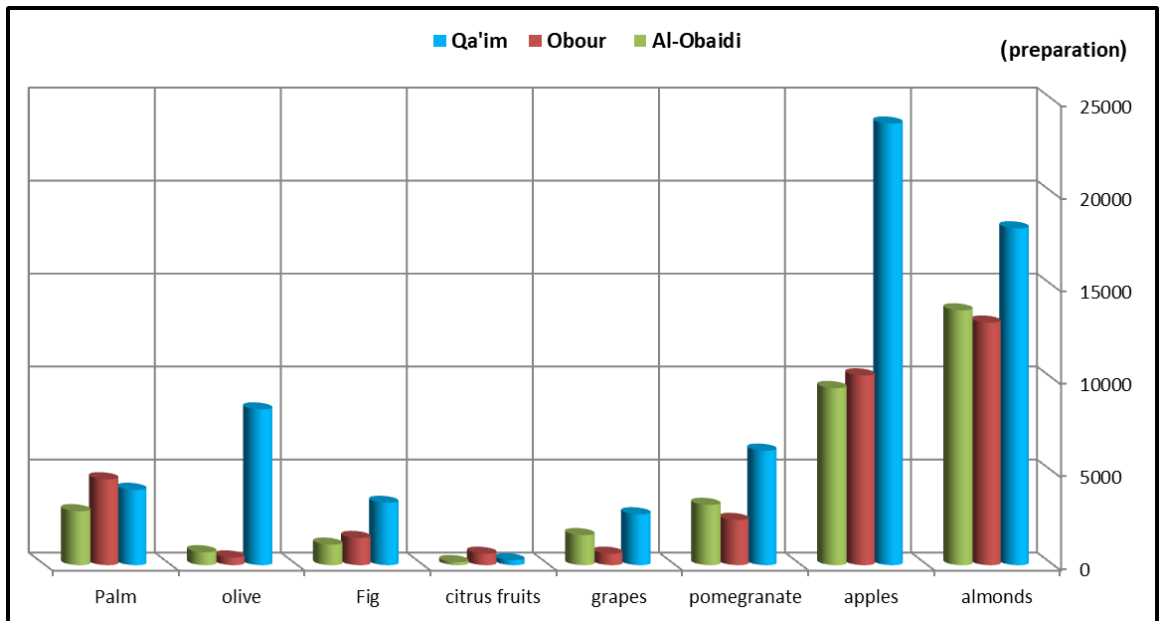
As for the year (2020), by looking at Table (3) and Figure (4), it was found that the total number of citrus trees in the study area is (503) trees that are distributed differently among the administrative units of the district. Al-Obour district occupied the first place, as the total number of citrus trees in it reached (249) trees, at a rate of (50%) of the total study area. In the second place, it is represented by Al-Obaidi district, where the number of citrus trees reached (144) trees, at a rate of (28%) of the total study area. . As for the Al-Qaim district center, it represents the third rank, as the number of trees in it reached (110) trees, at a rate of (22%) of the total trees in the study ar

Table (3) Existing agricultural reality of horticultural crops by type of crop and according to the administrative units of Al-Qaim district for the period (2000-2020)

	Administrative unit	almonds		apples		pomegranate		grapes		citrus fruits		Fig		olive		Palm	
		number of trees	%	Number trees	%	Number trees	%	Number trees	%	Number trees	%	Number trees	%	Number trees	%	Number trees	%
2000	<u>Qa'im District</u>	18112	%40	23748	%55	6156	%52	2733	%55	260	%25	3350	%57	8371	%88	4048	%35
	Transit	13044	%29	10201	%23	2429	%21	614	%12	612	%59	1460	%25	413	%5	4617	%40
	<u>Al-Obaidi</u>	13702	%31	9524	%22	3240	%27	1614	%33	161	%16	1102	%18	693	%7	2898	%25
	total elimination	44858	%100	43473	%100	11825	%100	4961	%100	1033	%100	5912	%100	9477	%100	11563	%100
2020	<u>Qa'im District</u>	18342	%54	10470	%50	3069	%47	1469	%61	110	%22	1709	%58	3847	%86	3617	%33
	Transit	7663	%23	5354	%25	1748	%27	423	%17	249	%50	742	%25	232	%6	4190	%38
	<u>Al-Obaidi</u>	7675	%23	5342	%25	1649	%26	531	%22	144	%28	484	%17	363	%8	3153	%29
	total elimination	33680	%100	21166	%100	6466	%100	2423	%100	503	%100	2935	%100	4442	%100	10960	%100

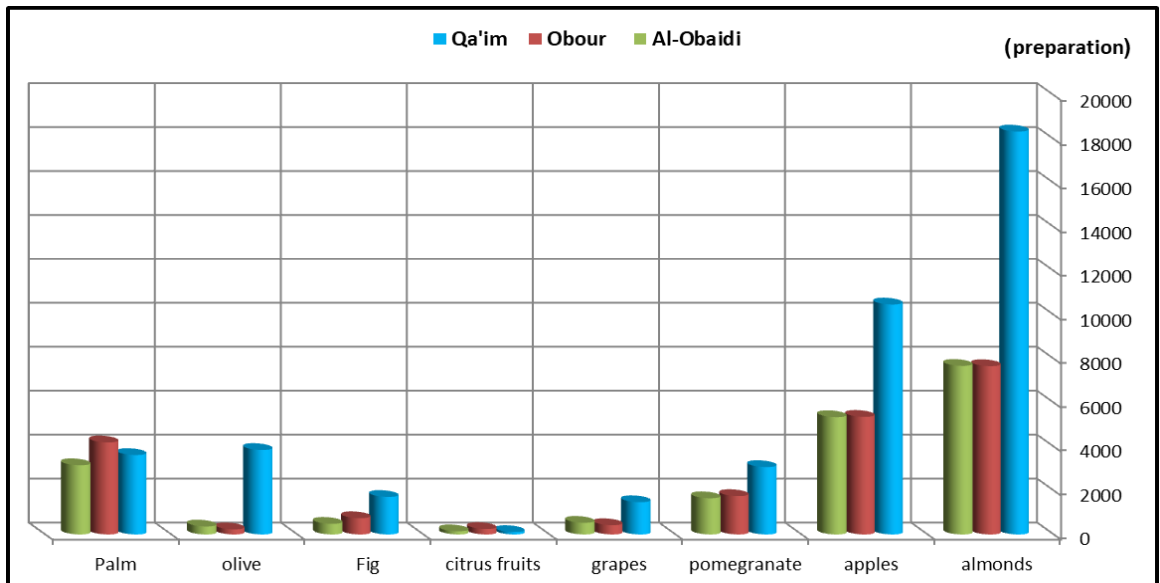
Source: Ministry of Agriculture, Al-Qaim Agriculture Division, Planning and Follow-up Department, unpublished data

Shape (3) Number of trees according to the type of crop and according to the administrative unit of the study area for the year 2000



Source: Based on Table (3)

Shape (4) Preparing trees according to the type of crop and according to the administrative unit of the study area for the year 2020



Source: Based on Table (3)

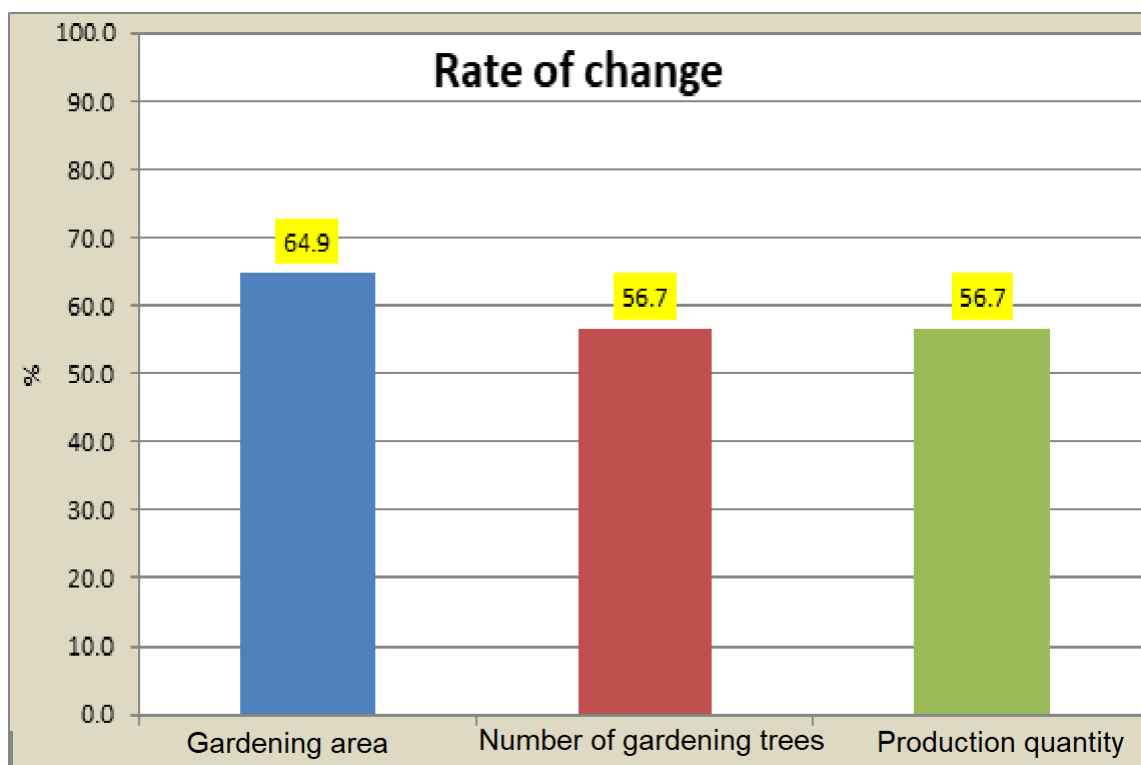
4. Analysis of change trends for horticultural crops for the total district of Al-Qaim for the period (2000-2020)

Determining the trends of change helps to highlight the levels of variation in agricultural crops between the parts of the study area, as well as identifying the most important reasons behind this. 507) dunums, with a rate of change of (64.9), and a relative change of (-35.1), as shown in Figure (5), due to the deterioration of the security conditions experienced by the study area. Which led to the migration of the population outside the judiciary. After the events, most farmers left the agricultural profession and turned to other professions because of the economic returns. In addition to the fact that most of the population did not return to the study area, as the study area was an area expelling the population due to the lack of living policies in it. As for the number of trees, by looking at Figure (5), it was found that the rate of negative change in their numbers amounted to (56.7), with a relative change of - (43.3), which was reflected on the quantity of horticultural crops production in, as the percentage of change in the amount of production amounted to (43.3).

Table (4) Change rate of areas and numbers of horticultural trees in Al-Qaim district

Indications	Gardening trees area	Number of gardening trees	production quantities
2000	1444	145753	6558885
2020	937	82575	3715875
relative change	35-	43-	43-
rate of change	64.9	56.7	56.7

Shape (5) The rate of change of areas, numbers and quantities of production for horticultural crops in Al-Qaim district for the period (2000-2020)



Source: Based on Table (4)

5. Analysis of change trends by type of crop at the level of administrative units in Al-Qaim district for the period (2000-2020)

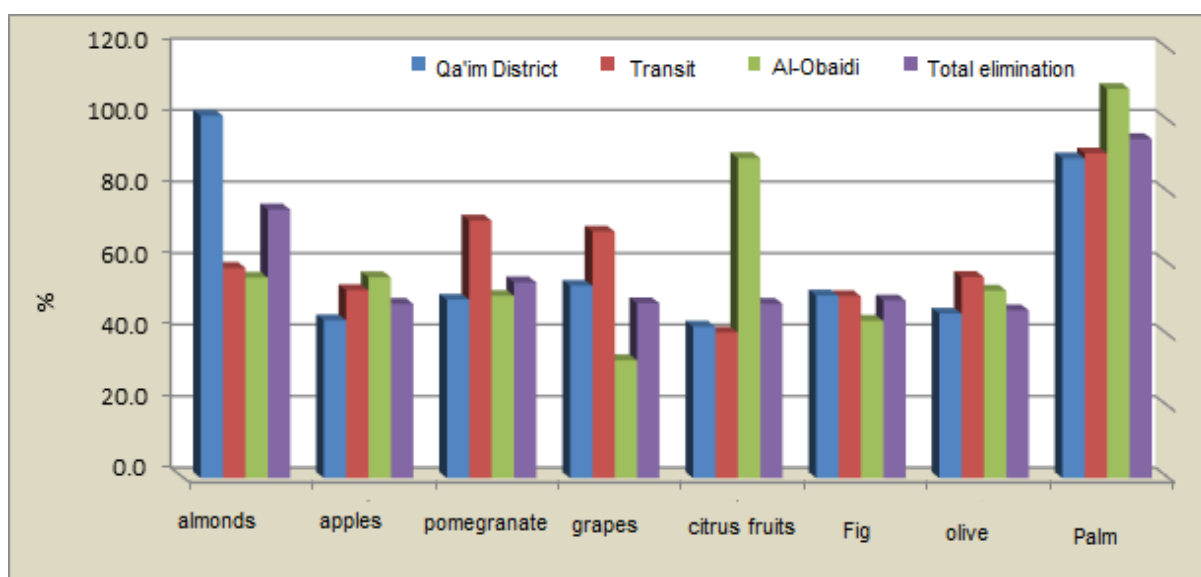
By observing Table (5), it was found that the rate of change in trees (apples and citrus) respectively amounted to (-48.7) and relative change (-51.3) due to the security events that passed through the study area, power outages, fuel sources and the migration of most of the population for long periods, which led to the decline of large areas of these crops. As for the lowest rate of change, it is represented in palm trees, as it reached (94.8) with a relative change of (-5.2), due to the palm trees' endurance to drought conditions for long periods, as well as the entry of large quantities of palm trees from the Syrian country.

Table (5) The rate of change and relative change by type of crop at the level of administrative units in Al-Qaim district for the period (2000-2020)

Rate of change	Administrative units	almonds	apples	pomegranate	grapes	citrus fruits	Fig	olive	Palm
	Qa'im District	101.3	44.1	49.9	53.8	42.3	51.0	46.0	89.4
	Transit	58.7	52.5	72.0	68.9	40.7	50.8	56.2	90.8

	Al-Obaidi	56.0	56.1	50.9	32.9	89.4	43.9	52.4	108.8
	total elimination	75.1	48.7	54.7	48.8	48.7	49.6	46.9	94.8
the change relative	Administrative units	almonds	apples	pomegranate	grapes	citrus fruits	Fig	olive	Palm
	Qa'im District	1.3	-55.9	-50.1	-46.2	-57.7	-49.0	-54.0	-10.6
	Transit	-41.3	-47.5	-28.0	-31.1	-59.3	-49.2	-43.8	-9.2
	Al-Obaidi	-44.0	-43.9	-49.1	-67.1	-10.6	-56.1	-47.6	8.8
	total elimination	-24.9	-51.3	-45.3	-51.2	-51.3	-50.4	-53.1	-5.2

Figure (6) Change rates of horticultural crops by administrative units of the study area for the period (2000-2020)



Source: Based on Table (5)

Conclusions

1. Through the study, it was found that Al-Qaim district owns an area of (2928354 / dunums) and an arable area of about (111880 / dunums). Which gives indications that there are no obstacles to the expansion of agricultural production in terms of quantity and quality, if the ingredients for that are available.
2. It was found that the area of horticultural crops in Al-Qaim district for the year (2000) amounted to (1444/dunam), while in the year (2020) it amounted to (937/dunam) and with a negative decline of (-35.1%).

3. The study showed that the highest rates of change were recorded in olive trees, which amounted to (46.9) with a relative change of (-53.1%), while the lowest rate of change was recorded in the cultivation of palm trees, which amounted to (94.8) and with a relative change of (5.2%).

Recommendations

1. It is necessary to address the problem of urban sprawl towards arable lands and lands designated for orchards, which most of the districts of the study area suffer from, through the imposition of laws and legislation by the local government under the supervision of the Qaim Agriculture Directorate.
2. Supporting orchard owners by providing advances and agricultural loans from the Agricultural Bank for the purpose of maintaining and establishing new orchards
3. Allocating a cadre of agricultural engineers with high expertise and efficiency, in proportion to the number of farmers and the areas of orchards planted in the district.

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