PHYSICAL PROPERTIES AND THEIR ROLE IN THE CULTIVATION AND PRODUCTION OF DATES IN THE FARMS OF FADAK OF THE ALAWIAH SHRINE AND THE HOLY HUSSEINIYA

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Abstract:

The physical characteristics play a major and essential role for plant growth by studying their impact on the production of dates in the farms of Fadak of Alawiah shrine and the holy Husseiniya, therefore, laboratory analyzes have been conducted to show the extent of the impact of physical elements (soil texture, bulk density) and others, the analyzes were conducted in the laboratories of Alawiah shrine inside the Fadak farm (Najaf), as for the laboratory analyzes of Fadak farm (Karbala), the analyzes were conducted in engineering laboratories under the supervision of Miss. Manar through the help of the researcher, both results found that the soil texture varies from one place to another and has great importance in deteriorating or increasing production by knowing the quality of the soil, whether it is sandy, clayey or mixed, the results showed that sandy soils are almost the dominant soils in both regions and soil texture may be considered one of the main reasons behind the decrease in production and its degradation as soils that do not retain much water and are poor in organic matter, as well as for the bulk density, its high is latent cause of low production because the high density works on the lack of plant root growth and lack of oxygen diffusion, and this ultimately led to a decrease in the production of dates in the two farms of Fadak.

key words: Physical Properties, Farms of Fadak of the Alawiah Shrine

Introduction:

This research aims to study the effect of the physical properties of the soil in the study areas of Fadak farms on the variation of palm production and its quantity, these characteristics serve as the basis by which soil management can be determined, as well as conducting agricultural operations on it in addition to determining the type of crop and its suitability for soil cultivation, this research included the physical properties that represent each of (soil texture, bulk density) through the impact of these elements on the production of dates and its quantity, therefore, laboratory analyzes were conducted by taking (15) samples at two depths, the first (0-30) and the second (30-60), laboratory analysis of the samples was conducted at Fadak farm (Najaf) in Alawiah shrine laboratories located in Fadak farm Najaf, as for the laboratory analyzes of the samples of Fadak farm (Karbala) in the engineering laboratories located at the University of Karbala, which the researcher conducted these analyzes under the supervision of Miss. Manar Muhammad and all the results confirm that the physical properties have a significant role and impact on the variation of production in the two farms of Fadak.

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Research Problem:

Do the physical properties of the soil have a role and influence on the production of dates in the farms of Fadak of the holy Alawiah and Husseiniya?

Research Hypothesis:

Yes, the physical properties have an impact on the production of dates in the farms of Fadak of the Alawiah and holy shrines of Husseiniya

Research Objective:

The main objective of studying the physical properties of both farms is to identify the reasons for the decrease or increase in production of date palm.

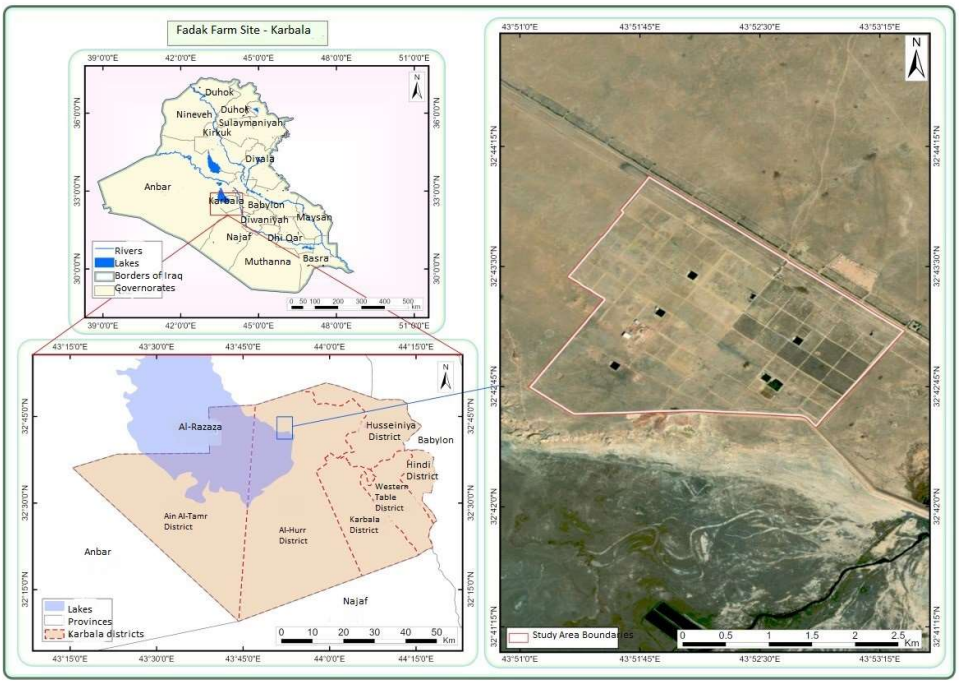
Research Importance:

The importance of the study comes through clarifying the most important physical elements of the soil and studying the extent of their impact on the production of dates in both farms.

Limits of the study area:

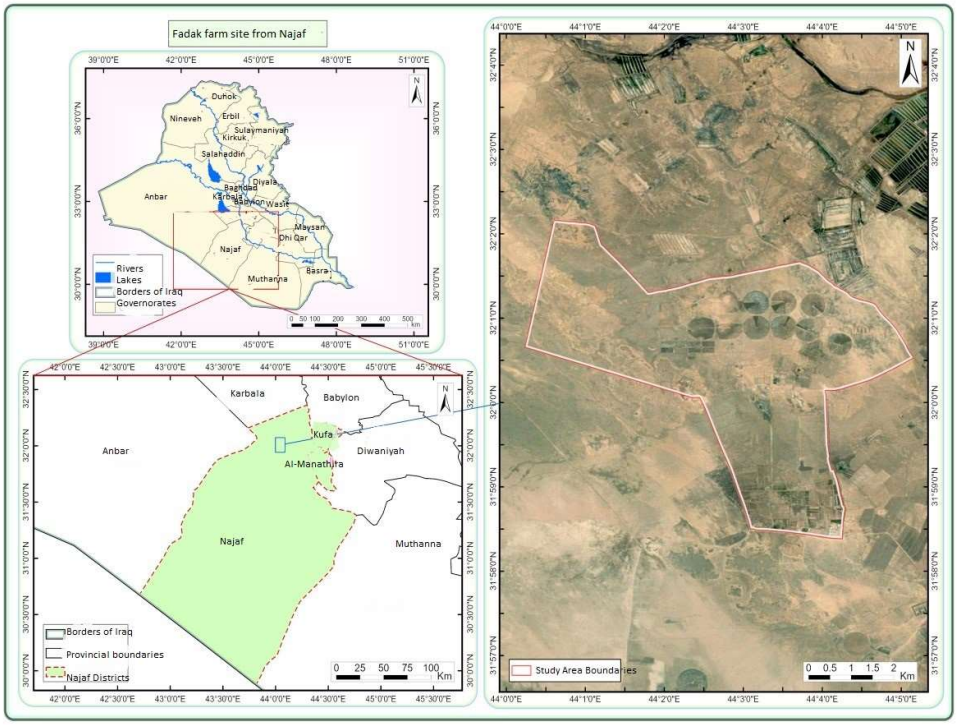
Fadak Karbala farm is located in the western part of Karbala province, about 24 km from the center See Map (1), as for the farm of Fadak Najaf, it is located in the western part of the province on the Najaf Sea Road, 33 km away from the center, see map (2).

Map (1) Fadak farm site from Karbala



Source: From the work of the outputs of the program (Arc GIs 10.8)

Map 2 Fadak farm site from Najaf



Source: Arc GIS 10.8

First: Soil texture

It means the relative distribution of the aggregates, minutes and separations of the soil (sand, clay, alluvial) or the size and totals of soil particles that are smaller than gravel (minutes with diameters less than 2 ml) since the soils differ in the percentage of particles in addition to the difference in shape and size, therefore, the texture has become the guide that is used to determine the roughness or softness of the soil through its different types[i].

One of the most famous classifications that were developed on the basis of determining the soil texture, a classification proposed by the US Department of Agriculture and on the basis of which the soils were classified into a group of coarse soils, which includes sandy and sandy mixed soils, as for the medium rough texture, it also represents sandy soils, as for the soils with medium texture, they include sandy mixed soils, very soft sandy mixed soils, mixed and alluvial soils, as for the soils of medium softness, they are represented by mixed clay alluvial soils, as for the soils that are soft in texture, they represent clay, sandy clay and alluvial clay, that is, it is the size of the atoms that determines the name given to the soil, for example, soils with a high percentage of clay are called clay soils, which is the same case applies to alluvial soils and sandy soils[ii] (See Table (1) Classification of soils based on the system of the US Department of Agriculture.

Table (1) Description of soil texture based on the U.S. Department of Agriculture system

Common name	Texture	Texture type name
Sandy soil	rough	Sandy
		Mixed sandy
Mixed soil	Moderate roughness	Sand mix
		soft sand blend

	Medium	very soft sand mix
		Blend
		Alluvial blend
		Alluvial
	Medium soft	Clay sandy mix
		Clay alluvial mix
		clay mix
Clay soil	Soft	Sand clay
		Clay alluvial
		Clay

Source: Claude F Boyd, bottom soil, sediment, and aquaculture, Chapman and Hall, U.S.A, 1995, pp20.

Where soil texture plays a significant and clear role in its importance in determining other physical properties such as aeration, water permeability and porosity, as well as the ability of the soil to retain water and how easy or difficult it is to carry out agricultural operations and root growth and the extent to which it absorbs water and nutrients necessary for plant growth, on this basis, soils with a coarse texture have several advantages, the most important of which is that they contain appropriate proportions of clay where the roots grow inside them easily, this led to the ease of conducting agricultural operations in it, such as tillage and others, as well as containing small percentages of organic matter, as for the ability of soils to raise water with capillary property, it is less compared to soils with soft textures, therefore, the amounts of water lost from the surfaces of these soils are less compared to the varieties of soils with soft textures, so they are characterized by their abilities to retain nutrients in a good proportion, there are many sources that have confirmed that soils in which the proportion of clay increases the readiness of nutrients of calcium, magnesium and nitrogen is more than it is attic in coarse weaving soils, unlike the phosphorus element, which turns into less ready soils in which the proportion of clay increases, therefore, we see that soils whose minutes are soft are difficult to conduct agricultural operations in them and with poor ventilation and difficulty in penetrating their roots, so they do not help to cultivate in them[iii].

The texture of the soil can be identified through the naked eye or by touching by hand, and on the basis of that, the soils that are characterized by an increase in coarse sand atoms have a rough texture and one feels its roughness, as for atoms that are medium in size, that is, they contain a percentage of clay atoms and a percentage of sand atoms, they are called alluvial soils, where the texture is very soft, one feels at the touch as if it is cooked or flour, but when the percentage of clay increases to a high degree, it is difficult to see and its texture is sticky and sometimes wet[iv] , through his pictures (1) of the researcher for the process of sampling from 15 sites at two depths (0-30) - (30-60) and see picture (1,2).

It is clear from Table (2) containing the soil weaving of Fadak farm (Karbala) for the two depths (0-30) that there is a kind of disparity in the soil separations (sand, clay, alluvial), the disparity was very clear in the farm Fadak, in terms of sand we see a high percentage of sand in a group of samples, where the highest percentage of sand, the depth (0-30) is (49.3%, 63.3%, 59.6%, 68.2%) which are within the samples (2,6,12,15), as for the lowest percentage of sand, it

was recorded at 38.2%, 34.0%, 37.3%) represented by samples ((3,4,9) and through Table (21) and map (1) for depth (30-60), the highest percentage of sand recorded is (48.2%, 66.2%, 61.4%, 62.5%, 70.0%) represented by samples (1,6,7,14,15), as for the lowest percentage, for the same depth (32.5%, 30.6%) and for samples (3.4), the remaining percentages are different in value as shown in Map (3).

Table (2) shows the separations of the soil of Fadak farm (Karbala) (g / kg) and its name

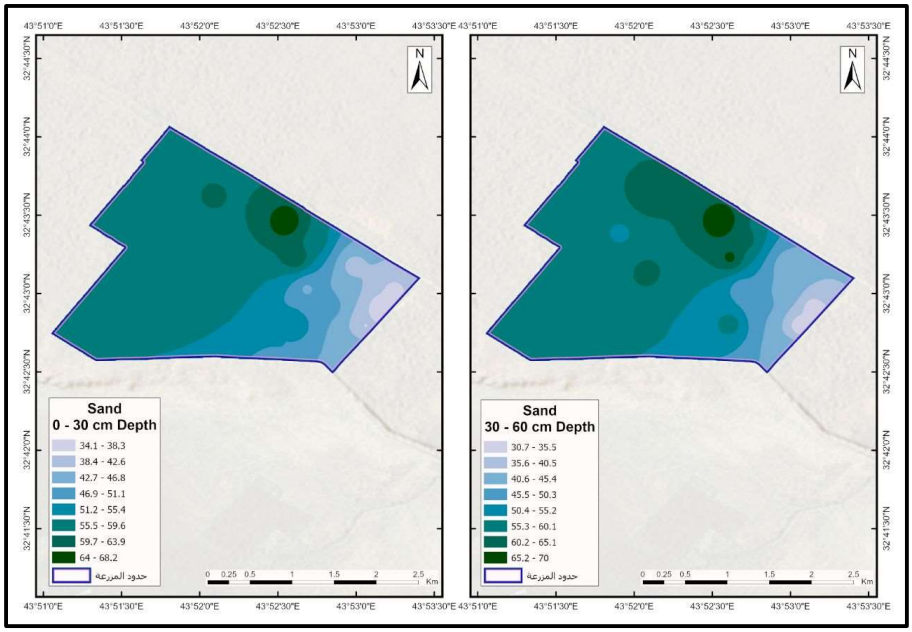
Sample name	Depth / cm	Sand %	Clay %	Alluvial %
First sample	0-30	46.3	24.5	29.2
First sample	30-60	48.2	21.3	30.5
Second sample	0-30	49.5	22	28.5
Second sample	30-60	46.2	18.6	35.2
Third sample	0-30	38.2	10.5	51.3
Third sample	30-60	32.5	14.3	53..2
Fourth sample	0-30	34	16.7	49.3
Fourth sample	30-60	30.6	19.2	50.2
Fifth sample	0-30	43	26.8	30.2
Fifth sample	30-60	44.2	27.2	28.8
Sixth sample	0-30	63.3	12.7	24
Sixth sample	30-60	66.2	10.6	23.2
Seventh sample	0-30	59.5	15.5	25
Seventh sample	30-60	61.4	12.5	16.1
Eighth sample	0-30	40.8	27.5	31.7
Eighth sample	30-60	41.6	26.4	32
Ninth sample	0-30	37.3	20.7	42
Ninth sample	30-60	40.2	16.8	33
Tenth sample	0-30	45.3	25	29.7
Tenth sample	30-60	43.4	23.6	33
Eleventh sample	0-30	53.8	14.2	32
Eleventh sample	30-60	57.3	11.5	31.2
Twelfth sample	0-30	59.6	13.4	27
Twelfth sample	30-60	61	10.6	28.4
Thirteenth sample	0-30	58.2	17.6	24.8
Thirteenth sample	30-60	54.6	13.4	32
Fourteenth sample	0-30	60	14.3	25.7
Fourteenth sample	30-60	62.5	12.4	25.1
Fifteenth sample	0-30	68.2	13.5	18.3
Fifteenth sample	30-60	70	11.6	18.4

Source: Results of laboratory tests conducted in the laboratories of the Directorate of Agriculture

in Karbala 2022

The high percentage of sand in the area works on the large number of pores in it, which makes it low water retention in addition to exposure to erosion because the study area Fadak (Karbala) is a somewhat desert area, therefore, we see a significantly high percentage of sand in it, which exposes it to strong wind erosion that was the cause of its erosion, after discussing both depths, it was found that the percentage of sand increases in the second depth (30-60), where it increases by about a degree or more than the first depth (0-30) for Fadak farm 0

Map (3) Percentage of sand in Fadak farm (Karbala)



Source: Based on Table data (2) using Arq Gis10.8

As for Table (2) for soil separations (sand, clay, and alluvial) for Fadak farm (Najaf) we also find that there is a large disparity between the separations of soils within the farm, where the ratio of sand to depth (0-30) is significantly high, where the highest percentages of sand height are (792%, 892%, 912%) represented by samples (3,7,9) as for the lowest percentage of sand, it was recorded (532%) for the sample ((1), while for the second depth ((30-60), the highest percentage of sand was (852%,912%) These percentages came for the sample numbers (4.12), as for the lowest percentage recorded for sand for the same depth, it is (652%, 712%) for samples (1.2), as for the rest of the samples, they varied between (892%, 912%) and this rise in sand rates is due to the great distance from the city center, which made it vulnerable to erosion factors and as a result of the high temperatures in the summer very high, in addition, the area consisted of geological formations in which the percentage of sand is very high, as a result of the researcher's observation of the farm as a desert and dry area, as well as its dependence on well water that has a high percentage of chlorine and sulfur, all these reasons were enough to find a decrease in the production of dates in the region compared to the farm of Fadak (Karbala) because production of all kinds needs fertile soils rich in nutrients and soils that are good for the penetration of the roots and this was missed by the farm of Fadak (Najaf), as shown in map (4).

Table (3) shows the soil separations of Fadak farm (Najaf) (g/kg) and its naming

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Sample name	Depth / cm	Sand %	Clay %	Alluvial %
First sample	0-30	532	228	240
First sample	30-60	652	208	140
Second sample	0-30	872	48	80
Second sample	30-60	712	108	180
Third sample	0-30	792	88	120
Third sample	30-60	792	68	140
Fourth sample	0-30	792	108	100
Fourth sample	30-60	852	108	40
Fifth sample	0-30	692	168	140
Fifth sample	30-60	832	88	80
Sixth sample	0-30	872	68	60
Sixth sample	30-60	852	88	60
Seventh sample	0-30	892	88	20
Seventh sample	30-60	892	68	40
Eighth sample	0-30	792	88	120
Eighth sample	30-60	892	88	20
Ninth sample	0-30	912	68	20
Ninth sample	30-60	892	68	40
Tenth sample	0-30	912	68	20
Tenth sample	30-60	892	68	40
Eleventh sample	0-30	932	48	20
Eleventh sample	30-60	892	48	60
Twelfth sample	0-30	872	68	60
Twelfth sample	30-60	912	48	40
Thirteenth sample	0-30	872	68	60
Thirteenth sample	30-60	872	48	80
Fourteenth sample	0-30	812	88	100
Fourteenth sample	30-60	852	88	60
Fifteenth sample	0-30	912	68	20
Fifteenth	30-60	872	68	60

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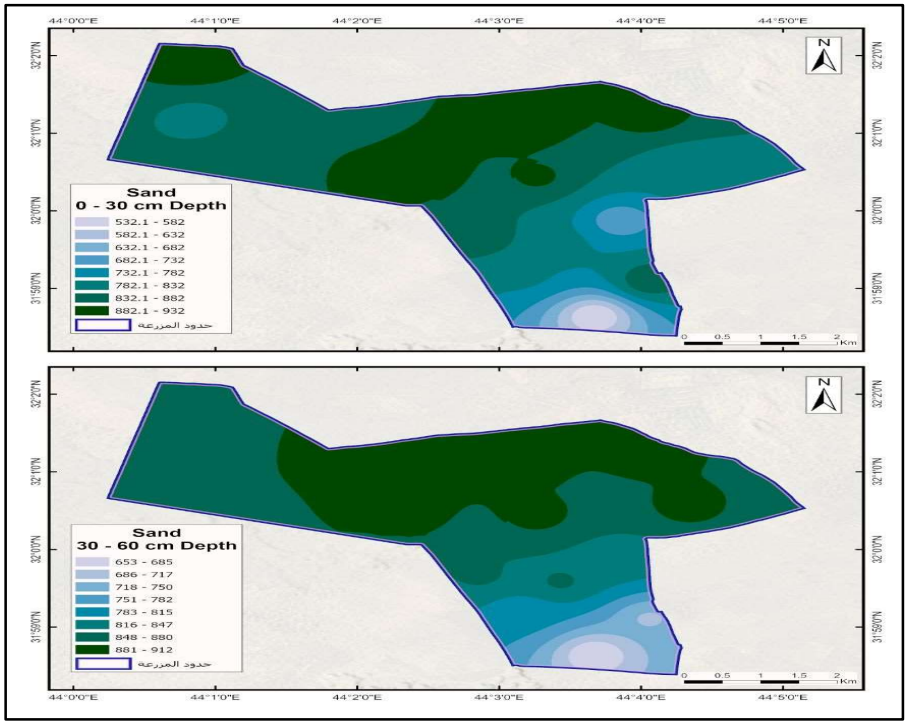
sample				

Source: Results of laboratory tests conducted in the Alawiah laboratories inside the farm 2022

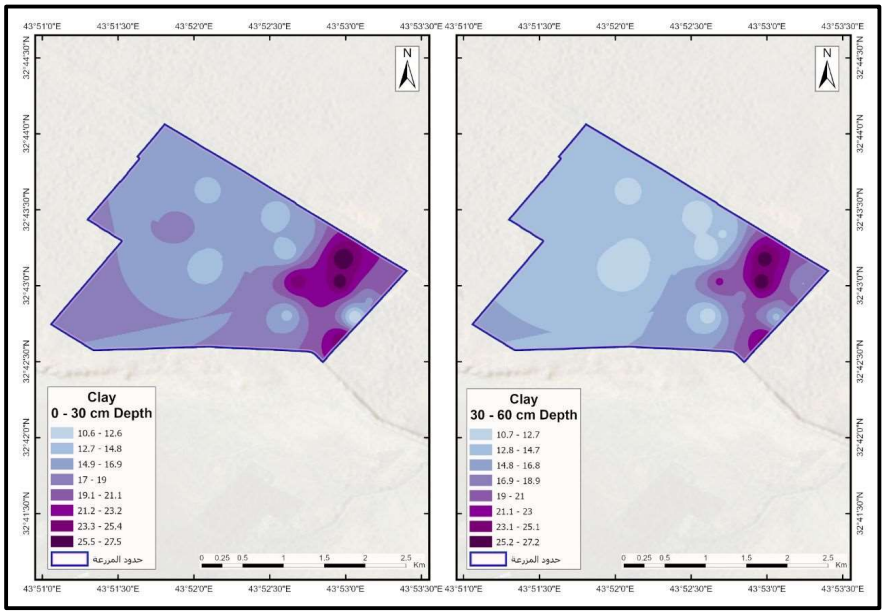
Map (4) Sand ratios in Fadak farm (Najaf)



Source: Based on Table (3) data using Arq Gis10.8

As for clay, it is also a varying percentage inside the farm, whether it is Fadak Karbala or Fadak Najaf, where we see that the highest percentage of clay and depth (0-30) was (27.5%, 25.0%, 24.5), which is represented in samples (1,8,10), as for the lowest value, it was (10.5%, 12.7%, 13.4%) for samples (3,6,12), as for the rest of the samples, they vary in their values between (14,12,13,17), this discrepancy is due to the different areas from which the samples were taken, as they were random, also, the reason for the decrease in the percentage of clay is due to the high percentage of sand in it, and that the difference in clay ratios is mainly due to the difference in the region in terms of its composition of sand, clay and alluvial, the researcher also noted this by touching the soil and knowing its weaving through the high percentage of sand and the low percentage of clay, and notes map (5) that shows the clay percentage in Fadak farm (Karbala).

Map (5) shows the clay percentage in Fadak farm (Karbala).



Source: Based on Table (2) data using Arq Gis10.8

As for the percentage of clay for Fadak farm (Najaf), when looking at Table (3) and depth (0-30), we find that there is a large variation in its value, where the highest percentages recorded are (228%,108%,168%,88%) represented by samples (1,4,5,7) the lowest percentages were recorded (48%, 68%) for samples (9.11), as for the rest of the percentages, their percentage varied between (88.68), as for the depth (30-60) that the highest percentage of clay is ((208%,108%), which is represented by (1,2) As for the lowest percentage of clay and the same depth is (68%,48%,) represented by samples (9,11) so we find that the soil weaving for most samples is a sandy mixture, the low percentage of mud with the high percentage of sand made the movement of water and air be more quality, which provided the opportunity for microorganisms to increase their fragmentation, this helped to decompose organic matter and increase it in the region, as shown in Map (6).

Map (6) Percentage of clay in Fadak Najaf farm

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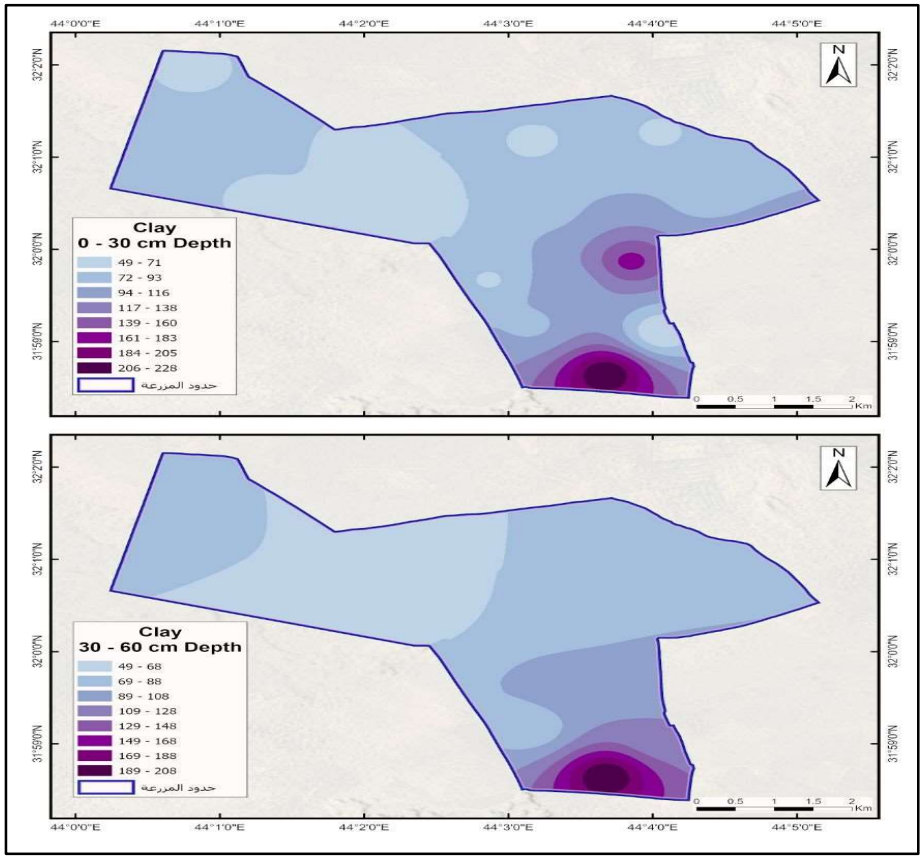
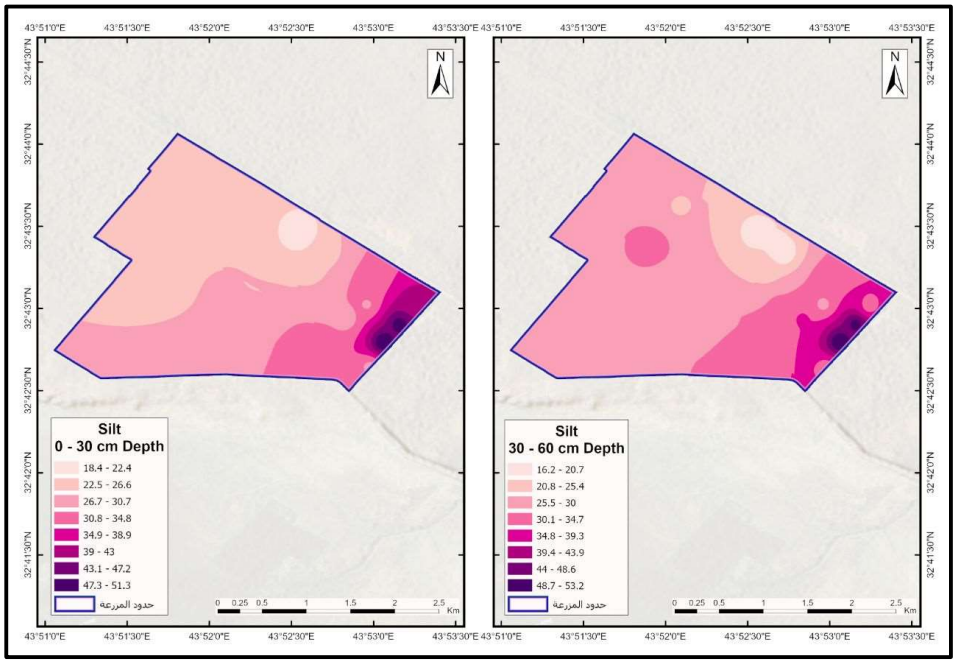


Source: Based on Table (3) data using Arq Gis10.8

As for the alluvial and through Table (2) for the soil separations in the farm of Fadak Karbala and for the depth (0-30) it is noted that the proportions of alluvial are somewhat close to us, where the highest values were recorded (51.3%, 49.3%, 42.0) for samples (3,4,9) the lowest percentages were recorded (23.2%,18.3% for samples (6.15), as for the second depth of Fadak Karbala farm (30-60), we find that the highest percentages of samples were (53.2%, 50.2%, 35.2%) represented by samples (3,4,2) and the lowest percentages were (23.2%,16.1%,18.4%) as for the rest of the percentages, they are almost close, where they are between (25.3%, 29.2%, 30.2%) the reason for the low percentage of alluvial is that the study area is located within the desert range, which is characterized by the lack of falling rain that works to bring sediment, this decrease had a negative impact by making it unsuitable soil, not predominantly crops due to their low water retention and poor aeration, as shown in map (7).

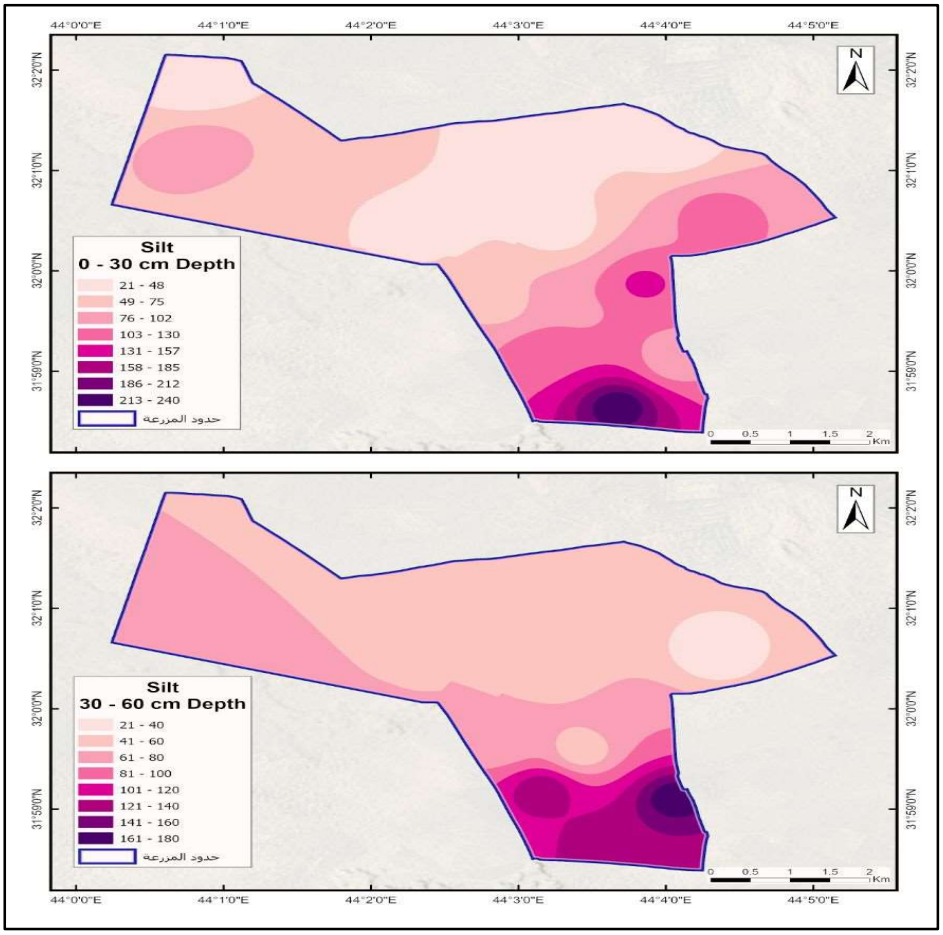
Map (7) Alluvial percentages in Fadak farm (Karbala)



Source: Based on Table (2) data using Arq Gis10.8

As for the alluvial ratios in Table (3) for Fadak farm (Najaf), where the highest ratios of alluvial for depth (0-30) were recorded (240%, 180%, 140%) represented by samples (1,2,3), as for the lowest percentages, they were recorded (20%, 60%) represented by samples (7.12), and that the reason for the low and high alluvial rates is the different places from which the samples were taken, they were random, but the apparent character on the farm is the high percentage of sand and the low proportions of mud and alluvial, because it is a desert area where there is less rain and surface water and temperatures rise significantly the area as shown in map (8).

Map (8) Alluvial percentages in Fadak farm (Najaf)



Source: Based on Table (3) data using Arq Gis10.

Second: Bulk density:

Density is defined as one of the important physical properties of the soil, which varies according to the state in which the soil is, which changes through pressure, grazing and the use of machinery, it is also known as the dry weight in the oven alone the volume of the soil, where it is expressed in units of grams / cm 3[v] it is also called the ratio of soil volume mass (M) to mass volume (V), bulk density depends on the size of the pores as well as the content of organic matter, organic soils contain a low density between (0.8-0.9) g / cm3 due to large pores and the bulk density varies according to the soil texture and nature[vi] see Table (4).

Table (4) Bulk density of different textile categories

Texture class	Bulk density g/cm3	Porosity%
Sandy soil	1.6	40
Alluvial soil	1.4	47
Mixed soil	1.3	50
Clay soil	1.1	58

Source: Ch annarayapp , D.p.Biradar, Soil Basics, Management , Rhizosphere Engineering for Sustainable Agriculture ,CRC press ,New york,2019,pp83.

In sandy soils, the bulk density rises to values that may reach 1.6 g / cm 3 but in clay soils it reaches (1.1-1.2) g / cm 3 and its value for most soils ranges between (0.9-1.8) g / cm 3, in

other words, we find that the value of the bulk density of land with a fine texture is much greater than sandy lands because the system of arranging granules in soils that have a soft texture and that contain organic matter in appropriate quantities, which is unlike sandy lands that have less content of organic matter, in no case can the bulk density exceed the real density, it is not reasonable to equal these two values, otherwise the porosity would be zero and the bulk density in the construction of the soil is affected by its compaction, disintegration, expansion and contraction and service processes the soil is also affected by organic matter[vii].

The apparent density varies in one agricultural season in the plowed soils amounting to (0.8) g / cm 3 and rises to (1.6) g / cm 3 at the end of the agricultural season and the end of agricultural operations and soil stability, plant growth and organic fertilization reduce the bulk density of the soil surface layer, the high bulk density gives the soils undesirable advantages such as increasing the capillary property, which is considered one of the most important causes of soil salinity and damage leads to a lack of root growth and a low rate of oxygen diffusion, which affects the respiration of plant roots and thus a low rate of absorption of nutrients[viii].

Through Table (5) and Map (11), we find that the values of the bulk density of the farm of Fadak Karbala vary and vary in relation to the first depth (0-30) that were taken from different locations, we find that the value of the bulk density of the highest samples is (1.8,1.6,1.5), which is represented by samples (6,5,1) as for the lowest values, (1.2,1.3) were recorded represented by samples (3,8), while the second depth of Fadak Karbala farm (30-60), we find that the highest values of samples (1.8,1,9,1.7) represented by samples ((1,6,9) as for the lowest percentages, they recorded (1.3,1.4) represented by samples (3,15) this disparity is due to the nature of the distribution of separations (clay, alluvial, sand), as we mentioned that tillage operations, and the addition of animal fertilizers and this leads to a reduction in bulk density.

Table (5) Physical Properties of Soil Samples in Fadak Farm (Karbala)

Sample name	Depth	Soil moisture	Bulk density g/cm3	True density g/cm3
First sample	0-30	10.81	1.5	2.63
First sample	30-60	8.84	1.8	2.68
Second sample	0-30	11.13	1.4	6.64
Second sample	30-60	12.16	1.5	2.69
Third sample	0-30	7.48	1.3	2.68
Third sample	30-60	8.63	1.3	2.74
Fourth sample	0-30	5.89	1.4	2.64
Fourth sample	30-60	5.4	1.4	2.69
Fifth sample	0-30	11.41	1.6	2.73
Fifth sample	30-60	9.82	1.8	2.74
Sixth sample	0-30	7.2	1.8	2.72
Sixth sample	30-60	5.5	1.9	2.63
Seventh sample	0-30	8.7	1.3	2.64
Seventh sample	30-60	8.24	1.5	2.68
Eighth sample	0-30	7.12	1.2	2.66
Eighth sample	30-60	8.37	1.3	2.69
Ninth sample	0-30	5.12	1.6	2.74

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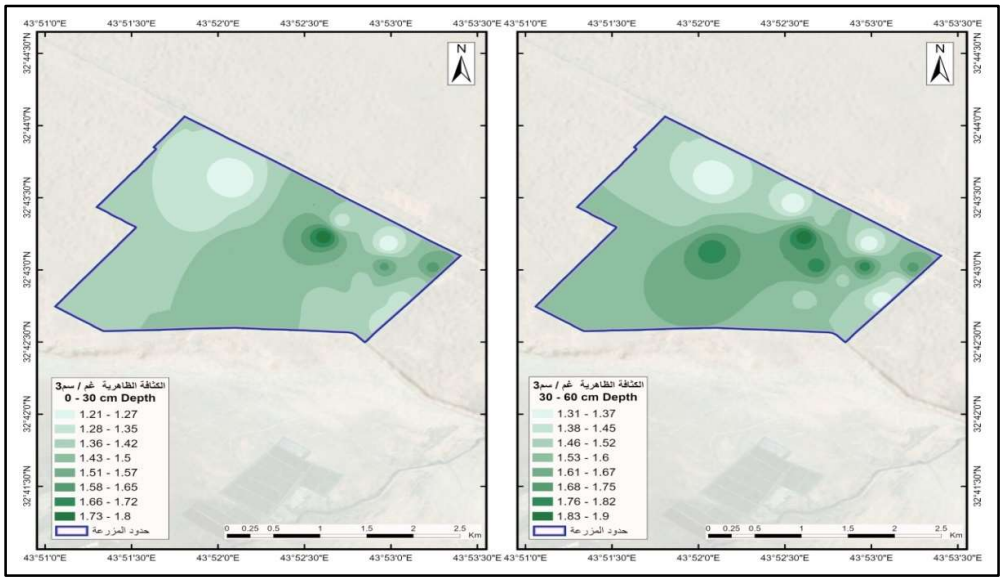
Ninth sample	30-60	7.17	1.7	2.72
Tenth sample	0-30	5.33	1.3	2.69
Tenth sample	30-60	7	1.5	2.72
Eleventh sample	0-30	10.91	1.4	2.69
Eleventh sample	30-60	12.5	1.5	2.71
Twelfth sample	0-30	9.38	1.4	2.69
Twelfth sample	30-60	8.51	1.8	2.7
Thirteenth sample	0-30	9.62	1.3	2.66
Thirteenth sample	30-60	9.32	1.5	2.69
Fourteenth sample	0-30	7.86	1.2	2.72
Fourteenth sample	30-60	7.77	1.3	2.73
Fifteenth sample	0-30	8.74	1.3	2.7
Fifteenth sample	30-60	9.84	1.4	2.73

Source: Results of laboratory tests, soil laboratories, College of Engineering, University of Karbala, carried out by the researcher under the supervision of Manar Muhammad

Map (11) Bulk density in Fadak farm (Karbala)



Source: Based on Table (5) data using Arq Gis10.8

As for the bulk density in Fadak farm (Najaf), when we observe Table (6) Map (12) and for depth (0-30), we find that the density values vary from one site to another, where the highest values were recorded for the bulk density (1.508, 1.642, 1.731) represented by the samples (7, 9, 11), as for the lowest percentages recorded for Fadak Najaf farm, they are (1.187,1.263), for samples (1,3), as for the variation of the ratios for the bulk density and for the second depth,

where the highest ratios of density were recorded are ((1.519,1.684), represented by the samples (7,12), the lowest percentages recorded are (1.199, 1.253, 1.332) represented by samples (1,2,14), this variation in the farm is due to the nature of the farm and its geological formations, as it was found that the high bulk density at the first depth is more than the second depth for most sites, the reason for this is due to the variation in the size of the pores and the proportion of organic matter, where the density is inversely related to them, the greater the pore area, the bulk density has decreased, as well as the percentage of organic matter, the more it increases in the soil, the lower the bulk density, as the density is inversely related to the moisture content with the decrease in the density increases the moisture content of the soil.

Table (6) Physical Properties of Soil Samples for Fadak Farm (Najaf)

Sample name	Depth	Soil moisture	Bulk density g/cm3	True density g/cm3
First sample	0-30	0.86	1.187	2.67
First sample	30-60	0.8	1.199	2.65
Second sample	0-30	0.32	1.459	2.56
Second sample	30-60	0.61	1.253	2.63
Third sample	0-30	0.58	1.263	2.6
Third sample	30-60	0.54	1.295	2.61
Fourth sample	0-30	0.61	1.214	2.62
Fourth sample	30-60	0.42	1.321	2.61
Fifth sample	0-30	0.64	1.2	2.63
Fifth sample	30-60	0.45	1.329	2.61
Sixth sample	0-30	0.35	1.395	2.58
Sixth sample	30-60	0.38	1.387	2.59
Seventh sample	0-30	0.29	1.508	2.57
Seventh sample	30-60	0.26	1.519	2.55
Eighth sample	0-30	0.58	1.274	2.6
Eighth sample	30-60	0.32	1.493	2.57
Ninth sample	0-30	0.19	1.642	2.56
Ninth sample	30-60	0.26	1.487	2.57
Tenth sample	0-30	0.22	1.632	2.56
Tenth sample	30-60	0.29	1.532	2.55
Eleventh sample	0-30	0.16	1.731	2.51
Eleventh sample	30-60	0.22	1.579	2.54
Twelfth sample	0-30	0.38	1.442	2.58
Twelfth sample	30-60	0.16	1.684	2.52
Thirteenth sample	0-30	0.35	1.471	2.59
Thirteenth sample	30-60	0.32	1.439	2.56
Fourteenth sample	0-30	0.51	1.314	2.6
Fourteenth	30-60	0.38	1.332	2.6

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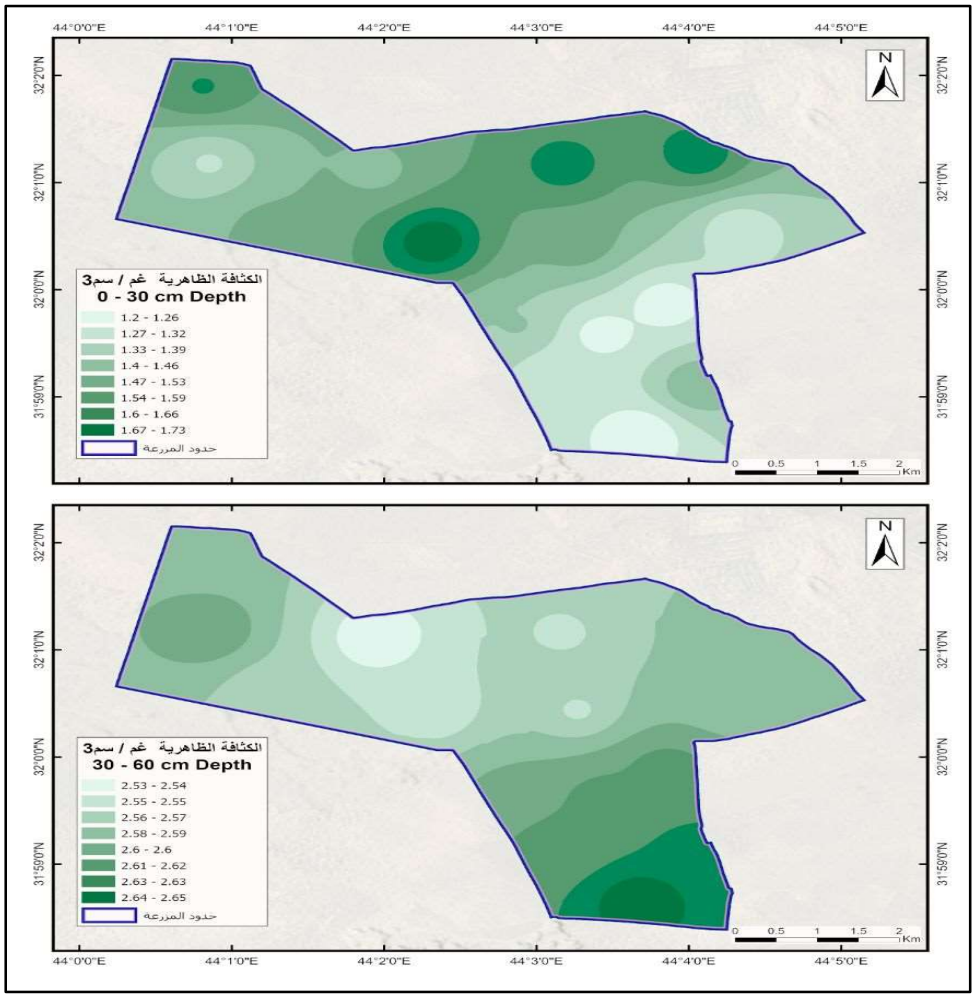
sample				
Fifteenth sample	0-30	0.29	1.599	2.55
Fifteenth sample	30-60	0.42	1.421	2.58

Source: Laboratory Analysis Results in Alawiah Laboratories in Fadak Farm

Map (12) Bulk density in Fadak farm (Najaf)



Source: Based on Table (6) data using Arq Gis10.8

Conclusions:

1- It has been found that the physical characteristics have a major role in the variation of date production in both Fadak farms of Alawiah shrine and the holy Husseiniya.

2- The results showed that the spread of sandy soils in the two farms and the lack or absence of clay or alluvial soils, which were important reasons of the decrease in the production of dates.

Propositions:

1- Work to encourage and conduct laboratory analyzes of soil samples by knowing the physical and chemical properties of the soil and thus working to solve its problem.

2- As well as working on adding fertilizers and increasing the quantities of water for sandy soils in order to pay attention to the agricultural crops grown in them because they lack the basic nutrients of the soil.

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