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م / لجنة فحص رسالة الماجستير العلمية

تحية طيبة...

أحضرت اللجنة الدائمة لفحص الرسائل العلمية في كلية الآداب والمثلث بموجب الأمر الإداري 618 في 1/3/2021 للطلاب المتقدمين من قبل طالبة الماجستير غفران مهدي كاظم / قسم الجغرافية والمجال علينا حسب هاشم السيد عميد الكلية. أثناء تفاصيل المجلة و رأي اللجنة :

1. اسم المجلة

Journal of Global Ethics

2. عنوان البحث

"Spatial analysis of geo-geographical factors (soil and surface) and their impact on the productivity of crop cultivation (Cucumber, Cowpea) in Muthanna Governorate"

تاريخ قبول النشر : 2023/5/24

رأي لجنة الفحص : المجلة امريكية مدرجة ضمن مستوعبات (Scopus) .

وبناء على الطلب أعلاه تم اعداد هذا المحضر وإدراج هذه المعلومات. علماً أن مسؤولية اللجنة تنحصر في تأييد صحة المعلومات أعلاه لغاية تاريخ اعداد هذا المحضر في يوم 2023/6/6 والجنة غير مسؤولة عن أي تحديثات نظراً على المعلومات المذكورة بعد هذا التاريخ.

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2023/6/6

Analysis Spatial For factors Geography The floor(the soil And the surface)And its impact on Agriculture productivity Crops (cucumber, cowpeas) in governorate Double

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Summary:

Highlights the importanceVegetables plantingthroughwhatTAdd it to the GDPAnd run the handsThe workerAndInvested capitalAndan offertheProducts and lower pricesAndreductionFrom importing and providing hard currency, The field of research was Al-Muthanna Governorate, which is locatedIn the southwestern part of Iraq, it is bordered to the north by Al-Qadisiyah Governorate, to the east by Dhi Qar and Basra Governorates, to the west by the Najaf Desert, and to the south by the Kingdom of Saudi Arabia., Bspace (51740 km)And percentage(11.9%) of the area of Iraq (434,128 km²).2), **And**Temporally by period (2011_2021)Through research, it has been shown that the soil of river shoulders and the soil of river basins is suitable for growing many agricultural crops, especially(option cucumber, cowpea) In addition to the gypsum desert soil, flood soil, and valley bottoms, after carrying out some treatments, the alluvial plain area, the lower valley area, and the Hajar area are among the most suitable areas for growing vegetables, especially the Katuf areas.LandstheSahliaAnd depressions canInvest it lightlyYes, because of the lack of complexity of its topographyExtraversionHaIn most of its partsA, the research came out with a set of recommendations, including addressing some of the problems that the soil of the study area suffers from, especially the problem of salinization and waterlogging, and introducing Types The good one from Seeds Improved and investment Lands Desert in plateau Western The righteous In which For agriculture and provision all requirements Make it work.

key words(Soil, surface,option Cucumber, cowpea)

the introduction:

The studies that dealt with vegetable cultivation are among the studies that have received great attention, because their availability or not is related to the food security of the population, and agricultural crops are greatly affected by the characteristicsNaturalEspecially (Soil andSurface) as well as other geographical factorsClimate and soilWater resources and natural plantsAccordingly, the areas cultivated with these crops vary as a

result of this effect. The turn comes Soil and its importance for growing vegetable crops As the natural basis on which agricultural operations depend tillage Fertilization, irrigation and drainage.

Research problem: The research problem is represented by a main problem, which is, what is the effect of geo-geographical factors on agriculture (cucumber, cowpeas) From this main problem, secondary problems arise as follows:

- 1- Is crop cultivation affected in Muthanna Governorate? (cucumber, cowpea) on the physical and chemical properties of soil.
- 2- Is there an effect of surface characteristics in the study area on the cultivation of agricultural crops represented by (cucumber, cowpeas).

Research hypothesis: The main hypothesis of the research is that there is an influence of terrestrial geographical factors on agriculture (cucumber, cowpeas) From this main hypothesis, it branches into secondary hypotheses, which are as follows:

- 1- Crop cultivation is affected (cucumber, cowpeas) In Al-Muthanna Governorate Soil texture and its chemical and physical elements.
- 2- There is an effect of contour characteristics in cultivation (cucumber, cowpeas).

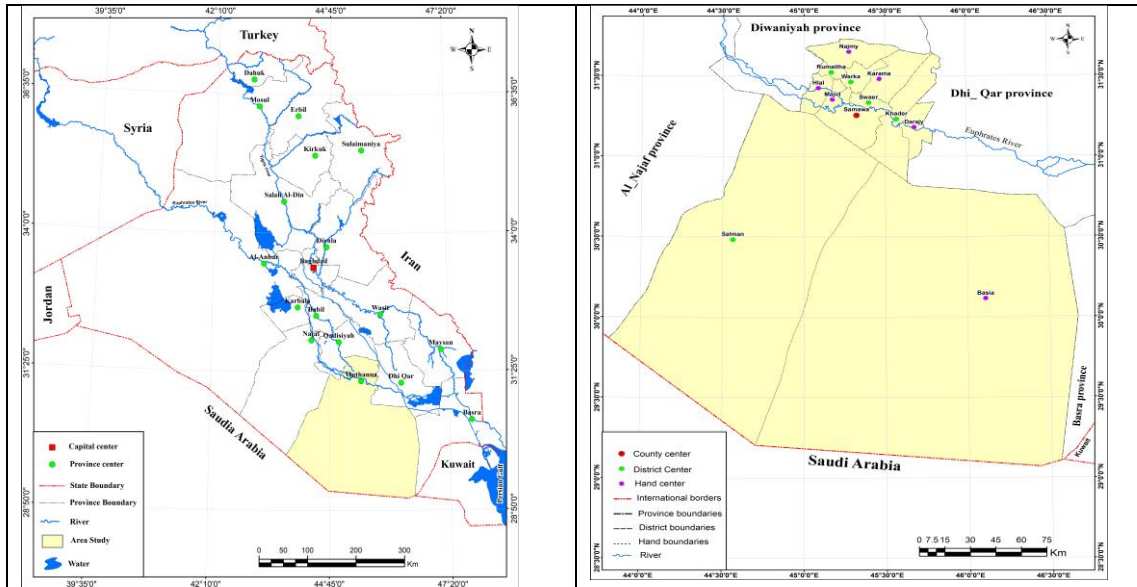
research importance The importance of the research is as follows:

- 1- Giving a clear picture of the geographical factors (surface and soil) affecting agriculture (cucumber, cowpeas).
- 2- Expanding the agricultural information base in Muthanna Governorate.

The limits of the study:

Located Al-Muthanna Governorate In the southwestern part of Iraq, it is bordered to the north by Al-Qadisiyah Governorate, to the east by Dhi Qar and Basra Governorates, to the west by the Najaf Desert, and to the south by the Kingdom of Saudi Arabia, as can be seen from the map (1) and (2), As for its astronomical limits: It is located between two latitudes (29.05 – 31.42) North and longitude (50 43-32 46) East, bspace (51740 km²) And percentage (11.9%) of the area of Iraq (434,128 km²). 2), And it has The study was limited in time to (2011) 2021) for climate data for a station Heaven.

Map (1) Map (2) Location of Al-Muthanna Governorate in Iraq Location of Al-Muthanna Governorate among the governorates



Source:

Sources:

1 - Ministry of Water Resources, General Authority for Survey, Map Production Department, Administrative Map of Iraq, on a scale of 1000 000;1, Baghdad, 2022.

-2 Ministry of Water Resources, General Authority for Survey, Map Production Department, Al-Muthanna Governorate Map, With scale 500 000;1, Baghdad, 2022.

The first topic: characteristics Natural(soil-surface):

First: the soil: Soil is defined as a mixture of mineral and organic materials, air and water, and covers the rocks of the Earth's crust. The thickness of this layer varies from a few centimeters to several meters (1), and the soil in Al-Muthanna Governorate varies spatially depending on the climatic conditions, distance and proximity to the Euphrates River and its branches, and the nature of the prevailing activity. Note map (3), which is as follows:

1. Alluvial plain soil:

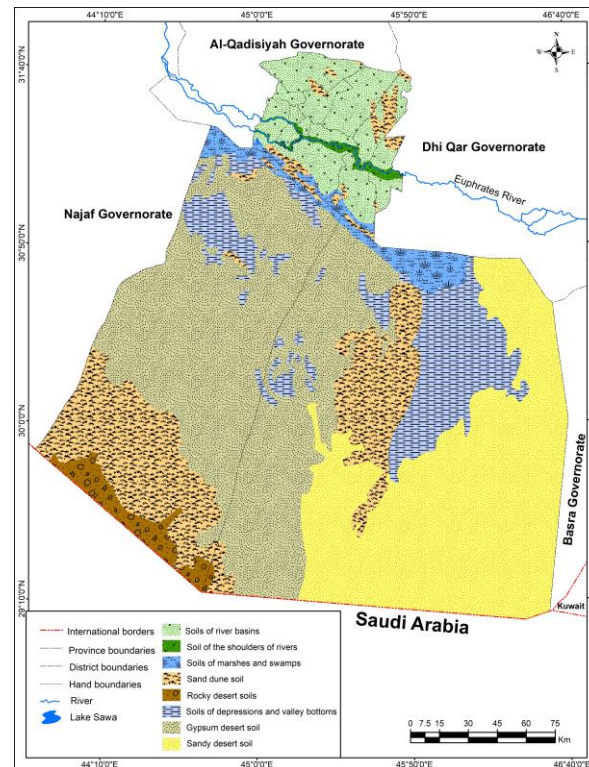
Composed This soil From sediments Which he carried The Euphrates River and its branches at the time of floods, as well as sediments transported by the wind, Which Soil Fertile fill and MH To cultivate Different Species Crops agricultural, Which Self weave H Soft to Medium Softness⁽²⁾ These soils occupy about 9% of the total area of the governorate (3), and are located to the north of the governorate. They are newly formed soils of transported sedimentary materials (sandy).- Alluvial-Clay), the soil of the alluvial plain can be divided into the following sections:

1- Soil of river shoulders:

These soils appear in the form of narrow strips extending along the Euphrates River and its branches (Al-Atshan, Al-Sabil), (Shatti Al-Samawah and Al-Sawir), and (Shatt Al-Rumaitha). She is the soil she created Modern river sediments Due to the frequent floods of the Euphrates River and its branches, its height ranges between (2-3 meters) above the neighboring lands, and thus the ease of surface drainage and the depth of the underground water in it, as it exceeds (2.5 meters) (4) The soil of the river banks is characterized as having a clayey texture, as coarse sediments of clay, sand, and silt are deposited near the rivers, at rates reaching (60.20%), (23.3%), and (16.5%), respectively (5). It is a soil with a sandy clay texture that facilitates the movement of water and air while containing organic materials. The salinity of these soils ranges between (4-8 dSiemens/m, and the percentage of lime in it is about (25%) and the organic materials are about (3.1%)(⁶).

We conclude from that that This type of soil The finest types of soil Wee Enjoy agricultural potential Suitable for growing vegetables in general and in particular To cultivate (option cucumber, cowpea), because of Khas And its soil And its being Good the Conjugation And Weaving the Mixture the Alluvial And its salinity decreases, as it can Invests in intensive agricultural operations, Especially Horticulture for its high production capacity To cultivate A specific crop or succession of crops.

Map (3) soil types in Muthanna Governorate



Source: Republic of Iraq, Ministry of Water Resources, General Directorate of Survey, Map Production Department, Digital Unit, Administrative Map of Iraq, scale (1: 100,000), Baghdad, 2021.

B. Soils of river basins:

These soils occupy large areas and are adjacent to the soil of river shoulders, and are found in lands with a relatively low level ranging between (2-3 meters above the level of the shoulders of neighboring rivers (7). It has a clayey, silty texture and is characterized by a high level of groundwater, poor drainage, and active capillary action due to increased dryness of the surface, which leads to the accumulation of salts (8), and the depth of its groundwater reaches between (1.5).-2.5 meters below the surface and during the flood period it reaches (0.5-1 meter (9), and these soils suffer from many problems, including soil waterlogging (10).

Despite some problems that these soils suffer from, that its importance comes from the large space it occupies compared to the area of river shoulders, so invest the regions adjacent including river banks for vegetable cultivation especially (option cucumber, cowpea), because of

the fertility of its soil And the need forFor wiperstheWideIn addition to its proximity to water sources.

C- Lowland soil:

It is a soil with a soft clay or silty clay texture. The underground water in it is close to the surface due to its depression and the flatness of its surface. It is a poorly drained soil (11). The percentage of salts in it reaches between (4-14 dS/m), and the degree of interaction in it reaches between (7.6). - 8.2)(12).

These soils occupy the lowest areas of the previous soil sites, and they prevail in separate and limited parts, especially the eastern and western regions of the alluvial plain, the most famous of which are the Karim Depression and the Salibat Depression. Through the field study, it can be noted that the importance of this agricultural area is low and that it is limited to some crops that tolerate High levels of salts, including rice, barley, and jet, due to the spread of the sewage phenomenon.

H- Sand dune soil:

The soil of sand dunes is one of the most modern types of soil composition, and is spread in various regions of the alluvial plain. It is characterized by its coarse sandy or sandy mixture texture and large porosity, which has led to a decrease in its ability to retain water and the speed of leaching in it. Consequently, salts do not appear on its surface, and it is characterized by a lack of It has a high percentage of gypsum and a high percentage of lime. It is poor in organic materials and is more susceptible to significant and continuous wind erosion..

It is evident from the aboveThis type of soil is suitable for growing agricultural cropsUsing modern irrigation methods, fertilization and improved seeds, Especially(option cucumber, cowpea),Because of the weaveGet lostRoughAnd it has good ventilationIt drains well and salts do not appear on its surfacea.

2. Soil of the Western Plateau:

These soils are spread on a very large scale in the southern parts, and their percentage reaches (90.7%) of the total area of the governorate, as noted in map (3), and they can be generally divided into three sections:

1. Gypsum desert soil:

This soil is represented in the northern part of the Western Plateau, and its fines are loose and are constantly exposed to erosion processes. Its thickness reaches (25 cm) and its permeability reaches at a minimum rate

of (10 mm/hour), which is about (24 cm/day) (13). It has a medium texture of sandy mixture or sandy or sandy mixture, and is characterized by the presence of a thick layer of secondary gypsum in its upper part, which increases with depth, as the percentage of gypsum in it reaches about (70%) at a depth of two meters, while it is about (20%)-30%) on the surface of the soil, which is hardened gypsum that often prevents the penetration of plant roots and their natural role in growth (14), and the percentage of lime ranges between (25-50%), and it is also of high porosity and low fertility compared to the soil of the alluvial plain (15). It is characterized by being poor in organic matter, which ranges between (0.1-0.2%), while its salinity percentage is noExceed(4 dSiemens/m)⁽¹⁶⁾.

From the above, it is clear that this soil is suitable for growing many cropsEspecially(option cucumber, cowpea),Depending on groundwater and using fertilizers and modern agricultural methods, as wellAbout the use of improved seeds, as is the case in Al-Salman Farms, which is witnessing great development in agricultureVarious agricultural crops.

ب. Stony desert soil:

This soil is represented in the southern part of the governorate and occupies very large areas of desert soil in the Western Plateau. Most of its compositions are made of limestone, flint, and dolomite. Its surface is covered with stones with sharp edges and is devoid of soil (17). It is shallow soil, as its thickness ranges from (10-20 cm) and the maximum permeability reaches (10 mm/hour), which is equivalent to (24 cm/day).This soil lacks organic matter, and therefore it is poorly fertile and poorly prepared soilHTo both wind and water erosion, which made it thin, and as a resultsheInvalidFor agriculture.

ت. Flood soils and valley bottoms:

These soils appear in separate areas and consist of clay, silty, and sandy deposits, in addition to a number of calcareous and gravel components (18), with textures ranging from mixed to silty, with medium porosity, and the percentage of lime in them is (19.8%), and the percentage of gypsum in them ranges between (0.15).-9%), and it is characterized by a lack of organic matter, in addition to the fact that it does not suffer from salt problems, and therefore it is a good soil for irrigated agriculture using the

stream irrigation method and in the event that other agricultural components are available (19).

These soils contain all the elements for successful agriculture, the most important of which is the availability of arable soil, in addition to the availability of groundwater and the presence of appropriate quantities of water collected in the silts and overflows.

ث. Sand dune soil:

It is found in small and scattered areas in the areas of the lower valleys, Al-Hajar and Al-Dabdaba, and sand particles are high in it, which has led to its texture being a coarse sandy or sandy mixture with high porosity and a high degree of permeability, and the percentage of lime ranges between (13.6-18.5%) and the percentage of gypsum is between (0.35-2.13%) and organic matter between (0.03-0.8%), and the degree of interaction is between (7.2-8.6)(20), although this soil contains large quantities of sand, it also contains varying percentages of clay and silt and a small percentage of organic matter. It is highly permeable, so that it is not possible to control the amounts of water added to it for irrigation, so it is not Suitable for agriculture.

It is clear from the above that the soil of the alluvial plain is one of the most suitable types of soil for investment in growing vegetable crops, especially(option cucumber, cowpea),Especially the soil of the shoulders of the rivers, in which production per dunum is high, and therefore it is considered better than the soil of the river basins, while the soil of the Western Plateau is considered a focus for agriculture after some treatments have been carried out on it, especially the gypsum desert soil, the flood soil, and the bottoms of the valleys, depending on the water of the wells in which modern irrigation methods are used. (IrrigationBy spraying, as is the case in Al-Salman District, where such soils began to be exploited.

secondly:Surface:Prepare the surfaceoneMore importantNatural propertiesInfluencing agricultural activityIn general and especiallyGrowing vegetables through its impact on most agricultural operations, and the plains are one of the most important sections of the Earth's surface suitable for agriculture due to the ease of carrying out agricultural operations there.

It is clear from Table (1) and Map (4) that there is a large discrepancy in the surface level of the governorate, as the elevation ranged between (172.1 - 255) m in an area of (15,385 km²), at a rate of (33.6)%, while the height ranged between (77.1 - 172) m in area.(2586) and (4.9)%The height between (255-330) m constituted an area of (12915 km²) and a percentage of (24.9%), while the parts located at an altitude of (330.1-440) meters reached an area of (9538 km²) and a percentage of (18.5)% of the surface area. The parts located at an altitude between (5-77) m reached an area of (8237 km²) with a percentage of (18.1%).

Table (1) Surface levels and area in Muthanna Governorate

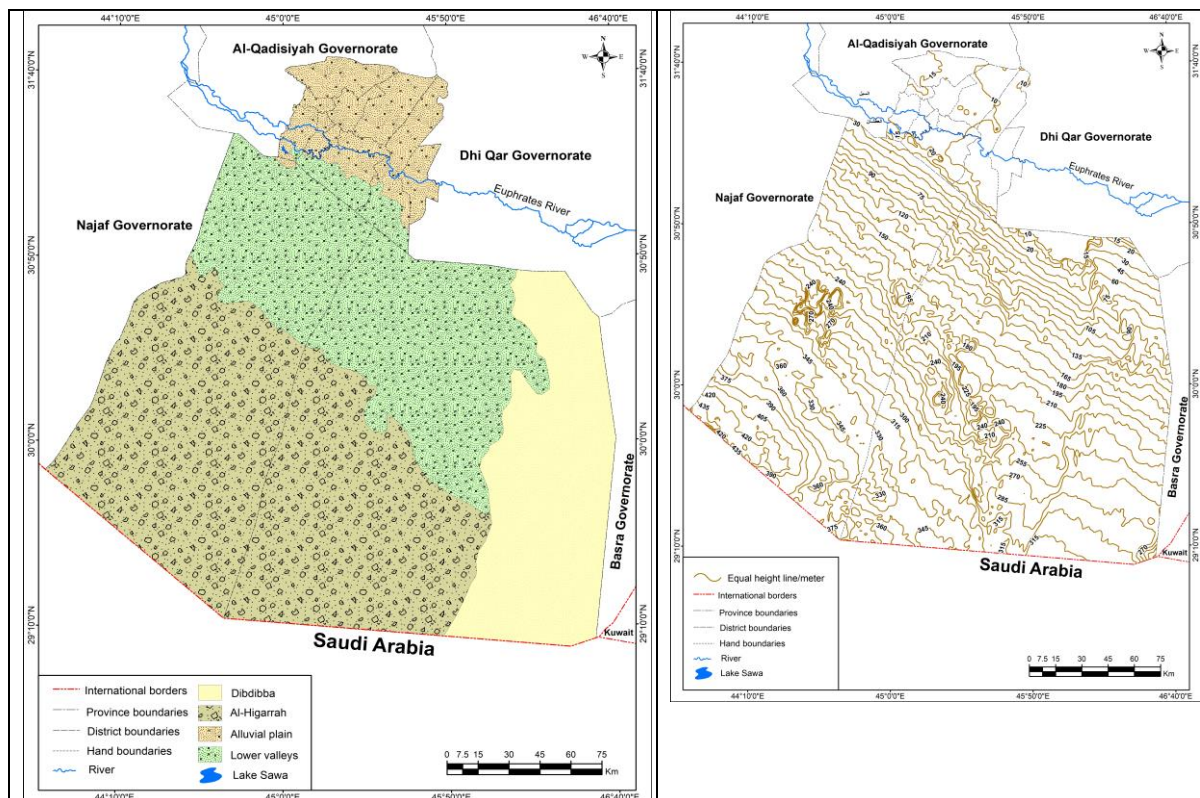
percentage	Area km ²	Height
18.1	8237	5 – 77
4.9	2586	77.1 – 172
33.6	15385	172.1 – 255
24.9	12915	255.1 – 330
18.5	9538	330.1 – 440
100	51740	the total

Source: Based on the digital elevation model and the 10.8 programARCGIS.

The surface of the study area is divided into two main partsThey are:
notes a map (5)

1. Alluvial plain

The alluvial plain is located in the northern part of the governorate and the southwestern part of the Iraqi alluvial plain, which has an area of (4812 km²).)Which is equivalent to (1.924.800 dunamsa)It constitutes a percentage of (9.3%) of the total area of the governorate.And it is characterized This part is flat, lacks slope, and varies in height, and takes the general slope of the surface from the northwest to the southeast
Map (4) Lines of equal elevations in Al-Muthanna Governorate Map
(5)Surface sections in Muthanna Governorate



Source: Based on the digital elevation model and the 10.8 program ARCGIS Source: Based on the Republic of Iraq, Ministry of Water Resources, Production Department. Maps, administrative map of Iraq, scale (1000000:1), Baghdad, 2021

In general, the alluvial plain is characterized by complete flatness (21), and these areas are considered the most suitable for growing and developing vegetables in the governorate. SO The areas of river banks are higher than the level of neighboring lands and are characterized by low groundwater, low salinity, and high organic matter, making them among the most fertile and suitable areas.

2. Western plateau:

The line of equal elevation (35 m) above sea level is the dividing line between the western plateau and the alluvial plain. Is characterized by this area Its surface varies from one place to another, so It gradually increases as we head south, And the southwest of the governorate, reaching its maximum height! It is 400m above sea level. And It divides the Western Plateau region to Sections Multiple It can be divided as follows:

1. **Lower valleys area:** It is located in the northern and northeastern parts of the Western Plateau. so It extends between the western banks of the

Euphrates River and the Shatt al-Atshan in the north, overlooking the alluvial plain and the Al-Hajara region in the south, the Dabdaba Plain in the east, and Najaf Governorate in the west. The lower valleys region is characterized by many steep valleys towards the Euphrates River, which is distinguished by its capacity. In which lake (Sawa), and plain lands are spread within this region, making large areas of it. It is possible agricultural investment!⁽²²⁾, Depending on rain water which gather in valleys.

٢. **Stones area:** It occupies a wide area between the lower valleys region and the north. And the political borders of the Kingdom of Saudi Arabia to the south. And between the Dabdaba area to the east. And the borders of Najaf Governorate to the west. And she descends from the southwest towards the northeast, and it spreads depressions. Multiple in Ha like Low salmon which she informs Surveyor Te (138.30 km²)⁽²³⁾, Which helped grow agricultural activity in the Al-Hajara area.

٣. **The teddy bear area:** Located in the south and southeast. It is characterized by flatness and a slow slope towards the north-east, with a height ranging between (50-250 m) above sea level. This area consists of a succession of river deposits, most of which are sandy in nature. The orthogonal and the gravel with sandy clay. so spread sand dunes that extend towards northwest - southeast)⁽²⁴⁾, And this region is poor in agricultural activity as a result of its poor soil and lack of water resources, which are limited to groundwater with high levels of salinity..

It is evident from that there are many areas in Muthanna Governorate that can be invested in agriculture (option cucumber, cowpea), being the study area is characterized by extension in most parts. A, even if this leveling and slight gradient in elevation has a clear impact on the ability to plant and develop vegetables. The alluvial plain area, the lower valley area, and the Hajar area are among the most suitable areas for growing vegetables, especially the Kutof areas. Land the Sahlia and the depressions that can invest it lightly. Aya.

The second topic: Spatial analysis of the productivity of cucumber, cucumber and cowpea crops:

First: Cucumber: Prepare this crop from the greens. Common and important, and has different uses (Power, industry Pickles, moisturizer), and India is home the original. This plant has the ability to withstand hot, dry climates and daylight hours short, and range grades the heat suitable for cultivation what between (38 During the day-27 night) M, And you succeed. Cultivate it in the soil Clay Heavy The good one Exchange And

sandy soils And the soil Sour (PH)between (5.5-6.7), and are added Fertilisers MembershipAs compensation for the lack of organic matter⁽²⁵⁾.

Table (2) shows that the area, production, and productivity of the cucumber cropFor the year (2021)In Al-Najmi district, it reached (80) dunams, (160) kg, and (2000) kg/dunam, respectively, with a standard score of (2.76), and thus it occupied first place in terms of productivity due to its location within the soils of river basins that are characterized by its capacity, followed by Al-Majd District. With an area, production, and productivity of (60) dunams and (60) kg (1000) kg/dunam, respectively, with a standard degree)**1.08**), while the area, production and productivity of the same crop in the sub-district (Al-Suwayr, Al-Khader district, Al-Daraji sub-district, Basiyah and Al-Karama) reached (0) and with a standard score (-**0.60**(The area, production, and productivity of the same crop in (Al-Salman and Al-Warka) districts amounted to (2) dunams and (0.3) kg (150) kg/dunam, respectively, with a standard degree (-**0.35**(The area, production, and productivity of the cucumber crop in Samawah District, Al-Hilal District, reached (2-5) dunums and (0.5-1.25) kg (250-250) kg/dunum, respectively, with a standard degree.-**0.18**).

Cowpea crop				Cucumber crop				
D.normativity	productivity	Production	Space	D.normativity	productivity	Production	Space	Administrative unit
0.69	700	7	10	-0.18	250	0.5	2	M. Q. Samawa District
-0.79	-	-	-	-0.60	-	-	-	Al-Sawyer district
0.26	500	4	80	0.24	500	35	70	Mq. Rumaitha District
0.48	600	3	5	1.08	1000	60	60	JudiciaryGlory
0.05	400	2	5	-0.18	250	1.25	5	JudiciaryCrescent moon
2.38	1500	375	250	2.76	2000	160	80	Al-Nujaimi district
-0.79	-	-	-	-0.60	-	-	-	JudiciaryThe greens
-0.79	-	-	-	-0.60	-	-	-	HandAl-Daraji
-0.79	-	-	-	-0.35	150	0.3	2	JudiciarySalman
-0.79	-	-	-	-0.60	0	0	0	HandBasya
0.90	800	4	5	-0.35	150	0.3	2	JudiciaryWarka
-0.79	-	-	-	-0.60	-	-	-	Handdignity

Table (2) Area, production, productivity, and standard grade for cucumber, cucumber, and cowpea crops

Source: The researcher, relying on the Muthanna Governorate Agriculture Directorate, Agricultural Statistics Division, unpublished data, 2022.

The division was made into four levels for the purpose of identifying the variation in the geographical distribution of the productivity of the cucumber crop in Al-Muthanna Governorate. Map (6) is noted:

The first level (0.50_and above): It came in first place in crop productivity. In a governorate, each of (The side of the astral and the glory) with a productivity rate of (2000_1000) tons for each, respectively.

The second level is (0.00_0.49): appeared within this level. There is only one administrative unit, which is the Rumaitha district center, with a production of (500) tons.

The third level of (-0.01_-0.49): Back. Within this level there are four administrative units: Samawah District Center, Al-Hilal District, Al-Salman District, and Al-Warka District. With a productivity rate of (250_250_150_150) tons for you to Of them.

Level 4 (-0.50_or less): Within this last level appeared five Administrative units are each of (Al-Suwayr District, Al-Khader District, Al-Daraji District, Basiya District, Al-Warka District) With a productivity rate of (zero) tons for you to Of them. Because they are non-productive units for this crop.

secondly: Cowpeas: Belong to the family. The legume is believed to be native to the Middle East Africa, a plant herbal around me, And it is planted For use. Seeds Dry that is Rich very With materials Carbohydrates And protein And iron And phosphorus and calcium, as for Cowpeas Green. So it is Rich With niacin And a few Content With vitamin A calcium and phosphorus, And it counts from Crops the weather Warm Hot, because no Bear Coldness Severe And degrees You are good Cultivate it in The soil Medium Fertility And sandy⁽²⁶⁾.

Table (2) shows that the cultivated area, production and productivity of the cowpea crop For the year (2021) In Al-Najmi district, it reached (250) dunums, (375) kg, and (1500) kg/dunum, respectively, and to a standard degree. 2.38 Thus, it occupied first place in terms of productivity, followed by the Warka District with an area, production, and productivity of (5)

dunums, (4) kg, and (800) kg/dunam, with a standard degree (0.90) (Because it is located within the soil of river basins, which are characterized by the relative fertility of its soil, while the cultivated area, production, and productivity of the same crop in (Al-Suwayr district, Al-Khader district, Al-Daraji district, Basiya district, and Al-Karama district) amounted to (0) dunums and (0) kg, with a standard degree. **-0.79** The area, production, and productivity of the same crop in (Al-Samawah District, Al-Majd District, Al-Rumaitha District, and Al-Hilal District) amounted to (10-5-80-5) dunams, (7-3-4-2) kg, and (700-600-500-400) kg/acre and standard grade) 0.69-0.48-0.26-0.05) respectively.

The variation in the spatial distribution of the productivity of these crops can be explained by the quality of the soil in Al-Najmi district, Al-Majd District, and Al-Rumaitha District (the soil of the shoulders of the rivers) on both sides of (the Al-Rumaitha River and the Al-Sabil and Al-Atshan Rivers).) which is distinguished by its soil and its good drainage and weaving the mixture of the alluvial and its low salinity, in addition to the (soil of river basins) adjacent to the soil of the shoulders of the rivers, which is characterized by its relative fertility, its proximity to water sources, and the nature of the surface, which is characterized by flatness, in addition to the material return of this crop, while the low productivity of this crop is observed in (the Karama district), Basiya district, Al-Khader district, Al-Suwayr district) due to the lack of water revenues, so the researcher sees the necessity of investing in these areas by adopting modern methods of irrigation in addition to digging wells.

The division was made into four levels for the purpose of identifying the variation in the geographical distribution of cowpea crop productivity in Al-Muthanna Governorate. Map (7) is noted:

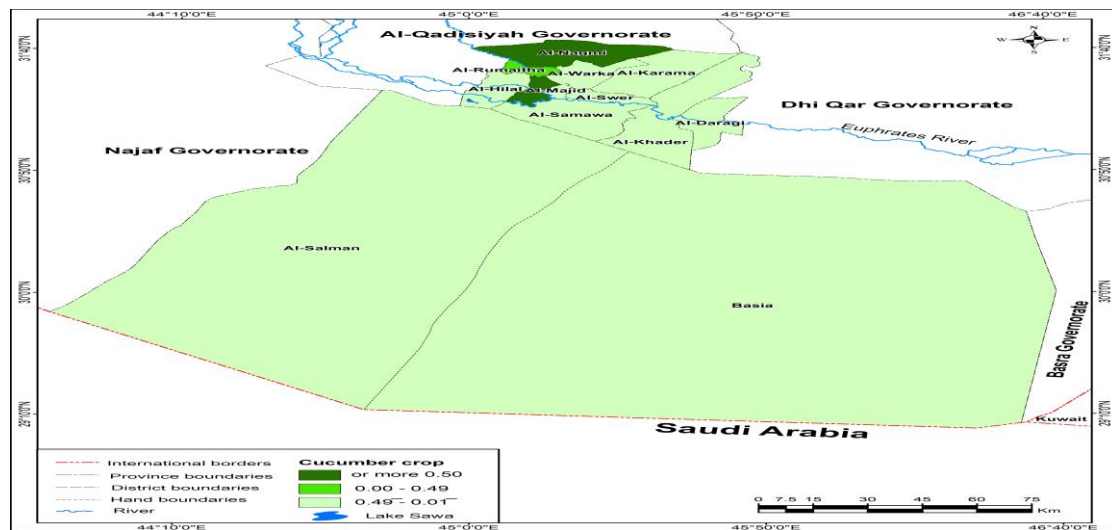
The first level (0.50 and above): It came in first place in crop productivity. Cowpeas in a governorate. Double Each of (Al-Najmi District, Warka District, Samawah District) With a productivity rate of (1500_800_700) tons each respectively.

The second level is (0.00_0.49): Back Within this level Three and Administrative units also. She is all of (Al Majd District, Al Rumaitha District, Al Hilal District) With a productivity rate of (600_500_400) tons for you to Of them respectively.

The third level of (-0.01_-0.49): No administrative unit has appeared within this level.

Level 4 (-0.50_or less): Within this last level appeared six Administrative units are each of (Al-Suwayr district, Al-Khader district, Al-Daraji district, Basiya district, Al-Warka district, Al-Salman district) With a productivity rate of (zero) tons for you to Of them Because they are non-productive units for this crop.

Map (6) cucumber crop productivity Map (7) cowpea crop productivity



Source: The researcher, based on Table (2) Source: The researcher, based on Table (2)

Results:

- 1- The research showed that there is spatial and spatial variation in the soils of the study area, and that there are many types of soils, including the soils of the alluvial plain and the soils of the Western Plateau.
- 2- The suitability of the soil of river shoulders and the soil of river basins for growing many agricultural crops, especially (cucumber, cowpeas) In addition to the gypsum desert soil, flood soil, and valley bottoms, after carrying out some treatments based on well water and using modern irrigation methods (irrigation by spraying).
- 3- it turns out The study area is characterized by a depression in most parts, as the direction of decline begins from the southwestern regions towards the north and northeast.
- 4- that leveling and a slight gradient in elevation have a clear impact on the ability to plant and develop vegetables.
- 5- The alluvial plain area, the lower valley area, and the Hajar area are among the most suitable areas for growing vegetables, especially the Kutof areas. Land depressions that can be irrigated lightly.
- 6- that ranking first in crop productivity in a governorate double there was (Al-Najmi District, Al-Majd District) with a productivity rate of (2000_1000) tons for each, respectively.
- 7- That arrangement the last in cucumber crop productivity in five administrative units are each of (Al-Suwayr District, Al-Khader District, Al-Daraji District, Basiya District, Al-Warka District).
- 8- It came in first place in crop productivity in a governorate double each of (Al-Nujaimi District, Al-Warka District, Al-Samawa District).
- 9- appeared at the last level, six administrative units are each of (Al-Suwayr district, Al-Khader district, Al-Daraji district, Basiya district, Al-Warka district, Al-Salman district)

Recommendations:

- 1- Planning from before country and follow up to implement and to address some of the problems that the soil of the study area suffers from, especially the problem of salinization and waterlogging.

- 2- Enter Types The good one from Seeds Enhanced from before Concerned authorities And distribute it on Farmers At reasonable prices.
- 3- Benefiting from the outputs of specialist agricultural colleges for the purpose of guidance, supervision and conduct Seminars Guidance.
- 4- investment Lands Desert in plateau Western The righteous In which For agriculture and provision all requirements Make it work.
- 5- Water protection Subterranean And the province on this the supplier Watery from Attrition a result For exploitation Unjust.
- 6- Approval Policy Price Specific To buy Agricultural crops from Farmers And at prices verification Profitability The high The product is without harm to the consumer.
- 7- There is a possibility to invest in areas (Al-Majd Al-Majd Al-Majd Al-Warqa Al-Samawah Al-Samawah Al-Samawah Al-Majd Al-Majd Al-Majd Al-Majd Al-Majd Al-Majd In intensive agricultural operations, Especially Horticulture for its high production capacity To cultivate A specific crop or succession of crops.

Sources and footnotes:

- 1- Ali Hussein Al-Shalash, Soil Geography, 2nd edition, Basra University Press, 1985, p. 63.
- 2- Buringh, P, Soils and Soil Conditions in Iraq, Baghdad, 1960, p. 11
- 3- Muthanna Governorate Agriculture Directorate, Castration Division, unpublished data, 2020.
- 4- Hamida Abdul Hussein Al-Zalimi, Spatial Analysis of Field Crop Production in Al-Muthanna Governorate for the Period (1991 - 2000), previous source, p. 39.
- 5- Salam Salem Abdul Hadi Al-Jubouri, Natural factors and their role in the variation in oil crop production in Al-Rumaitha district, a study in Geography of Agriculture, Journal of Geographical Research, Issue (8), 2007, p. 330.
- 6- Mustafa Abdullah Muhammad Al-Suwaidi, Variation in the geographical distribution of the population of the Middle Euphrates governorates according to the census (1978), thesis.Ph.D. (unpublished), College of Arts - University of Basra, 1996, p. 27.
- 7- Munira Muhammad Makki, Geographical characteristics in the Middle Euphrates region and their spatial relationships to regional specialization, Previous source, p. 77.
- 8- Hamida Abdel Hussein Al-Zalmi, spatial analysis to produce Field crops in Muthanna Governorate for the period (1991).– 2000), source Previous, p. 39.
- 9- Abdul Amir Kasib Mazal, The geographical components of female economic activity in the governorates of the Middle Euphrates (1977 - 1987), Doctoral dissertation (g.M.) , college of Literature, University of Basra, 1998, p. 24.
- 10- Alia Hussein Salman Al-Bo Radi, evaluating the irrigation water situation and optimal exploitation of water sources In the middle Euphrates region, Previous source, p. 51.

- 11- ProtectDrSaeed Al-Ghariri, Geomorphological characteristics of the Euphrates River and its two main branches, Al-Atshan and the paths betweenShanafiya and Samawah,Master's thesis (unpublished), College of Arts - University of Baghdad, 2000, p. 38.
- 12- Alia Hussein Salman Al-Bou Radi, Evaluation of the irrigation water situation and optimal exploitation of water sources in the Middle Euphrates regionPrevious source, p. 51.
- 13- Yahya Abbas Hussein, the water springs between Kubaisa and Samawah and their investments, unpublished doctoral thesis, p. 81.
- 14- Alia Hussein Salman Al-Bo Satisfied ,Previous source, pp. 52-53.
- 15- Sarhan Naeem Tashtoush Al-Khafaji, Geomorphology of the Euphrates River with its two main branches, Al-Suwayr and Samawah, between Samawah and Al-Daraji.,Master's thesis (n.M), College of Arts,University of Baghdad, 2003, p. 51.
- 16- Mustafa Abdullah Al-Suwaidi, previous source, p. 40
- 17- Khaled Fahd Mohsen Al-Sarhan, Al-Muthanna Governorate, A Study in Population Geography, previous source, p. 25.
- 18- Kifah Saleh Bajay Al-Asadi, Estimating the water requirements for tomato cultivation within the eastern edges of the Western Plateau in Iraq, previous source, p. 28.
- 19- Hamida Abdel Hussein Al-Zalimi, Spatial analysis of field crop production in Al-Muthanna Governorate for the period (1991 - 2000), sourcePrevious, p. 42.
- 20- Alia Hussein Salman Al-Bou Radi, previous source, p. 54.
- 21- Souad Abdullah Fadeeh, A geographical analysis of the factors affecting the disparity of departments in Al-Muthanna Governorate, Forum Yearbook for Human Studies, Issue (5), Second Year, Basra, 2016, p. 173.
- 22- Bassem Razzaq Abd Sawadi Al-Zayadi, Change in agricultural land uses and its relationship to water resources in Muthanna Governorate, Master's thesis, College of Education, University of Wasit, 2013, p. 23.
- 23- Muhammad Falih Awad Al-Janabi, The impact of water resources on the productivity of some agricultural lands in Al-Salman district (Muthanna Governorate - Iraq), a dissertation.Master's degree, College of Education for Human Sciences, University of Basra, 2015, p. 23.
- 24- Jasib Kazem Abdul Hussein Al-Jawhar, landforms of the dry valley basins in the Busayya region usingGIS, doctoral thesis, College of Arts, University of Basra, 2011, p. 18.
- 25- Hamid Muhammad Sidqi, Vegetable Supply Districts for the City of Baghdad, Master's Thesis (unpublished), University of Baghdad, College of Arts, 1976, p. 73.
- 26- Ahmed Abdel Moneim Hassan, Vegetable Crops Production, Cairo University Center, pp. 293-296.