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PHYSICAL CHARACTERISTICS OF THE SLOPES OF DOKAN DISTRICT

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ABSTRACT

The study aims to know the difference of slopes and their impact on the differences in the characteristics of the soil study in Dokan district which is located in the north western part of the province of Sulaymaniyah. Thus, their results are close. Thus, 20 samples of soil were obtained from different areas according to the degree of regression, simple slope, moderate slope, extreme regression, analysis of physical and chemical properties, and finding a heterogeneity in the properties of soil texture, colours, construction, real density, porosity, by degree of gradient.

Keywords: *Physical, characteristics, slopes, Dokan, district.*

INTRODUCTION

The study of land slopes occupied an important geomorphological concern because it is considered the earthliest manifestation of nature, as well as of modern scientific studies. Be constantly changing and moving in relation to their ground appearance. It gives us a clear and distinctive picture of the Earth's surface, especially when studied and analyzed using modern scientific techniques.

The study area is administratively located in the north-east of Iraq and in the north-west of Sulaymaniyah Governorate and between the longitudes (44.41) and (45.20) east, and the width (35.40) and (36.60) north. The location of the study area from the natural point of view is determined from the northern district of Rania and from the south Srinagar district and from the east district of Mawat and to the west Koesengk district. The total area of the study area is (1,789.5 km2).

The study problem can be formulated according to the following questions:

1- What are the geomorphological factors and processes that formed the slopes.

2- What is the effect of the degree of regression on the soil.

Hypotheses of the study are:

1- The slopes in the study area were formed by tectonic factors and then contributed to the geological and climatic factors in their development.

2- The degree of regression has a significant impact on soil characteristics

The importance of the study is that the study area did not have geomorphological studies, especially the first study in the study area and the study of the slopes.

This research relayed on some previous studies which are:

1 – Reference [12] dealt with the classification of the slopes of the surface of the land area of Lake Micron comparative study using GIS.

2 - A thesis of [3] entitled Study of land slopes and applications in the province of Sulaymaniyah using GIS and remote sensing.

3 - A master thesis of [9] entitled Land slopes in the area of Qush study in Applied Geomorphology.

4 - A master thesis of [1] entitled study of the slopes of the mountain range of Bradust in the province of Erbil.

MATERIALS AND METHODS

The researcher relied on more than one approach to research and therefore to achieve the objective of the study, these approaches will be summarized in our study as follows:

1- The descriptive approach: Use this approach to give the reader a clear picture of the nature of geographical phenomena.

2- Quantitative approach: It is one of the most common and widely used methods in scientific studies. It represents a set of quantitative methods that rely on mathematical models that produce sufficient and acceptable results in different situations and locations.

The study aims at highlighting the following aspects:

1- Identify the natural characteristics that formed the slopes in the study area.

2- Identify the difference in the slopes and the impact of different soil characteristics.

Study stages were as following:

1- The stage of office work

The collection of data and information related to the subject of the research, including books, published researches, letters and university papers.

2- Field work

The most important stage of the preparation of the research included the exploratory visits to the research area, which were distributed in several geomorphological stages, followed by a field visit lasting 7 days for the period from 10/7 to 7/7/2017.

RESULTS AND DISCUSSION

The physical and chemical properties of the soil are of great importance to the geographies because they determine the quality of the soil, which is an important resource of natural wealth because these characteristics have a direct effect on the roots and the soil's ability to plant the plant with food and water and soil ventilation [4]. The importance of the study of soil for geographically is one of the products of geomorphological processes, which is a form of the surface of the earth and soil properties are the result of the influence of environmental factors (soil composition factors) [8].

A. Soil Texture

Soil Texture is a constant property, unlike some other properties, such as the ratio of organic matter, soil interaction, etc [5], which do not change and are not reliable as fixed properties of soil. The soil is composed of three types of minutes (sand-silt-clay). There are three groups of soils, which are soft, tissue, medium, texture and soft texture groups [5]. It has been shown through the mechanical analysis of the soil samples in the study area shown in Fig. 1 that there are several types of Texture in the soil of the study area, namely, clay loin, mixed sand texture, glacial texture, sandy clay texture, and glacial texture. This type of texture is very important in physical soil properties as small soil areas do not allow water to flow down. Soft texture has a water retention capacity so there is little air movement. The soil Texture ranged from heavy (clay to silt) to light (sandy mix) depending on the location (regression). In the areas of extreme gradient, the predominant texture was coarse (sandy mix), while the Texture in the soils of simple regression heavy (clay (Mud, sand, and silt clay), because the soils in steep slopes are prone to erosion due to water and wind. Thus, soil granules move smaller and smaller minutes and leaves the soil rough due to the increase in the proportion of sand in it [13].

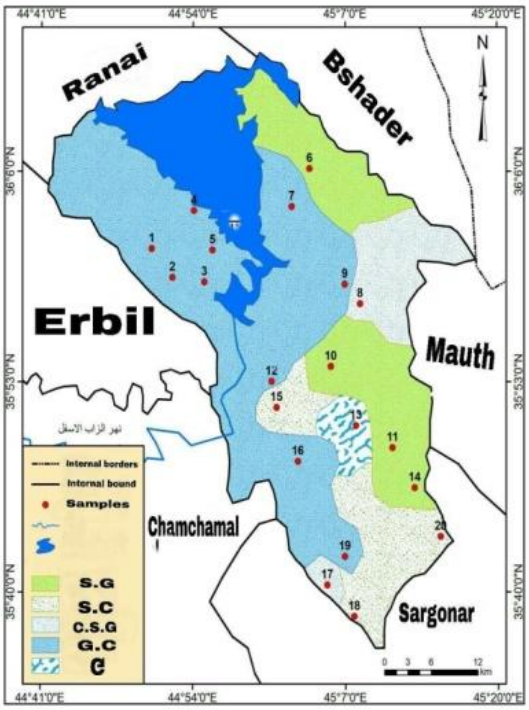

Figure 1. Geographical distribution of soil Texture in the study area. Source: From the work of the researcher based on the field study and the results of laboratory analysis.

B. Soil color

The color of the soil is most obvious because it is visible because the eye can easily see it. The color of the soil is not a specific factor for the soil but reflects some of the characteristics or factors that occur in the soil [2]. The color of the soil is one of the most prominent natural characteristics and the most obvious of any characteristic of natural qualities. Color is a direct measure of other important properties and

properties of soils. For example, dark-colored soils in temperate regions indicate that they contain a high proportion of organic matter [14]. The red color of the soil indicates that it contains the iron element and the blue-gray color in the wet soils indicates that it is poor drainage. Dark black colors indicate a large amount of humus. Salt containing salts sometimes appears in open colors from non-saline soils, but in some cases, they appear darker. Sodium carbonate also causes soil to appear black in color due to dissolved soil organic matter [6].

The morphological description of the soil samples in the study area shown in map in Fig. 2 which presents the color of the soil of the study area tends to be dark yellowish brown to control the clay and sand content on the silt in the areas of simple regression [4]. This area constitutes about 35% of the study area. The yellowish-brown color is found in areas with moderate slope, due to the increase in the proportion of sand and the lack of organic matter, and includes an area of about 15% of the study area. The light brown color is found in the soils of the steep gradient areas. This is due to the exposure of the material to clay, organic matter, and other simple and moderate precipitation in other areas, constituting an area of 15% of the study area. In general, the colors prevailing in the study area varied according to the degree of regression. In areas with a slight gradient, the soil tends to be dark (dark brown - dark yellow) due to the increase in the proportion of organic matter and the accumulation of erosion products. It is also noted that the areas of extreme decline tended to light brown because they lost some minutes of mud and organic matter (humus) because of erosion and therefore we see in temperate areas was the color tends to redness and yellowing (red yellowish - yellowish) for the same reason above (Erosion) and low humidity.(Dark brown - dark brown) for increasing the proportion of its organic matter and collecting the products of erosion [15].

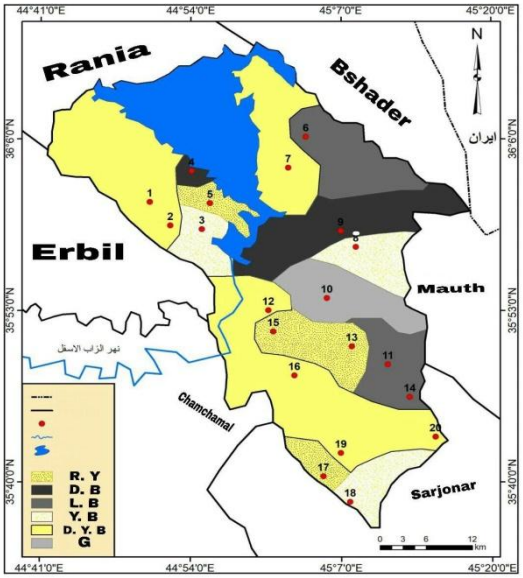

Figure 2. Geographical distribution of soil colors in the study area, Source: From the work of the researcher based on the field study and the results of laboratory analysis.

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C. Soil Structure

One of the most important physical characteristics that reflect the environmental conditions and the biological and agricultural processes that have been exposed to the soil [4]. The importance of soil construction is greater than the nature of its texture. Some soil may have a new internal structure that makes it unable to hold water, air and food more than other soil, which has the same fabric, but whose internal structure is poor, does not help the passage of water and air. Soil structure has an effect on soil ventilation, nutrient transport, root growth and degradation as well as soil service. The soil, which is characterized by good construction, is easy to plow. It reverses poorly constructed soils [11]. The morphological description of the soil samples in the study area shown in Fig. 3 which shows the construction in the area of the study area ranged from acute and narrow masses in areas with moderate slopes, while in the areas of low slopes, Areas in addition to the intensity of agricultural operations prevailing in the region (Tillage, crop service operations) As for the soils with steep slopes, the building is a steep building. The reason for the variation in the structure of the study area is the erosion in the highlands and the lowlands [4].

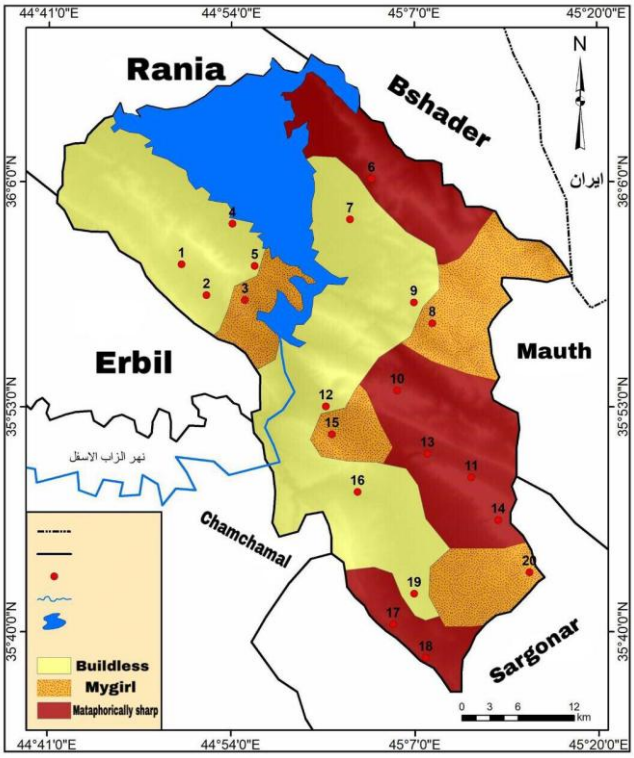

Figure 3. Study area construction ranged from acute and narrow masses in areas with moderate slopes

Table I. Virtual density c/m

Sample number	*Virtual Density c/m*	*Sample number*	*Virtual Density c/m*
1	1.2	11	1.7
2	1.2	12	1.3
3	1.4	13	1.4
4	1.3	14	1.6
5	1.5	15	1.4
6	1.7	16	1.2
7	1.2	17	1.4
8	1.4	18	1.4
9	1.3	19	1.3
10	1.8	20	1.3

D. Bulk Density

The importance of the study of the density of the apparent in order to know if there are layers of deaf within the soil section may inhibit the growth and spread of roots and impede the movement of water. Decomposed soils with low density are more productive because of their good physiological properties, unlike the high density, cohesive soils that have low permeability to water and air [4]. It is clear from Table I that the density of soil density of the study area ranged between 1.2-1.8 kg / cm3. Also indicated the best apparent density of Iraq soil ranged between 1.2-1.3 and maximum of 1.4 g / cm when it is 48-50% The superficiality of this limit impede the process of germination of the roots [7]. In simple soils, they were 1.2-1.3 mg / cm3 while in steep soils, 1.6-1.8 g / cm3. The soils with moderate slopes ranged in value from the above-mentioned limits. The reason for the difference in density values may be attributed to the erosion and sedimentation of the study area, as well as the agricultural processes in which it occurs. In areas with high slopes, the percentage of sand minutes was higher than in other areas with lower slopes

E. Soil porosity

Porous is one of the most important physical properties of the soil, because the presence of pores allows the movement of air and water, which are very important elements of plant life. The porosity varies from soil to soil according to soil structure and structure. Pore spaces in the soil are the first two spaces between solid elements in the soil, this type is related to the living composition of the soil. The other type is the spaces between the structural units and land masses and this type is related to soil construction and degree of development [10].

The ratio of porosity varies between soil and soil and even between the soil layers themselves. The difference is due to the difference in texture, structure and soil content of the organic matter. The soil porosity rate is between 30-50% but decreases to 4% in clay soils and rises to 90%. Table II shows that the soil porosity values in the study area ranged between 31% and 52% due to differences in the real and virtual density values of the soil in the study area according to the different slopes.

Table II. Variability of porosity values%

Sample number	*Porosity%*	*Sample number*	*Porosity%*
1	52%	11	35%
2	53%	12	48%
3	54%	13	45%
4	48%	14	38%
5	41%	15	44%
6	35%	16	52%
7	53%	17	45%
8	45%	18	46%
9	48%	19	49%
10	31%	20	48%

CONCLUSION

1. As for the physical properties of the soil in the study area for the tissue prevalent in the study area, the tissue in the study area ranged from heavy to light depending on the location.
2. The colors tend to be dark yellowish brown in the areas of simple gradient and light brown in areas of steep gradient.
3. The construction in the steeply built steep slopes of steep slopes In areas with simple gradient, there is no construction
4. The mean density ranged between (1.2-1.8 g / cm3) and porosity ranged from (31-52) %.

RECOMMENDATIONS

1. Guiding farmers to use agricultural methods in the right ways, such as planting slopes through the work of terraces and conservation of drift.
2. The need to create a number of small water dams on the valleys of the valleys to store rain water and benefit from them in summer.
3. Protection of vegetation in the slopes of the slopes of the erosion of the slopes and the planting of slopes with pine trees, acacia, olives and others.

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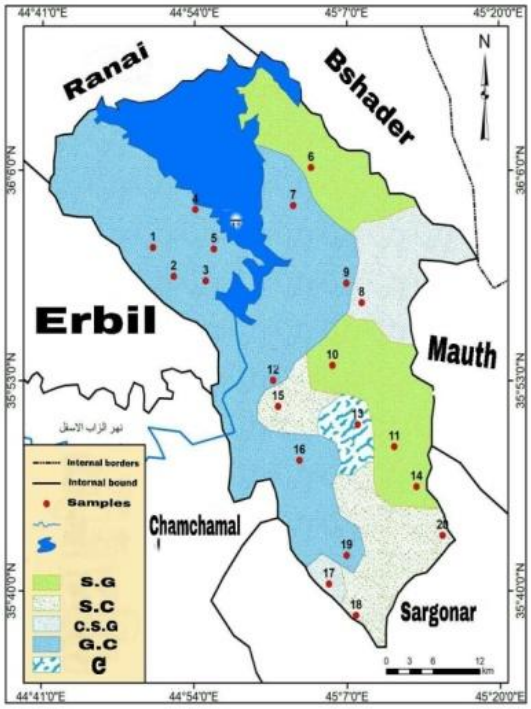
FIGURES



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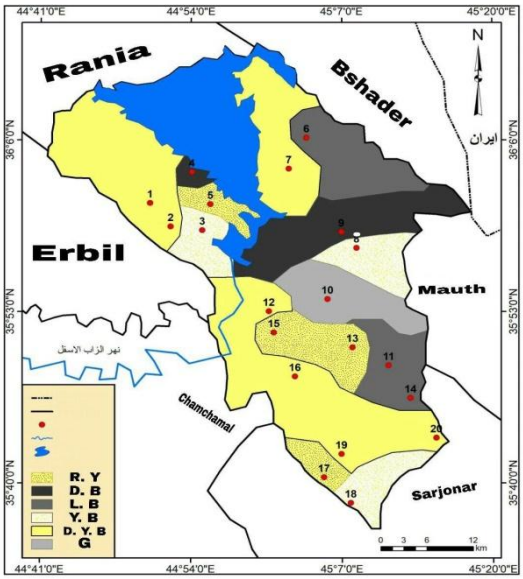

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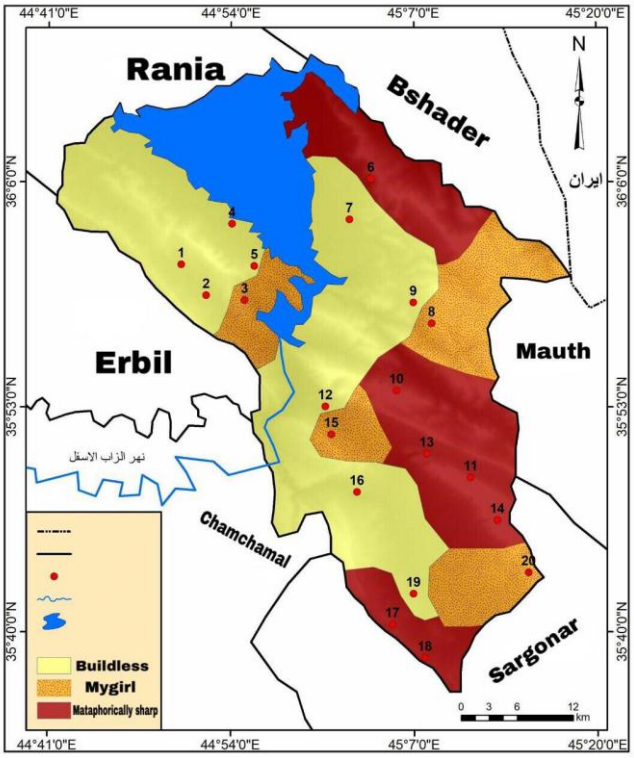

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