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PREPARATION OF MAPPING EVALUATION, EXTENSIONAL DEVELOPMENTAL AGRICULTURAL CHEMICAL AND FERTILITY TO SOIL USING GEOGRAPHIC INFORMATION SYSTEMS IN BABYLON GOVERNORATE, IRAQ

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Abstract

The current research aimed preparation of mapping evaluation extensional developmental agricultural chemical and fertility to soil using geographic information systems in Babylon governorate. The map is a criteria evaluation for chemical and fertility soil. The research area for the evaluation criteria for the distribution of chemical soil properties showed a difference in the level of soil salinity and organic matter in the distribution of S4 and S5 area of 18.36% and 7.33% respectively, 25.69% of the total area of the research area 54604.87 ha represents saline desert that cannot be invested for agricultural purposes, S0 and S1 distributed 18.42% and 18.21% respectively, which means that the agricultural areas represent 36.63% of the total area of the research area 77858.16 ha, The S2 and S3 varieties are 21.82% and 15.86% respectively, which means 37.68% of the total area of the research area is 80089.97 ha. S4 and S1 are concentrated in non-saline agricultural areas and are subject to permanent agricultural use, while S4 and S5 are in the low category. The relatively successful soil management was limited to 17.39%, which is equivalent to 36,962.97 ha of the research area. The Weakness and absence of agricultural extension activity and lack of proper agricultural management means 82.61%, which is equivalent to 175590.03 ha of the research area. As for the orthodontic criteria for the distribution of soil fertility properties, the quantities of nitrogen N in the soil were distributed at the shoulders of the rivers and the areas of continuous cultivation, and the areas of not more than 19.50%, which corresponds to 41447.84 ha of the search area, 80.50% suffer from conditions unsuitable for growth Plant due to severe salinity Nitrates are part of the problem of environmental pollution in this element, which threatens the health of humans and animals alike, The amount of phosphorus-ready P in the soil, which occupies 4.14%, which is equivalent to 8799.69 hectares only of the research area,, 95.86% suffer from the lack of availability of phosphorus ready due to the decline of natural vegetation.

Key words: Evaluation Extensional Developmental Agricultural, Mapping, GIS.

Introduction

Agricultural work is one of the most important and essential areas for any country in the world for its contribution to the national income on the one hand and the percentage of its employees, which in Iraq constitute approximately 33% of the total population (Central Bureau of Statistics, 2017). Agricultural extension work contributes to the achievement of self-sufficiency in agricultural production and the achievement of national food security, as the educational system for farmers and their families, which is responsible for the delivery of technologies, practical recommendations and solutions to farmers' agricultural problems And to convince them of the importance of adopting them, and imparting the knowledge, skills and trends necessary to apply them in their fields and integrate them into their farming systems in order to increase productivity and agricultural production (Taha, 2013). The level of performance and effectiveness of the agricultural extension work is influenced by many factors, both internal and external. The most important of these factors is the nature of the agricultural extension work, especially the specialization in the performance of the guiding tasks and duties. The literature and scientific studies in the fields of management and organizing agricultural extension work emphasized

the importance of specialization in the extension work Agricultural, Many successful and successful international experiments to achieve the objectives of agricultural extension work as a result of the adoption of specialized formulas in the performance of agricultural extension functions (Al-Rimawi, 1995). And 79% of the respondents preferred the specialized formula to the general formula in providing extension services (Hassan, 1998). Therefore, the effectiveness of the organization in achieving its objectives efficiently and effectively depends largely and fundamentally on the specialization in the performance of its functions (AL-Samurai, 2003). The administrative work represents a continuous process that requires the implementation of decisions (Waldron, 1997). In order to ensure the effective implementation of these decisions, it should be assigned to a person who has the necessary means to perform these tasks in order to achieve the objectives of the agricultural extension organization and their growth (Peterson, 1997).

Which are capable of keeping abreast with the knowledge changes, renewable technologies and the needs of the growing rural population, the agricultural extension work department has to provide specialized guidance from agricultural extension workers who are able to cope with these changes within the agricultural (plant, animal and household) aspects.

The most important of these tasks is the preparation of digital maps using geographic information systems, including soil maps, which are one of the best ways to spread modern agricultural awareness in explaining the amount of development or deterioration in this important natural resource, especially chemical maps, which are mainly in salinity maps And the distribution of soil organic matter (Dioudis, 2009). It is an easy and effective way for decision-makers to identify quickly and directly, which enables them to take the necessary action to meet the needs and problems before they occur. Decision makers need to make many decisions about organizational procedures related to development trends and priorities (Nisha, 2000). It provides a new and efficient dimension for monitoring and managing land resources in an integrated agro-ecological manner. These technologies play an important role in the assessment of agricultural land for the purpose of sustainability and decision-making on land uses. Climate change and optimal built-up management (Patel, 2002).

In the field of fertility, the physiological importance of nitrogen comes from a number of characteristics, including the following:

1. It should be 2-5% of dry plant material, protoplasm and plant biophilic associated with it.
2. In addition to its composition of nucleic acids, energy carriers and enzymatic accompaniments, and in building amino acids and thus in the formation of proteins in plants (Brady, 2004). pointed out that one of the most important priorities of soil fertility surveys is the spatial distribution of prepared nitrogen, *i.e.*, spatial distribution maps for ammonium and nitrate in GIS software, providing a solid information base on the transformation of these two ions in soil or what is called Spatial Statistics (Haberle, 2004), also stressed the importance of using the regular spatial prediction in ArcGIS software to determine the distribution of environmental characteristics on the surface of the earth and its interior (Diggle, 2007), And the importance of spatial prediction in determining the spatial distribution of nitrate and ammonium concentrations in farm systems, in the preparation of high-resolution maps in the representation of ArcGIS programs, as well as the importance of this method, especially in the diagnosis of high concentrations of Nitrate in order to ration the nitrogen additions in it, which allows to maintain the ecological balance and save money to invest in the of the management of other farm systems (Piccini, 2012). In the preparation of maps of this ions in the soil, both within the root mass or the limits of the ground water, as well as an effective way to implement the guidance programs in urging the avoidance of high fertilizer additions to the soil Which is not justified and which directly affects human and animal life. The distribution of nitrates and ammonium in the soil should be reinforced by maps of the most important chemical properties in the soil and that affect the stability or transformation (Panagopoulos, 2015), Also emphasized the need to prepare spatial distribution maps of organic matter and saline concentrations to explain the distribution of nitrate and ammonium concentrations in soil. The extension process is used to explain the presence of degraded or fertile areas under nitrate contamination (Pravin, 2013).

Research Problem

Many countries, including Iraq, suffer from food deficits (Arab Organization for Agricultural Development, 2017). The increase in the production of fertilizer plants led to the occurrence of the phenomenon of food enrichment Eutrophication, which have negative effects on human health and animal, to the process of salinization of the soil and the loss of arable areas of agriculture difficult to return to its fertile (Salama, 2010). Iraq has an estimated desert area of 38% and a threatened desertification of 54.30%, which can be attributed to the

excessive use of fertilizers (AL-Hiti, 2011).

In order to serve farm systems in the adoption of modern technologies diagnosis of imbalances comes the current research to ask the following question:

- Is the preparing of mapping evaluation extensional developmental agricultural distribution of salts and organic matter (soil chemistry maps) suitable to solve this problem using GIS the ordinary kriging method and within the Arc GIS software and its application in Babylon Governorate?
- Is the preparing of mapping evaluation extensional developmental agricultural for the distribution of nitrogen and phosphorus (soil fertility maps) suitable for solving this problem using GIS the ordinary kriging method and within the Arc GIS software and its application in Babylon Governorate ?

Research Goals

1. The preparing of mapping evaluation extensional developmental agricultural distribution of salts and organic matter (soil chemistry maps) using Geographic Information Systems in Babylon Governorate.
2. The preparing of mapping evaluation extensional developmental agricultural for the distribution of nitrogen and phosphorus (soil fertility maps) using Geographic Information Systems in Babylon Governorate.

Research Importance

The current research comes within the framework of the reform of the local extension organization and its rehabilitation through:

1. The effectiveness of any agricultural extension system depends to a large extent on the level of its field performance.
2. Emphasis on the principles of agricultural extension organization, especially the principle of specialization in the performance of agricultural extension tasks and duties.
3. Provide data to serve the extension work department and its stakeholders in the construction of training and training programs that meet the needs of those targeted by agricultural work.
4. Contribute to the process of spreading awareness of the importance of modern technologies in improving the process of sustainable development

Materials And Methods

Research Methodology

The current research is classified as part of the exploratory research that falls within the descriptive approach (Milliji, 2000). states that these researches provide data and information about the reality of a specific phenomenon or society.

Research Population:

The research population included interviews by observer with some agricultural employees and farmers in the research area and various agricultural crops (plant, animal & household).

Building The Criteria

That the best criteria derived from the characteristics and elements of the subject matter, and therefore the map and its characteristics will serve as criteria for the current research (AL-Shibli, 2000) and (AL-Taei, 2001), Which formed the process of preparing agricultural development agricultural development maps of the following stages:

The First Stage - The Criteria for the development of agricultural indicators were set in the light of literature, studies and scientific research in the field of GIS and remote sensing, as well as the opinions of researchers and specialists in the field of GIS and remote sensing. Fertility of soil is chemical (soil salinity classes, soil content categories of organic matter) and fertility (nitrogen intake in soil, amount of phosphorus ready in soil).

Table 1: Experts' opinions on the Criteria of chemical aspects and fertility of soil in its preliminary.

Alternatives	Criteria Number	%	Paragraphs Number	%
Valid	3	60	4	80
Valid with modification	2	40	1	20
Not valid	0	0	0	0
Total	5	100	5	100

The Second Stage- The set of chemical and soil fertility criteria in a preliminary form on a group consisting of (5 experts) the competence of agricultural extension, soil, water resources and geographic information systems to show their opinion and the necessary modifications for the purpose of finalizing the map. To be reached in the light of the views of the experts, as shown in (Table 1).

The Third Stage- Use quantitative Criteria of chemical maps and a tri-quantitative scale of fertility maps. That one of the most important criteria used in this evaluation is of quantitative nature (AL-Karkhi, 2001).

A. The five criteria for soil salinity are (S.O.L.R, 1982) (Table 2).

Table 2: The criteria map of soil salinity varieties.

Symbol	Class Description	EC dS.m^{-1}
S_0	Very Slightly Saline Soil	0-4
S_1	Slightly Saline Soil	4-8
S_2	Moderately Saline Soil	8-16
S_3	Strongly Saline Soil	16-25
S_4	Very Strongly Saline Soil	25-50
S_5	Extremely Saline Soil	>50

Table 3: The criteria map of soil content classes of organic matter and the quantities of nitrogen and phosphorus ready in the soil.

	Low	Medium	High
S.O.M (g.kg^{-1})	<6.80	6.80 – 12.90	>12.90
N (kg.ha^{-1})	<280	280-560	>560
P (kg.ha^{-1})	<9.68	9.68-24.20	>24.20

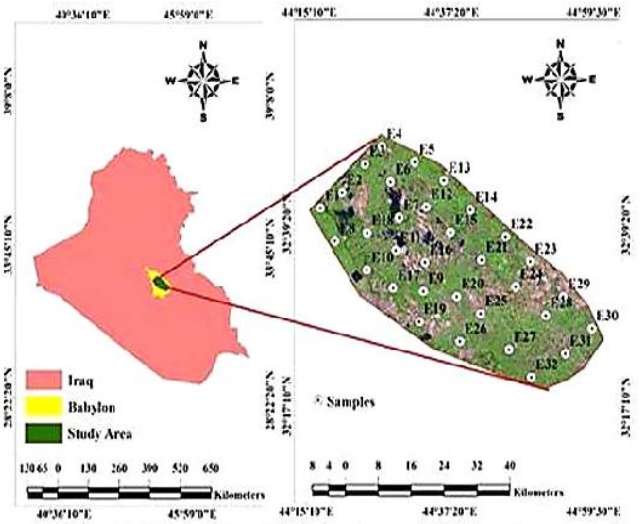


Figure (1): The location of the research area for Iraq and babylon governorate is shown with representation of the sampling sites

B. Criteria for the soil content of the organic matter according to the classification, and the nitrogen and phosphorus prepared in the soil according to (Baruah, 1999) (Table 3).

The Fourth Stage- The researcher explored the reality through the analysis of reports, documents, statistics and interviews with a number of agricultural staff in local extension units and units as well as farmers in the search area.

The Fifth Stage- Comparison of criteria with data (evidence), with a view to making a judgment on the adequacy of maps.

Site map search

Fig. 1 shows the boundaries of the research area in the eastern part of Babylon province in central Iraq within the area extending from Alexandria to the north and reaching the ancient Kish region between latitudes 32° 21'01.24 "N to 32° 50'10.94" N North and longitude 44° 32'39.41 "E to 45° 01'11.55" E east and an area of 212553 hectares, 32 sites were identified using a UTM GPS device and landed spatially on a satellite image taken by the Landsat 8 sensor on 11/2/2017 after all ERDAS Imagine 2014 digital processors were carried out. Surface samples were taken from all locations and at a depth of 0-30 in order to obtain the most accurate spatial representation, for the period from 1/2/2017 to 20/2/2017 (Lark, 2009), in addition to estimating the surface density of the surface horizon in the way of the metal cylinder Core Method According to (Black, 1965).

Laboratory Soil Analysis

Both the electrical conductivity and the degree of soil reaction in the saturated paste extract were estimated by Ec meter and pH meter (Page, 1982). Organic matter was estimated by wet oxidation with double potassium dichromate and the addition of concentrated sulfuric acid as a source of heat and then corrected with ammonia iron sulfate (Jackson, 1958). Nitrate and ammonium were extracted with potassium chloride solution (2N), then ammonium was estimated using magnesium oxide and diameter after digestion in the Chaldeal system according to Bremner and Keeney method. Nitrates were reduced with Devardo-alloy and the extracted extract diameter in the Chaldeal system according to Bremner method according Black. Nitrogen in the soil represents the sum of nitrate and ammonium concentrations as in equation 1.

$$ASN = [NO_3^-] + [NH_4^+] \quad (1)$$

The prepared soil phosphorus was extracted using sodium bicarbonate solution (0.5 M) according to the method proposed by Olsen. The color of the extract was then developed with ammonium sulphate and ascorbic acid and phosphorus was measured by the spectrophotometer at a wavelength of 882 nm. In order to convert the concentrations of the *M* gm kg^{-1} unit into kg. ha $^{-1}$, equation (2) was used (Motsara, 2008):

$$N = A * D * \rho b * n \quad (2)$$

Were N = Nutrient (kg.ha^{-1}), A = 10000(m^2), D = Soil depth (m), ñb = bulk density (g.m^{-3}) and n = Nutrient (mg.kg^{-1})

Statistical Means

1. Perform spatial analysis according to the Variogram equation and as follows:

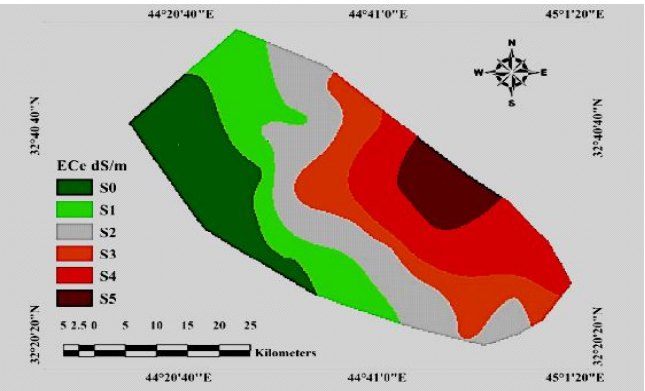
$$2\gamma(h) = \frac{1}{n(h)} \sum_{i=1}^{n(h)} [z(x_i) - z(x_i + h)]^2 \quad (1)$$

is a variable that moves away from the variable x_i + h by a spatial displacement of h, by the Ordinary Kriging method in Arc Map by the Geostatistical Analysis window and by applying the spherical model as follows:

$$\gamma_{a,b}^{sph}(h)=\left\{b\left(\frac{3}{2}\frac{|h|}{a}-\frac{1}{2}\left(\frac{|h|}{a}\right)^{3}\right)b,otherwise,if\ 0\le|h|\le a\right\} \quad (2)$$

$\gamma_{a,b}^{sph}(h)$, Where is the spatial prediction function, a is the range and b is the threshold of the distance constant between the values of the spatial variable (Lichtenstern, 2013).

2. Representing the percentages of the areas of search categories in histograms within Microsoft Excel 2010.



Figure(2) :shows the spatial distribution of soil salinity species in the research area

Results And Discussion

First Goal : The preparing of mapping evaluation extensional developmental agricultural distribution of salts and organic matter (soil chemistry maps) using Geographic Information Systems in Babylon Governorate.

1. Agricultural Development Extension Evaluation Plan for the distribution of soil salinity varieties

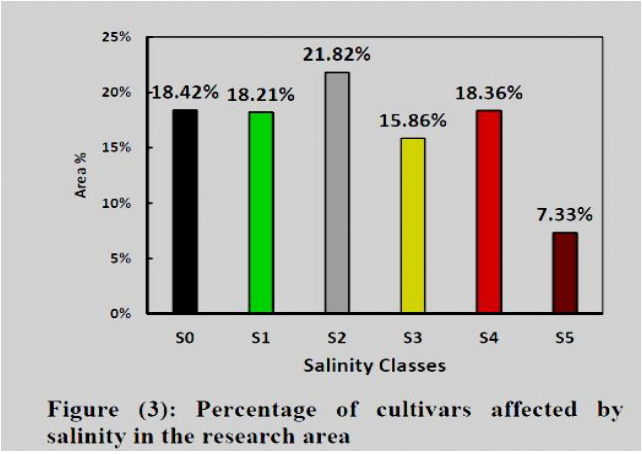


Figure (3): Percentage of cultivars affected by salinity in the research area

Fig. 2 shows variation in the distribution of soil salinity species, as saline areas are increasing towards the east, where the main drainage area and the ends of agricultural areas in the province of Babylon, (S4 and S5), which in fact represent a degraded and fertilized soil that is unsuitable for economic cultivation with a weak vegetation cover of saline plants suitable for grazing livestock.

Fig. 3 shows that the area of the cultivar (S4) was 18.36% The area of the category (S5) 7.33%, which means that 25.69% of the total area of the research area, or 54604.87 hectares represents a saline desert cannot be invested for agricultural purposes only after extraordinary efforts, S0 and S1 are distributed in the agricultural areas adjacent to the Hilla and the main irrigation channels. The nature of the formation of these areas and their topography, which represent the soil of the river beds with light to medium tissue, allows for the activity of natural peat, which is often under continuous cultivation and management. (Fig. 3) shows that the area of the cultivar (S0) was 18.42%, while the area of (S1) was 18.21%,, the agricultural areas represent 36.63% of the total area of the research area 77858.16 ha. Due to the absence of the industrial subspecies under the surface and the neglect of surface (open) salts, the salts are moving. The salinity of the areas following the low-level stratosphere is concentrated. The concentration of S2 and S3 is concentrated in the middle of the research area and is accelerated to become S5 and S4. Agricultural investment unless it takes measures and preventive measures to reduce the deterioration and start reclamation in order to preserve the soil resource from loss,

Fig. 3 shows that the area of category (S2) was 21.82% and the area of the category (S3) 15.86%, or 37.68% of the total area of the search area, 80089.97 hectares. This spatial distribution and low area of saline soils can be explained by the concentration of agriculture at sources close to the main and secondary irrigation channels (Gomez, 2014)

While farmers resort to alternative irrigation sources in remote areas that are often saline to the soil, such as mixing irrigation water with the water of the falcon or using the saline water of poor quality in the irrigation process without washing requirements, allowing the soil to deteriorate and then turning it into saline and (Nasser, 2016). That there is a great need for knowledge by the employees in agriculture Management of saline soils. (AL-Haidari, 2015)

2. Agricultural Development Extension Evaluation map for the distribution Organic matter varieties, Fig. 4 shows the spatial distribution of the high organic matter (High), which increases the organic matter content to

12.90 g.kg $^{-1}$ in the soil. It is concentrated in non-saline agricultural areas, which are subject to permanent agricultural use, which continuously adds decomposed organic matter Decomposing into the soil, which increases their quality and increases their productivity.

However, Fig. 5 shows that this relatively successful soil management was limited to 17.39%, which is equivalent to 36962.97 ha of the research area. This means that the agricultural management is absent or not

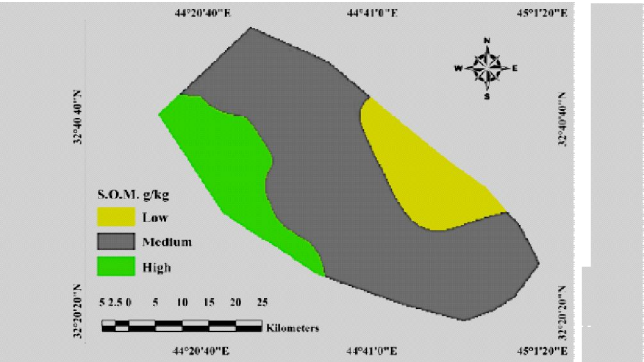


Figure (4): shows the spatial distribution of soil content varieties of organic matter in the research area

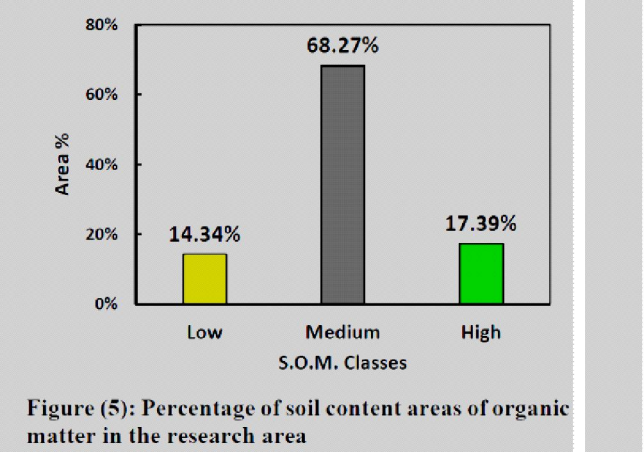


Figure (5): Percentage of soil content areas of organic matter in the research area

followed in 82.61%, which equals 175590.03 ha of the research area. The widespread deterioration in the soil content of the organic matter not to adopt organic agriculture as a practical method to increase the soil content of organic matter with the absence of the use of agricultural courses, adding the situational conditions of low soil moisture and low vegetation and the adoption of mineral fertilization,

As well as the effect of soil salinity on the decline of agricultural areas. Fig. 4 shows a spatial correlation between high and S0 and S1 with a clear spatial correlation of S5 and S4 with Low, where the soil content of the organic matter is less than 6.80 g.kg $^{-1}$, Due to the effect of salt accumulation in reducing the density of the soils that lead to poor soil erosion. In dry areas where the ground water is close to the surface of the soil, salt compounds will move due to evaporation with water to accumulate on the surface of the soil. The mineral state

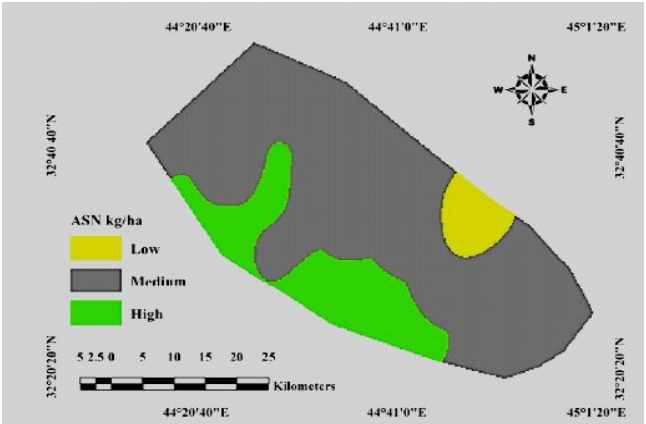


Figure (6): shows the spatial distribution of ready nitrogen quantities in the research area

is more prevalent in saline soils than in organic matter (Vagan, 2016).

Second Goal : The preparing of mapping evaluation extensional developmental agricultural for the distribution of nitrogen and phosphorus (soil fertility maps) using Geographic Information Systems in Babylon Governorate

1. The agricultural development extension evaluation for the amount of nitrogen (N) ready in the soil

Fig. 6 shows that the quantities of nitrogen ready in the soil, which is more than 560 kg.ha^{-1} distributed at the shoulders of the rivers and areas of continuous cultivation, especially vegetative plants that require organic fertilizer additions with mineral fertilization, which promotes the

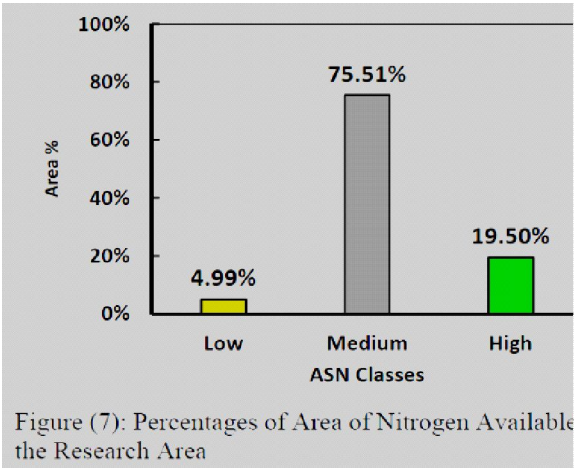


Figure (7): Percentages of Area of Nitrogen Available the Research Area

balance of nitrogen in the soil And the loss of loss of biological stabilizing or washing with water of the tapestry and the areas of these soils do not exceed 19.50%, which corresponds to 41447.84 ha of the search area as in Fig. 7, While the soil with the average content of organic

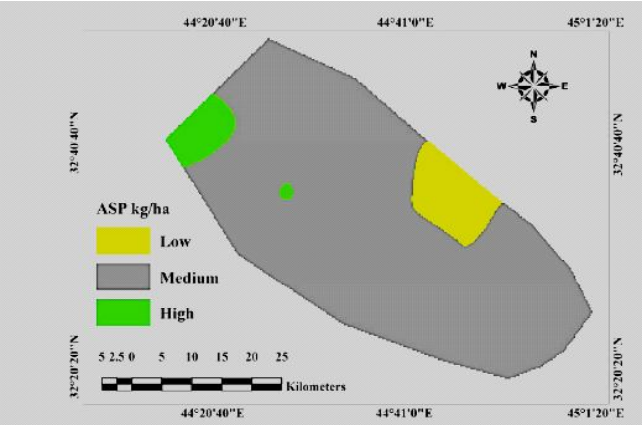


Figure (8): shows the spatial distribution of ready-made phosphorus in the research area

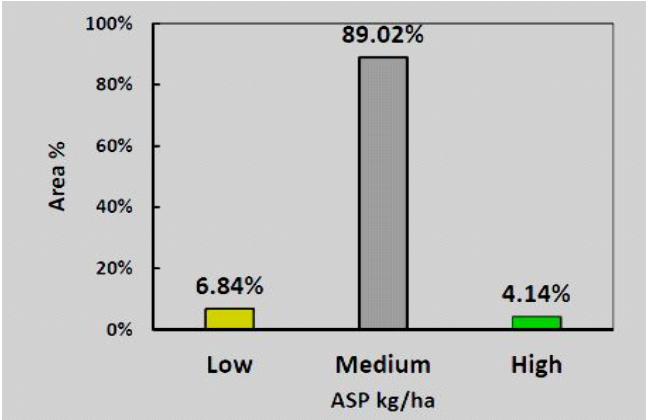


Figure (9): Percentages of areas of phosphorus quantities in the research area

matter depends on the mineral fertilization of the main degree, causing the loss and loss of nitrogen and the overlap of the middle class and distributed over the soils affected by salinity is the product of washing nitrates and movement towards those areas, which is often land water carrier of salts close to the soil surface (Ali, 2015). The high level of ground water to the soil surface due to poor management and lack of adequate internal drainage encourages the increase of concentrations of nitrates in saline areas and because of the physiological conditions unsuitable for plant growth due to severe salinity of more than 25 $ds.m^{-1}$ In this region are nitrates Part of the problem of environmental pollution in this element which seriously threatens human health, animals and ecosystems (Panagopoulos, 2015).

That low salinity of soil with organic farming allows ammonium to be conserved without diffusion into the atmosphere by ammonia gas or a rapid transition to the image of easily lost nitrates outside the root zone, which often dissolves with water As well as it encourages the growth of halophytic plants in the open-tap networks, causing an economic and environmental loss that harms the environmental and health balance in the fertility zone (Taha, 2015).

2. The agricultural development extension calendar for the amount of phosphorus (P) ready in the soil. Fig. 8 shows a clear decrease in the amount of nitrogen available in the soil at the high level, where the amount of phosphorus ready in the soil is more than 24.20 $kg.ha^{-1}$, which occupies 4.14%, which is equivalent to 8799.69 ha only from the search area and as shown fig. 9 in the area adjacent to the hill planted with vegetables, which depends mainly on organic fertilization, as the conditions of Iraq's soil in general caused the deposition of phosphate salts, which requires reduction of soil reaction to the limits that allow the phosphate ions back to the soil solution and Is what organic agriculture provides mainly, indicate that the decline in natural vegetation and the failure to follow organic agriculture in the arid regions of the basal world, the reaction of calcium carbonate, and the non-subordination of the soil to the continuous agriculture balanced under the cycle system inevitably leads to the reduction of the quantities ready by the activity of carbonates Calcium that increases the chances of fixing it before the plant can benefit from it (Amara, 2015).

Conclusions

1. The topography of high topography and light tissue does not permit the accumulation of salts permanently, especially when irrigated regularly.
2. Near-water sources of continuous agriculture, which include the use of organic fertilizer, have shown a significant increase in their organic matter, ready nitrogen and, to some extent, phosphorus in the soil.
3. Mineral fertilization in regional conditions increases the chances of nitrate-ready nitrogen loss to saline-affected areas, increasing the chances of disruption of environmental balance.
4. The distribution of the categories of agricultural development extension criteria for the chemical properties and fertility of the soil according to each of the following:

The level of effect of soil salinity and organic matter is distributed according to each category:

The distribution of S5 and S4, which in fact represent degraded and extinct soil, is unsuitable for economic cultivation with a weak vegetation cover of saline plants suitable for grazing livestock. The S4 area was 18.36%, while the area of S5 was 7.33%, which

means that 25.69% of the total area of the research area, ie 54604.87 ha, represents saline desert that can only be invested for agricultural purposes.

S0 and S1 are distributed in the agricultural areas adjacent to Hilla and the main irrigation channels. The nature of the formation of these areas and their topography, which represent the soils of the rivers with a light to medium texture, allow the activity of natural pests, which are often under continuous cultivation and management, (S0) was 18.42%, while the area of (S1) was 18.21%, ie, agricultural areas accounted for 36.63% of the total area of the research area ie 77858.16 ha.

The area of category (S2) was 21.82% and the area of the category (S3) 15.86%, or 37.68% of the total area of the search area, 80089.97 hectares.

Spatial distribution of high organic matter (S0 and S1), in which the organic matter content is greater than 12.90 gg^{-1}. In soil, it is concentrated in non-saline and subject to permanent agricultural use, which continuously adds decomposed and non-decomposed organic matter To the soil, which increases their quality and increases their productivity, while the S5 and S4 categories are in the low category, where the soil content of organic matter is less than 6.80 g. The relatively successful management of the soil was limited to 17.39%, which is equivalent to 36,962.97 ha of the research area. This means that the agricultural management is absent or not followed in 82.61%, which is equivalent to 175590.03 ha of the research area.

Distribution of soil fertility characteristics

Nitrogen content (N) Preparedness in the soil The quantities of nitrogen ready in the soil, which is more than 560 $kg.ha^{-1}$ distributed at the shoulders of the rivers and areas of continuous cultivation, especially vegetative plants that require organic fertilizer additions with mineral fertilization, which encourages the balance of quantities Nitrogen in the soil and the loss of the loss of biological stabilization or washing with the water of falcons and the areas of these soils do not exceed 19.50%, which corresponds to 41447.84 hectares of the research area, 80.50% The high level of ground water to soil surface due to poor management and lack of adequate internal drainage encourages high concentrations of nitrates in saline areas and because of the physiological conditions unsuitable for plant growth due to salinity of more than 25 $ds.m^{-1}$ In this region Nitrates are part of the problem of environmental pollution in this element, which seriously threatens the health of humans, animals and the ecosystem. It also encourages the growth of halophytic plants in the open-pole networks, causing economic and environmental loss that harms environmental balance.

The amount of phosphorus ready in the soil decreased from 24.20 kg to 1.14, accounting for 4.14%, which is equivalent to 8799.69 ha of the research area,, 95.86% suffer from the lack of available phosphorus due to the decline of natural vegetation and the failure to follow organic agriculture. Inevitably reduce the amount of ready-made by the activity of calcium carbonate, which increases the chances of installation before the benefit of the plant.

Recommendations

In order to improve the level of performance and effectiveness of the Agricultural Extension Organization in the province of Babylon through the following:

1. Rapid action in order to preserve the properties of the chemical soils and to benefit them in sustainable development due to the absence of the industrial subsurface and the neglect of surface (open) spills. The salinity of the areas following the low level of the rivers is activated to exit the possibility of agricultural investment unless measures are taken. Preventive measures to reduce their degradation and start reclamation in order to preserve the soil resource from loss. By adopting organic agriculture as a practical method to increase the soil content of organic matter
2. Farmers use alternative sources of irrigation in remote areas that are often saline to soil, such as mixing irrigation water with the water of the falcon or using the poor quality saline water in the irrigation process without washing requirements, allowing the soil to deteriorate and then turning it into saline and standard times. During the course of conducting several urgent guidance activities (courses, manuals, etc.).
3. Disseminate and develop the awareness of both the management and the implementers of the importance of the application of GIS technology in achieving the organization's objectives.
4. The principle of specialization in guiding work should be adopted because its absence or any other principle of organizing the indicative work leads to the weakness of the level of performance of the organization and its efficiency, because of its interdependence and integration with each other.
5. To develop awareness of the importance of specialized extension work through the qualification of agricultural guides specializing in such programs, as well as taking the principle of career enrichment through the assignment of one of the agricultural extension

workers to carry out the duties and duties of those in GIS.

6. Utilizing and benefiting from teaching staff in the province of Bablon (universities, institutes and research centers) in the construction of training and training programs that contribute to achieving sustainable development.
7. Conducting periodic inspection and mapping for time periods that are compatible with agricultural operations to detect early obstacles to agricultural production.
8. The interest of the directorates of agriculture and especially the agricultural extension agents and subject them to intensive courses to train on this technology which is in keeping with the concepts of modern agriculture.

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