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Geographical Distribution Of Industrial Crops In Anbar Governorate And The Relative Change Of Their Cultivation Between 2011 And 2019

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Abstract

Agro-industrial development has its role in developing the country's economic activity and achieving agricultural-industrial integration, especially when industrial crops are used as raw materials for agricultural industries. Therefore, the research came to give a clear picture of the reality of cultivating industrial crops in the study area, and to know their geographical distribution, extent of concentration, and the relative change between 2011 and 2019, so that the picture becomes clear to decision-makers to dress the reasons for the decline in their cultivation. The field study has been relied upon to obtain information from Directorate of Agriculture in the province and field visits.

1. Introduction

The geographical distribution of industrial crops in the study area for the year 2019 confirms the extent of change that affected them and their percentage decline from what they were in 2011 . Therefore, an analysis will be me for the geographical distribution of them in the form of categories, showing the percentage of concentration and the relative change that affected them due to displacement and leaving agricultural lands and focusing on wheat cultivation. Barley and the lack of state support for industrial crops despite their importance as food and as a raw material in the manufacture of vegetable oils. A geographical analysis of each of the industrial crops grown in the study area can be examined in detail and compared with the year 2011 in terms of the area of agricultural land and its percentage as well as the relative change (*). Through which the relative change of each crop between the base year and the comparison year (1) is known, then the districts in which each crop is grown is shown in categories. The research reached a set of conclusions, the most important of which is the retreat of cultivating industrial crops in Anbar Province due to the deteriorating security situation and the lack of state support for their cultivation despite the availability of natural and human resources.

Therefore, a research problem was developed which is: -

Is there a relative change in the cultivation of industrial crops between 2011 and 2019 in Anbar Governorate?

To formulate the research hypothesis as follows:

The geographical distribution of industrial crops is in decline and relative change between 2011 and 2019.

1-1 Geographical distribution of industrial crops in Anbar Governorate: -

It is clear from Table (1) and Figure (1) the spatial and relative distribution of the areas cultivated with industrial crops (dunums) and the amount of production (tons) for the study area in 2019, as the area of land cultivated there constituted (13928) dunums at a rate of (2.29)% of Actually cultivated lands, and by comparing them with the year 2011, Table No. (2) and Fig. No. (2), the deficit is clearly evident, as its area reached (27885) dunums by (4)%, a difference (13957) dunums, and a decrease of (2.1%) from what it was In 2011 .

Table No. (1) Spatial and relative distribution of areas planted with industrial crops (dunums) and the amount of production (tons) in the districts of Anbar Governorate for the year 2019

%	Total of area	Production Tons) (	Olives		Production (Tons)	Cotton		Production (Tons)	Groundnut Arachis		Production Tons) (	Sesame		Production Tons) (	Sunflower		Production (Tons)	Maize corn		ministrative unit
			%	Area		%	Area		%	Area		%	Area		%	Area		%	Area	
31	4271	35	63	2350	8	30	3	200	14,5	450	500	7	5	299	44,4	200	4068	19	1263	Ramy
48	6666	69	18	690	20	50	5	900	55	1696	840	27	20	225	23,3	105	9022	63	4150	Fallujah
5	648	15	3	105	-	-	-	1000	24	751	900	29	22	198	7	32	610	6	365	Hait
1,1	163	21	1,4	55	12	20	2	43	2	60	-	-	-	60	1,1	5	376	1	41	Hitha
0,1	95	2	0,2	11	-	-	-	11	0,4	15	-	-	-	200	13	60	135	0,1	9	Anah
0,4	63	3	1	20	-	-	-	7	0,1	4	700	11	8	53	2	8	156	0,3	23	Rawya
14	1964	40	12,4	467	-	-	-	44	4	124	800	26	20	90	7	30	2000	10,6	696	Al-Qaim
0,4	58	2	1	48	0	0	0	0	0	0	0	0	0	0	2,2	10	0	0	-	Alrateba
%100	13928	187	100 %	3746	40	100 %	10	2205	100 %	3100	3740	100 %	75	1125	%100	450	16367	100 %	6547	Total

Source / the researchers' work depending on the Ministry of Agriculture, Anbar Governorate Agriculture Directorate, Planning Department, unpublished data, for the year 2019.

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Figure No. (1(
The relative distribution of the area cultivated with industrial crops in the districts of Anbar Governorate for the year 2019.

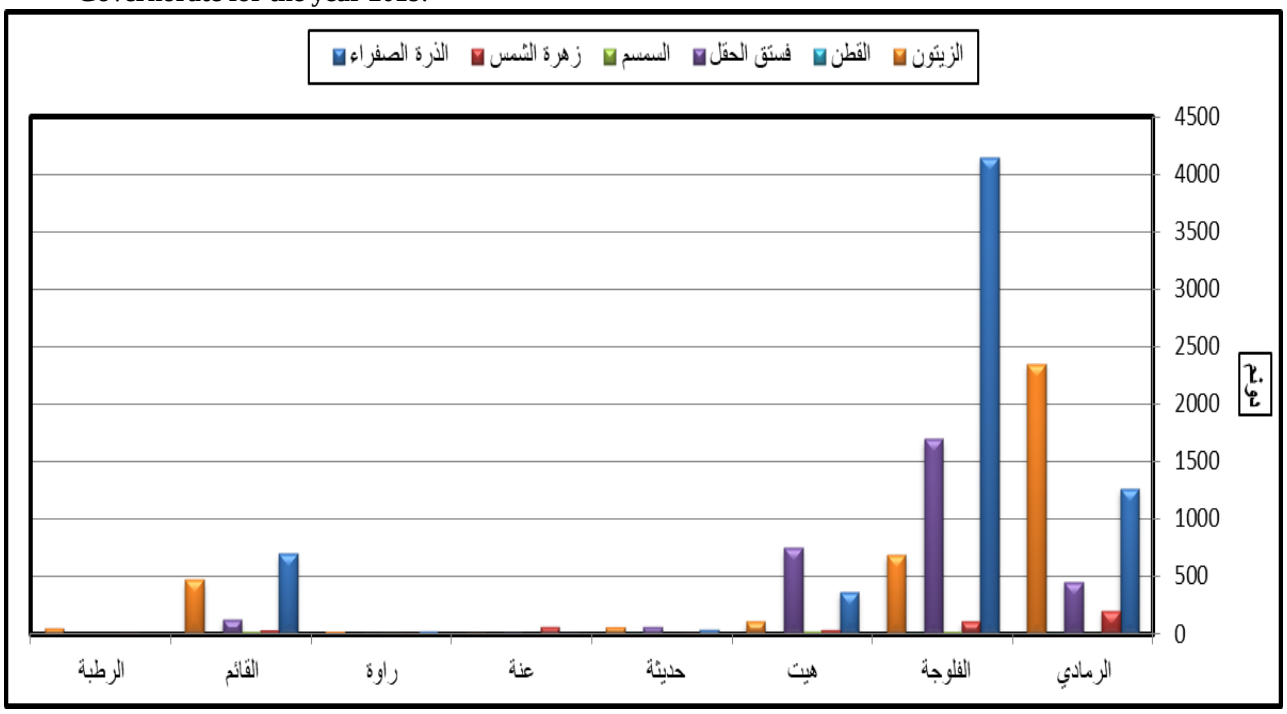


Table No. (2) Spatial and relative distribution of the area cultivated with industrial crops (dunums) and the amount of production (tons) in the districts of Anbar Governorate for the year 2011

Source / made the two researchers, depending on the Ministry of Agriculture, Directorate of Agriculture, Anbar Governorate, Planning Department, unpublished data, 2011.

%	Total of area	Production	Cotton		Production	Groundnut Arachis		Production	Sesame		Production	Sunflower		ministrative unit
		Ton	%	area	Ton	%	area	Ton	%	area	Ton	%	area	
33	9211	-	-	-	1750	41.8	2500	807	37.3	5386	331	18.3	1325	Ramia
39.4	10991	18	28.6	60	105	2.5	150	825	38	5501	1320	73.1	5280	Fallujah
12.7	3529	-	-	-	1358	32.4	1940	147	6.8	984	151	8.4	605	Hait
1.1	292	-	-	-	10	0.3	15	41	1.9	277	-	-	-	Hitha
0.5	150	45	71.4	150	-	-	-	-	-	-	-	-	-	Anah
0.3	79	-	-	-	-	-	-	11	0.5	79	-	-	-	Rawya
13	3633	-	-	-	966	23	1381	335	15.5	2239	3	0.2	13	Al-Qaim
-	-	-	-	-	-	-	-	-	-	-	-	-	-	Alrateba
%100	27885	63	100	210	4189	%100	5986	2166	%100	14466	1805	%100	7223	**Total**

Figure No. (2(
The relative distribution of the area cultivated with industrial crops in the districts of Anbar Province for the year 2011

Source / me by the researchers, based on Table No. (2)

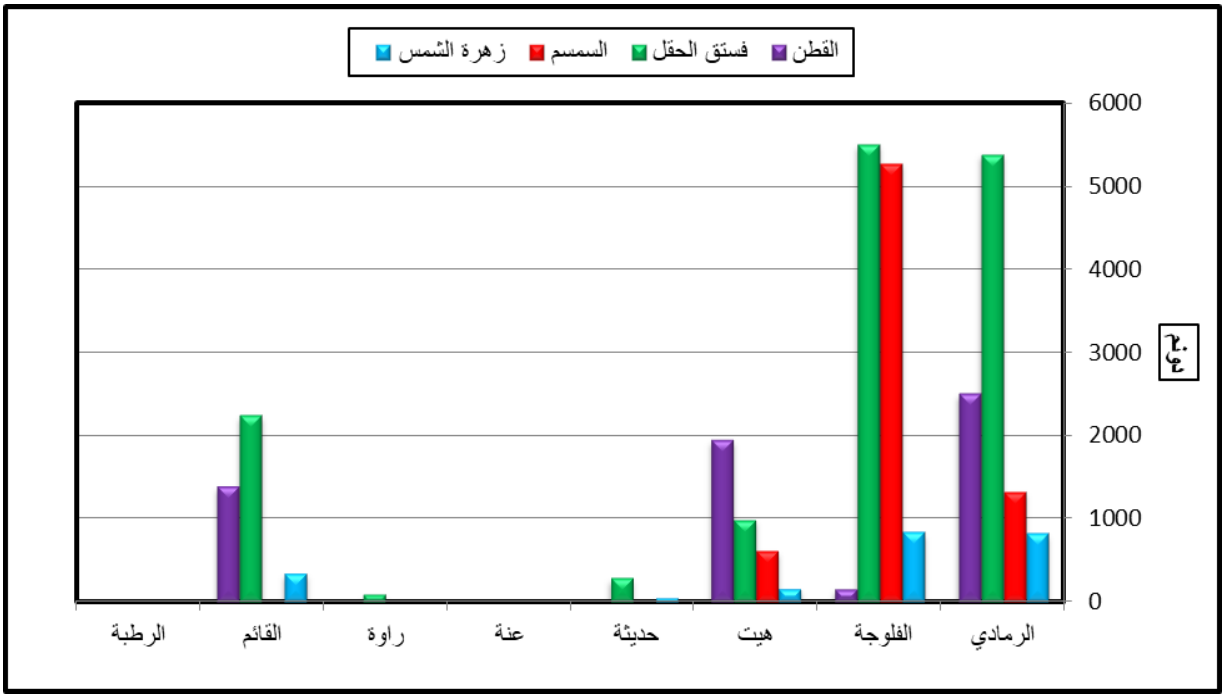


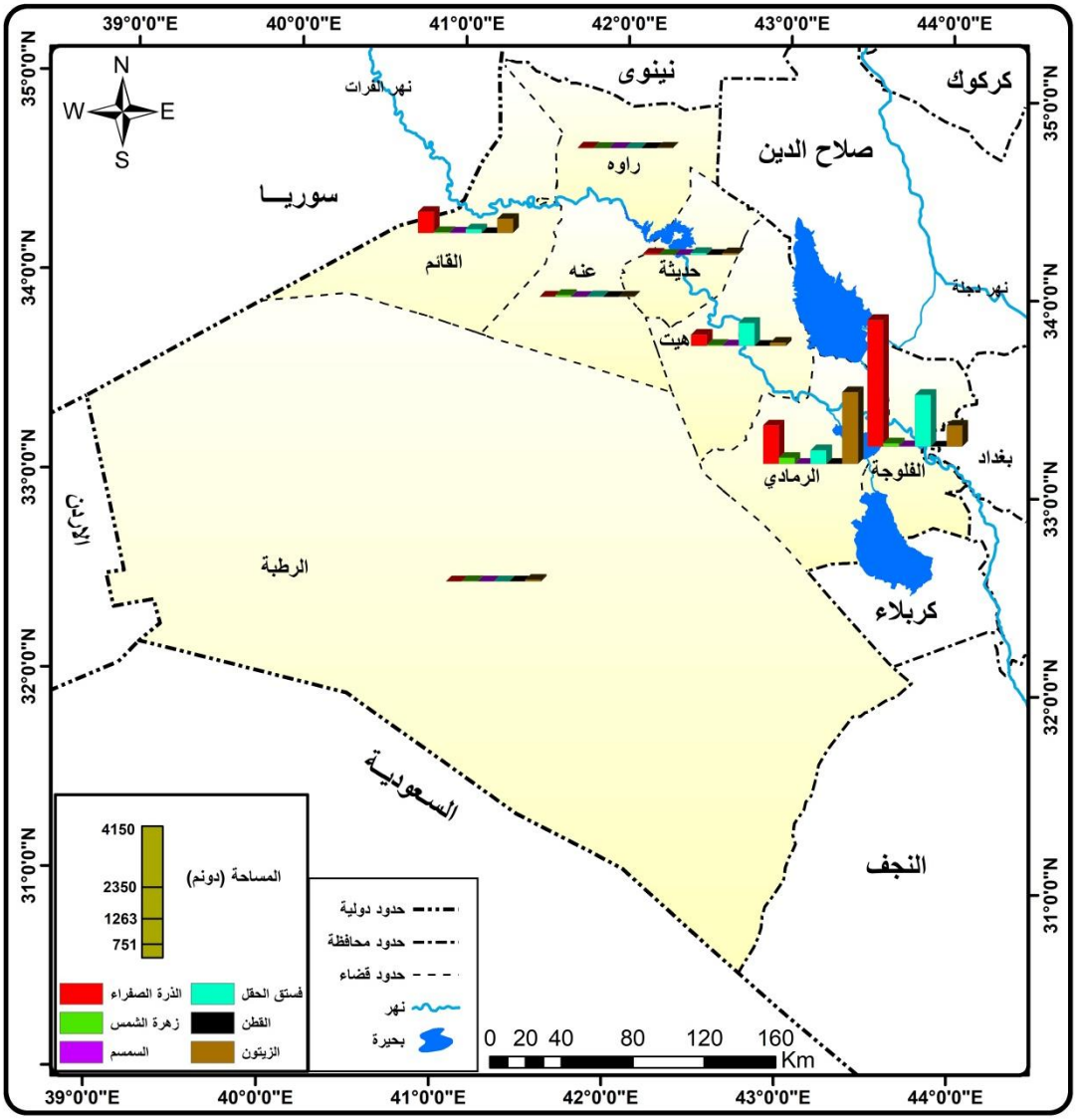
Table No. (3) **Concentration factor of industrial crops in the districts of Anbar Province for the year 2019.**

The source / the researchers' work depending on- :

olives	cottton	Groundnut A rachis	Sesame	Sunflower	Maize corn	ministrative unit
32,4	0	58	0	7,49	10,1	
0	0	0	0	0	0	Rami
0	0	1,95	0	0	0	Fallujah
0	0	0	0	0	0	Hait
0	0	0	0	1,6	0	Hitha
0	0	0	0	0	0	Anah
1,62	0	0	0	0	1,8	Rawya
1,62	0	0	0	0	0	Al-Qaim

1-Mathematical Law: - Concentration factor
If the number is more than (1), then the area planted with the crop is large, but if it is less than (1) it is less concentrated, and if the coefficient is negative, it means that the area is free of cultivation.
2- Table no (1)

Map No. (1)The relative distribution of cultivated areas / dunums with industrial crops in Anbar governorate for the year 2019.



Corn is grown as a summer crop, as it needs temperatures up to (28 ° C) and light that helps speed ripening and has great importance as food for humans and animal fodder. In dition to the most important use, which is a raw material for extracting oil, the researcher included it among the industrial crops, as yellow corn is me from oil, paper, dyes and gum (3), in dition to being one of the important grain crops.

The maize crop is grown in most districts of the governorate, Image No. (1), but there is a spatial discrepancy between one district and another, as the area cultivated in it reached (6547) dunums, at a rate of (47)% of the total area of industrial crops for the year 2019 , while its percentage in 2011 was 13 , 4)% (4). With a difference of (33.6)%, and the relative change reached (53)%, and its production reached (16,367) tons, Figure No. (3), and by looking at Table No. (1) and the map of the proportional distribution of the areas invested in crop No. (1), the former can be classified Spend its production into the following categories- :

Image No. (1) One of the fields of yellow corn cultivation

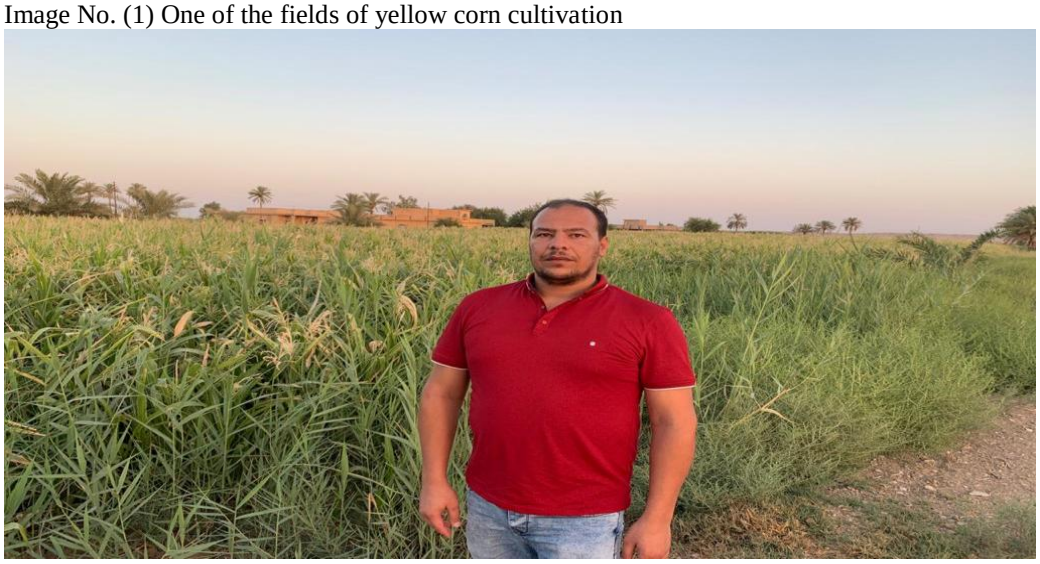
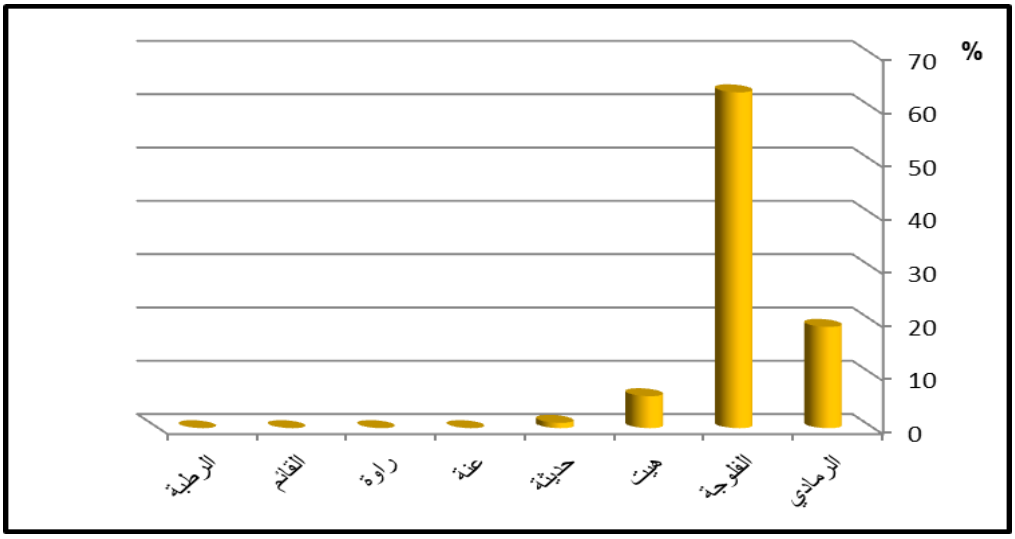


Photo taken on 7/20/2020

Figure No. (3)The percentage of yellow corn crop industrial crops in Anbar Governorate for the year 2019



The source / made by researchers, according to Table No. (1)

The first category: includes the districts of (Fallujah, Rami, Al-kaem and Heet), as the percentage of cultivated lands reached (63%, 19%, 6. 10%, 6%) of the total area, respectively, these districts outnumber the Euphrates River water and soil It is fertile, as well as raising poultry and livestock, which are used in it as fodder and the capacity of agricultural land in it.

The second category: includes districts (Hitha, Rawah and Anah) and the percentage of crop cultivation in it does not exceed (1%, 0.3%, 0.16%) of the total area invested in it and in succession, and the reason for neglecting cultivation in it is due despite the availability of water and the appropriate climate, the ignorance of farmers of the economic importance of the crop as a food, raw material for the manufacture of oils and others, and animal fodder.

The third category: - It was confined to the Rutba district, which did not achieve any percentage of its crop cultivation in it, and for several reasons for farmers 'neglect of arable agricultural lands due to military operations, as well as the scarcity of agricultural land, as it is a semi-desert area and the lack of water resources due to its distance from the Euphrates River.

As for the concentration factor of the yellow corn crop, Table No. (3) above, the Rami district issued the rest of the districts, so that the yield factor in the district reached (10.1) because the area of its cultivation in the district amounted to (1263) dunums for use as food as well as fodder for livestock, but it is not used as a raw material in Industry, followed by Al-Qaim district, bringing the concentration factor to (1.8) for the capacity of agricultural land, availability of water, and its need as fodder for livestock. As for the rest of the districts (Fallujah, Heet, Hitha, Anah, Rawah), the concentration factor for each of them reached (0) in which it is cultivated. However, it is less concentrated for the dominance of other crops, such as wheat, barley, fruit trees, and others more than it. As for the Rutba district, it is distinguished by its complete absence of crop cultivation.

2-1-1**Sun flower**:

Al-Anbar Governorate is considered one of the areas in which sunflower cultivation is good due to the availability of suitable mix soil and the suitability of the climate in terms of temperatures, light hours and the presence of water, but the production of the crop did not exceed (1125) tons with an area planted in it and reached (450) dunums only by (3) % Of the area cultivated with industrial crops, Image No. (2) and Fig. No. (4).

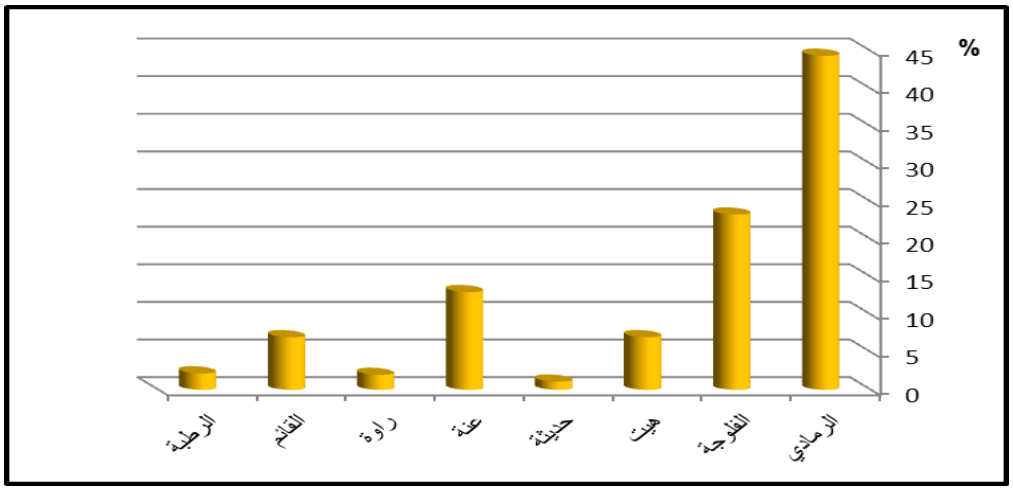
It is a low percentage compared to 2011 , which amounted to (25)%, with a difference of (22)%, with a relative change reaching (-1505)% for the wide difference in the change of crop productivity, which confirms the farmers' negligence of this high-benefit crop, as it is used to extract oil from it and the husks of animal fodder and use it. Its stems are fuel and from it the calcium carbonate used in the manufacture of chemical fertilizer is prepared, as it contains (35)% of calcium oxide and is me from the pulp of its stems paper and silk. . As it has economic and industrial importance worth introducing it as a raw material and establishing a factory for that, especially the availability of the components of its industrial settlement in the study area, that les to industrial development, as well as agricultural development. The area of cultivation varies in the districts of the governorate if it can be classified into the following categories:

The first category: includes the districts of the first rank in which the percentage of land cultivated with crops reached (44.4%, 23.3% and 13%) respectively, and which were in the districts of (Rami, Fallujah and Anna), respectively, due to the expansion of the agricultural lands in them and the availability of agricultural labor.
The second category: - It includes the districts of the second rank, in which the percentage of agricultural lands invested in the crop reaches 7% to be acquired by both (Heet and Al-Qaim) due to the availability of natural and human resources in them.
The third category: - The districts in which the percentage of agricultural lands cultivated with this crop are (2.29%, 2%, 1.16%) and include districts (Al-Rutba, Rawah and Hitha(
The low spre of the crop in it competes with other crops such as vegetables. As for the concentration coefficient for the sunflower crop, it was the share of Rami (13.49) and Anah (1.6). As for the other districts, it recorded (0) due to the dominance of other crops and their competitors, such as cereals and horticulture.

Image No. 2 Sunflower farm

Photo taken on 5/19/2020

Figure No. (4) The ratio of the sunflower crop to the industrial crops in Anbar Governorate for the year 2019.



Source / made by the researchers, based on Table No. (1)

3-1-1**sesame**: -

The sesame crop is important in several fields, as it is used as a raw material in the oil industry and as a food substance for the manufacture of sweets and pastries and its stems as animal fodder, and being a summer crop that is well cultivated in the study area to suit the climate from heat and sunny weather throughout the period of its growth to its harvest and the presence of fertile mixing soil with good drainage and availability Water. The best germination of the crop is when the soil temperature ranges between (20-22) ° C (5). Sesame is an economical cash crop that contains a large proportion of oil (50% - 60%) (6). Therefore, using it as a raw material in the manufacture of oil by establishing a plant, thus enhances the economy of the province and the country and achieves agricultural-industrial integration and thus industrial development.

The area of agricultural land cultivated with crops in the study area amounted to (75) dunums only, at a rate of (0.5)% of the area of land cultivated with industrial crops, Image No. (3), with a decrease of (51.4)%, Figure No. (5) from 2011, in which the percentage of land cultivated in it reached to (51.9)% and its production did not exceed (3740) tons, and with a relative change of (-19188)%, which is the lack of interest in this important crop and for several reasons, the most important of which is the lack of support from the government and the farmers' ignorance of its importance, in dition to the fact that some are reluctant to cultivate it because it is an oil crop that consumes fertility Soil, in spite of all of the above, it has an important economic return**.**

Image No (3) One of the fields of sesame cultivation

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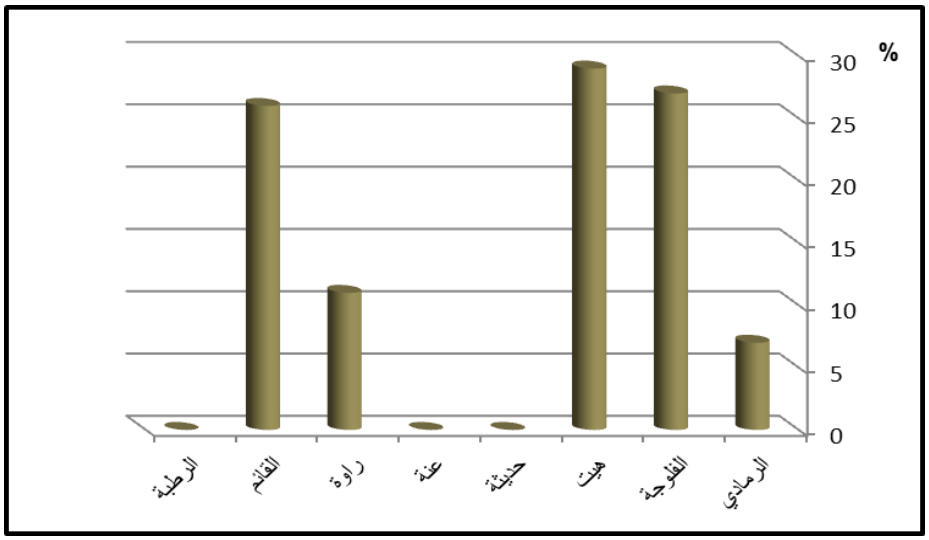


Source / made by the researchers, based on Table No. (1)

The relative distribution of the area of land cultivated with sesame, according to the districts of the governorate, appears to fall into the following categories:
The first category: includes the districts in which the percentage of the area of land cultivated with the crop has reached (29%, 27%, 26%) of the total area, namely (Heet, Fallujah and Qaim), respectively, due to the presence of farmers 'desire to cultivate the crop in these districts with the availability of natural factors. Mankind will help produce it.
The second category: includes the districts (Rawa and Rami) at a rate of (11% and 7%) for each of them. It was concentrated in it due to a desire to produce a crop.
The third category: - The category here consists of districts (Hitha, Anah and Al-Rutbah) to take a percentage of (0%) and the analysis of this is due to human obstacles in (Hitha and Anah) represented by the lack of desire to cultivate the crop as well as heing towards cities and leaving agriculture, because most farmers Their children have become employees of the state, and due to poor agricultural planning by the agricultural people, as for Al-Rutbah, its natural obstacles are the lack of water due to its dependence on ground water and its distance from the Euphrates and its poor soil. It has a high concentration, especially (Hitha, Anah and Al-Rutbah), which was completely devoid of its cultivation for the aforementioned reasons.
As for the rest of the districts, it is cultivated in it, but at a weak rate, which is dominated by the cultivation of other crops, such as summer vegetables and fruit trees, that prevailed in those districts.
4-1-1**Groundnut A rachis** :
The field of pistachios is one of the summer crops that grow in hot regions, and it has economic importance as it is a source of oil, protein and food industries, as its residues are animal fodder, in dition to its vital importance to the soil. Image No. (4) and Fig. No. (6) While in 2011 its percentage reached (21)% with a slight difference of (1)%, while its production amounted to (2205) tons. Bringing the relative change to (-93)

Image No (4) A farm of growingGroundnut A rachis

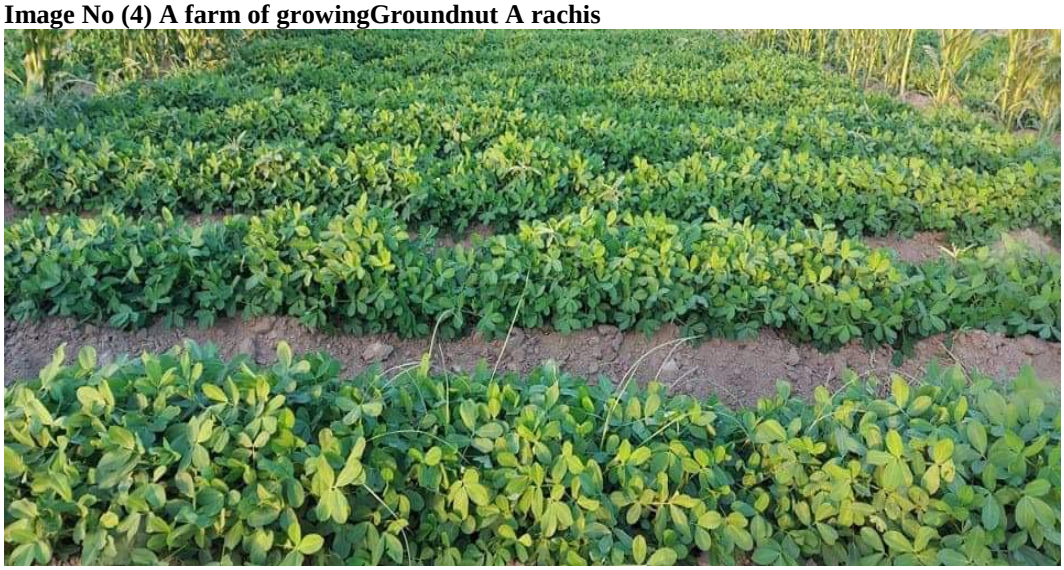
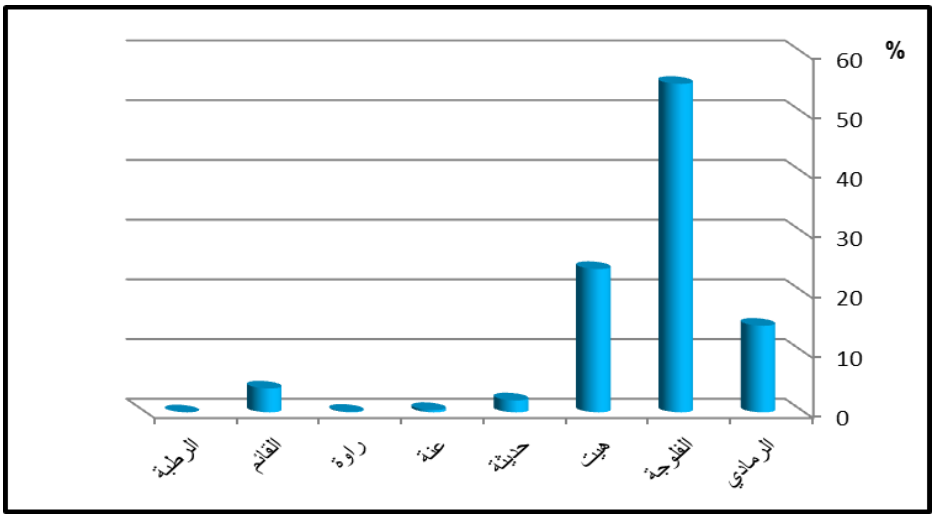


Image taken on 5/22/2020

Figure No (6) The percentage of Groundnut A rachis to industrial crops in Anbar Governorate for the year 2019



Source / made by the researchers, based on Table No. (1)

The districts of the governorate differ in the proportions of its production to take the following categories- :
The first category: - The districts of Fallujah, Heet and Rami (the districts of Fallujah, Heet and Rami) came first in the percentage of crop production by (55%, 24%, 14.5%), which are good proportions that show the peasants 'desire to cultivate it, especially the availability of natural and human factors, but it is only used as food. And as animal feed, it was not invested as a raw material in the manufacture of oil, which constitutes (50-60)% of its fruits (7), in dition to using its oil in the manufacture of good soaps and shaving soaps (8).
The second category: - Districts (Al-Qaim and Hitha) were included (4% and 2%), respectively, due to the availability of its cultivation requirements.
The third category: - It is the districts in which the percentage of pistachio cultivation in the field reached (0.4%, 0.1%), which is (Anah and Rawa) due to the departure of farmers to cultivate other crops, and the Rutba was (0%), meaning that it was empty of cultivation due to the lack of Irrigation and rain water because the crop is summer and the district is far from the Euphrates River, because one of the indicators of the success of its cultivation is the availability of water and large quantities (9). As for the concentration factor, the district of Rami was issued and then it was hit by a factor of (5.8, 1.95) in succession to concentrate its cultivation In both districts (Fallujah, Hitha, Anah, Rawa and Al-Qaim), the concentration coefficient in them reached (0), as it is cultivated, but it is less than the rest of the other crops that dominated the field of pistachio crops with their concentration, so that Al-Rutbah and its plants (0) came to the district being devoid of its cultivation.

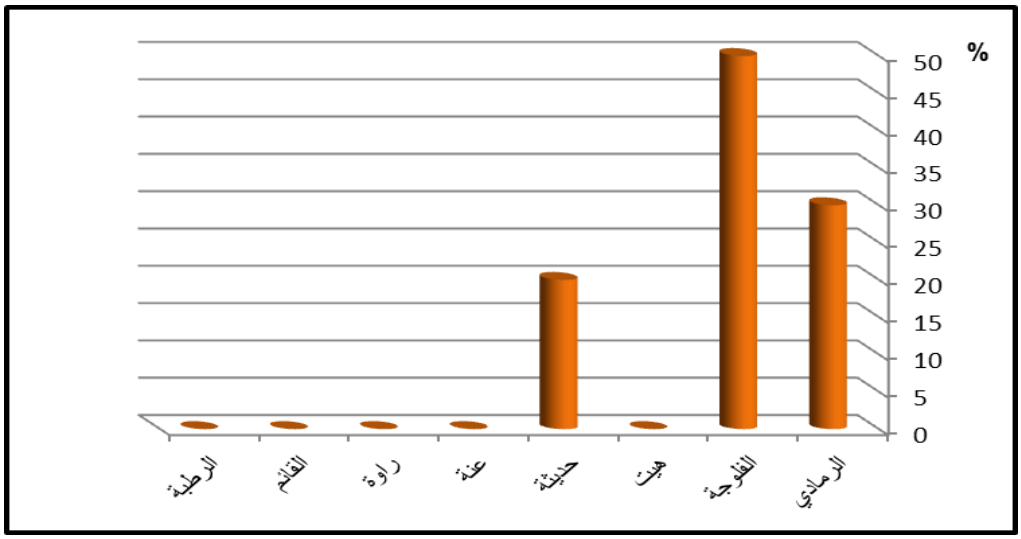
5-1-1**Cotton: Cotton**

Cotton is one of the most important agricultural crops with fibers, which is used in tre and industry, such as the manufacture of textiles and oils, and that the cotton tre is not limited to raw cotton alone, but rather includes cotton spinning, its textiles, cotton seeds and the oils extracted from them. As its importance is evident in the industry as it is a major raw material that plays an important role in the industry in relation to the number of workers in it, the quantity of goods me from it, and the value of that in relation to satisfying economic needs (10). Cotton is grown in the summer and grows in the form of a small tree up to four feet high. Cotton crop in Anbar Governorate, but the agricultural policy, farmers 'desire and poor agricultural management planning led to a lack of cultivation, if the area of cultivated land in it only occupied (10) dunums, at a ratio of (0.07)% of the land cultivated with industrial crops Figure (6) Image No. (5).

Image No (5) A farm of growing cotton

Image taken on 5/27/2020

Figure No (7) Percentage of cotton crop to industrial crops in Anbar Governorate for the year 2019



Source / made by the researchers, based on Table No. (1)

The percentage of cultivated area for him in 2011 was (0.7)%, a difference of (0.63)%, to show us that the lack of interest in cotton cultivation was in the year 2011 and 2019 despite the year 2011, (210) dunums were cultivated in it, so the relative change was Large, up to (-000)%, which confirms the neglect of the state, agricultural departments and farmers for the economic importance of the crop. Its production for 2019 reached (40) tons only. The districts producing the crop can be divided into the following categories- :

The first category: - The districts of (Fallujah, Rami and Hitha) formed the proportion of the lands cultivated in it with cotton (50%, 30% and 20%) respectively, so that we h a clear indication of the success of its cultivation in most of the districts of the governorate, as the natural and human factors for its cultivation were available in the above districts.

The second category: - It included the rest of the districts that were completely empty of its cultivation (Heet, Anah, Rawa, Al-Qaim and Al-Rutba) by (0)%, especially since the success factors for cultivation are present in temperature, long growth season, clear sky, bright sun, frost-free atmosphere and presence Irrigation water from the Euphrates River and fertile soil because it is abundant in the soils found in the flood plains (except for the district of Al-Rutba), as well as the presence of human factors from the labor force are all factors encouraging the cultivation of cotton in the study area. As for the concentration factor, it reached (0) in all districts. Other

crops are dominated and concentrated on it in each of (Fallujah, Rami, Hitha) such as vegetables and fruits, and the rest of the five districts are completely devoid of cultivation.

6-1-1-**Olives:**

The olive tree is one of the tree plants of the olive family and it is of economic wealth, just as small olives have great importance in extracting high-quality oil for its high nutritional, therapeutic and medicinal value, while the rest of the olives after extracting the oil are dried and used in heating and as an alternative to charcoal or gravel and it is called peat (11). The olive tree is highly resistant. It needs sunny weather and good soil for drainage. It is planted in the spring and before the end of June (12). It is cultivated in the study area and in its different proportions within the districts of the governorate. The area planted with olive trees reached (3746) dunums, at a rate of (26)%. In 2011, the percentage of land invested in it was (38)%, a difference (12)%. Image No. (6) and Fig. No. (8). As for its production, it reached (187) tons. The relative change in relation to its area change was (43)% between 2011 and 2019.

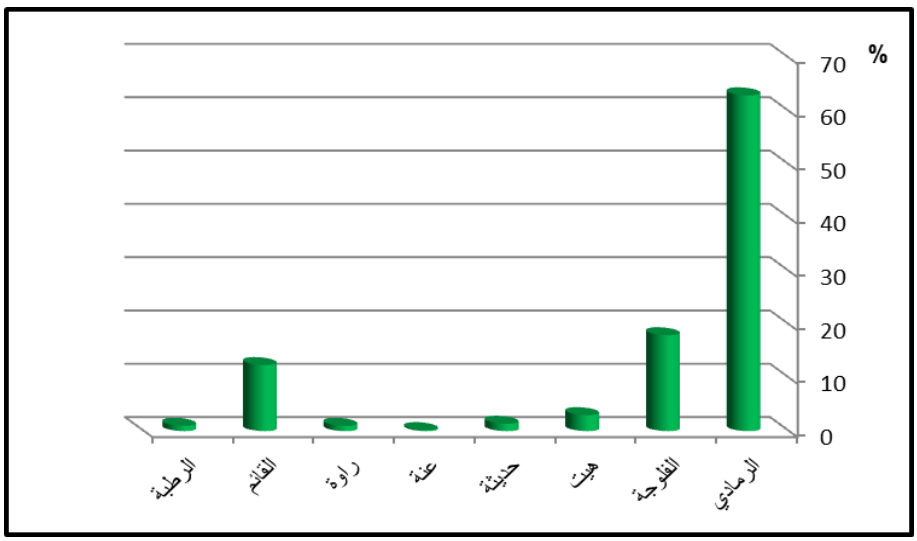
The relative distribution of it within the districts of the governorate takes the following categories- :

The first category: - (Rami, Fallujah and Al-Qaim) ranked first with percentages (63%, 18%, and 12%), respectively, for the capacity of its agricultural area and the farmers 'desire to plant olive trees (14). And the presence of ingredients towards it, but it is not operated as a raw material for the extraction of oil of nutritional and economic benefit.

Image No (6) An orchard for growing olives

Image taken on 3/6/2020

Figure No (8) The percentage of the olive harvest to the industrial crops in Anbar Governorate for the year 2019.



Source / made by the researchers, based on Table No. (1)

The second category: - included the rest of the districts (Heet, Haditha, Rawa, Rutba, Anah) with rates (3%, 1.4%, 1%, 1%, and 0.2%), respectively, as the success of its cultivation led to its spread to suit natural and human conditions. The concentration factor was from Ramadi's share to reach (32.4), then Al-Qaem with (1.62). As for the rest of the districts, the concentration factor was limited to (0), despite its cultivation there, but fruit and vegetable trees were more concentrated than it.

Conclusions- :

The research concluded with conclusions as follows:

1--There is a clear decline in the cultivation of industrial crops for the year 2019 AD from what it was for the year 2011 AD, as proven by research and by using the relative change.

2--The districts of the study area vary in the geographical distribution of each industrial crop, which emerged from its division into different categories.

3--The concentration factor confirmed to us a variation in the concentration of industrial crops and according to districts. The reason for the decline is the prevalence of other agricultural crops in the districts such as vegetables and fruit trees that compete with industrial crops.

Recommendations- :

The research recommends the following- :

1--The need to pay attention to the cultivation of industrial crops in Anbar Governorate.

2--The state's decisions (agricultural policy) have a great role in revitalizing the cultivation of industrial crops by encouraging farmers financially and making them aware of its economic importance.

3--Allocating farms in the study area to cultivate industrial crops, using scientific methods that raise the level of production for them**.**

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