Climate and its Effect on Soil Formation

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Introduction

Soil is the fragile layer covering the earth's crust at a height of between a few centimeters to several meters. It is a mixture or a complex mixture of mineral and organic materials such as air and water in which the plant fixes its roots and derives the necessary components of life for its survival, reproduction and production.

Soil is the fragmented layer in which organic, plant and animal life meets the world of minerals, water and air, and the four layers: atmosphere, biosphere, Lithosphere and hydrosphere. The plant gets what it needs from food,. At the same time, plants and animals return to the soil and their residues are analyzed. Living organisms play an important role in building soil. At the same time, soil is the source of life for all organisms, including humans, which depend on their food, habitat, and shelter on what grows in the soil of plants and animals.

The Problem

Does climate play a role in soil formation?

Climate plays a significant role in the composition of soil and the most important climatic factors involved in soil composition are: Humidity (precipitation — evaporation — humidity — temperature — wind).

Hypothesis: — Climate has an important role in the formation of soil and its development through the factors affecting the soil composition, like the state of humidity (evaporation — evaporation — humidity — temperature — wind).

Soil Composition Factors

1. Raw Materials

Raw material means the original rock material or the parent material with rock cuttings derived from the crustal rocks due to the weathering process which has been subjected to climatic conditions, plant life, biological processes, regression factor and drainage system.

2. Climate conditions

Climate is one of the most active factors in the composition and formation of soil as the it is affected by climate conditions directly during all stages through the stage of extraction from the rocks and some of the characteristics of the soil and its main characteristics are formed indirectly. Heat and precipitation are the two most important climatic elements in soil formation. Climatic elements have a clear effect on the transformation of crustal rocks into raw materials, conversion of raw materials into real soil and the effect of climate on soil. Direct impact is the direct effect by temperature and fall.as well as indirect impact through vegetation and topographic features.

3. Natural Plants

Vegetation affects the formation of soil and the formation of its distinctive characteristics in three

ways:

1. Vegetation prepares the soil with most organic materials.

2. Chemical composition of dead plant residues that are added to the soil directly affects PH ratio.

3. The decaying plant remains shall be partially or fully dissolved.

4. Underground Water and Drainage System

Drainage is defined as the passage of water through soil. The speed of passage depends on several factors, the most important of which is the soil slope and the degree of its permeability.

The Climate Role in Soil Composition and Development

Elements of the climate are an effective factor in the formation of soil patterns and their composition and control a large extent in the organization, even if they are composed of different raw materials. This is because they affect or interfere directly and indirectly in the distribution of their plant and animal life and in the activities of other factors contributing to the formation and the activity of various operations. Because their effects to vary by size, a close correlation usually exists between the distribution of most major groups of soil and the distribution of regions or climatic zones.

It consists of temperature, humidity, wind and air pressure. Each element has a function or functions that lead to soil composition and highlights its effect. However, some of them interfere with the functions of others. Sometimes, interference is in the form is cooperation and sometimes it is in the form of a conflict from the soil perspective. The impact of temperatures is clear in the weathering of rocks and the provision of raw materials It also highlights the activation of all chemical processes also in the temperament of rocks and the provision of raw materials and also directly on the activity of biology and the activity of all the processes in which the composition, including mechanical processes that lead to the formation of sectors and distinction between layers. It also has an effect on the conservation of soil temperature and on the provision of water to its neighborhoods at the time of need when it accumulates on its surface in the form of snow.

Physical Effects of Soil

Physical characteristics of the soil have a great relationship to the many uses by humans. Through the knowledge of these qualities, we can determine the most appropriate machines for soil tillage and distance between the poles and their depths and requirements, soil types of water and include color and texture porosity and resistance and so on. The color of the soil is the most visible of its physical properties, because it is visible and can be easily seen by the eye. However, it is easy to avoid and is classified by the researchers as the basis of Hue, the color of the spectrum, the value of the colors reflected by Chrono particles to the degree of color and luster.

Soil tissue means the mechanical composition of its mineral components and the relative values of their constituents. The composition of these components is composed of particles of different sizes, including sand, clay, and slit. Soil scientists call each one by a separate label or a class name. The soil consists of these grades. The soil types and weaves each class to a rank or to a rank that is most influential in its composition.

Soil construction means the pattern, shape and organization in which the soil is arranged in clusters. In accordance with this determination, the soil is not considered to be built if its particles are cone, each of which is independent of the other, such as sand in deserts. The soil whose particles are formed is not as dense as the clay soil that contains a high percentage of colloids more than it should or the soil of the impermeable layers which results from the deposition of the center of some adhesives such as silica or some oxide or some carbonates in the pores between the particles, the porosity of the soil and its influence. Soil porosity means that it contains pores and has an average rate of the total volume of the

samples taken from their layers of capillary follicles and other non-capillary pores. This ratio is estimated to be the total amount of the total sample sizes. The ratio may be fractional and usually a percentage. Or between one layer and another of the layers according to the texture, structure and content of the organic matter and in the rate of 30-50%, but may fall in the clay to 4% while rising in organic soil to 90%.

Table (1) Degrees of permeability

Degree	Speed (cm/hour)
Very Slow	Less than 0.215
Slow	0.125 — 0.5
Moderate slow	0.5 — 2
Moderate	2 — 6.25
Moderate fast	6.25 — 12.5
Fast	12.5 — 25
Very fast	More than 25

Climate and its relationship to soil problems

1. Soil salinity

Is a term used to express positive and negative ions in the soil and salts are necessary for plants when they exist in moderate proportions, but their harmful effect begins with the increase of concentrations of these salts. The saline soils are classified according to the US classification as soil which is classified by an electrical connection to the extract of the ingested dough more than (4 dsi / m) and the pH level is close to the equalizer and less than 8.5 and the percentage of mutual sodium is less than 15%. As for soil salinity, it is clear that the vast majority of the soil suffers from high salinity. This is true with the findings of the researchers that 75% of the land affected by different degrees of salinity.

The harmful effects resulting from increasing the salinity of the soil heavily, but the most harmful effects are: -

1. Increasing salinity concentration leads to increased nitrogenic pressure in the soil solution and the inability of the nitrogenous plant to absorb water and nutrients quickly enough to grow naturally.

2. Increasing the concentration of some elements in the soil solution so as to lead to imbalance between the different elements and the lack of some in the plant.

Although the problem of salinity is characterized by its steps relatively, but it can be found solutions to these solutions are summarized in two points:

1. Performing reclamation processes (in order to reduce the salinity of the soil, especially in the root layer, to the extent that crops are allowed to grow satisfactorily).

2. In order for the results of the reclamation to be successful, there must be two types of farmers and for good soil and water management.

Soil Classification

The classification of any natural or human phenomenon means that it is the means and means by which similar phenomena are combined in their characteristics and characteristics in larger groups. So that they can be easily understood, described, and linked. Classification is a criterion-based technique that enables the workbook to collect an infinite number of similar types in larger groups that are easier to describe, simplify, and evaluate in the training process of any science of human knowledge. Hence the

importance of soil classification as a first stage of scientific research in the study of soil geography. The fact of the climatic and vegetative conditions in the composition of soil characteristics was realized by the American soil scientist D. Marett, who took his idea of his Russian colleague Dokogiev and found his classification, which divided the soil into three large groups:

First: — Zonal Soils

Mature soils with full developmental characteristics and characteristics arising from the influence of climatic conditions and biological processes. These occupy broad regions that extend in the form of bands whose geographical distribution is closely related to the distribution of climatic and vegetative regions together and has a distinctly layered section with different characteristics and characteristics. They are divided into two main types:

A — Pesticides: — They are prevalent in arid and semi — arid climates with weed or weed — free vegetation in which the ratio of calcium and other calcareous substances increases in the surface layer or near them.

B — Pedalfires: — They are prevalent in humid climates with vegetation cover of forests and increase the amount of iron and aluminum on water soluble materials.

Second: Intrazonal Soils

They are mature and full-fledged cultivars such as zonal soils, but their characteristics and characteristics are not due to the effect of climate factors on natural plants, but due to other local factors such as gradient, natural terrain, water drainage, and the original materials derived from soil and local climate. These factors give the soil certain characteristics that differ from the general characteristics of the range of soil that occupies the whole region and the section of these soils influenced by the detailed and local climate more than the impact of the general climate prevailing in the region characteristics of overlapping seed within the general field soils. It is the result of local factors such as desert drainage, local climate, local natural plant or raw materials derived from a particular type of local rock. The overlapping soil is classified into three main groups:

A — Halomorph soil: — prevail in the desert and desert similarity and the reason for its presence is due to the concentration of sodium salts in the soil and this gives them chemical, natural and biological properties that negatively affect most types of agricultural crops. These soils are usually found in low-lying areas with sedimentary soil where irrigation depends on irrigation.

B- Hydromorphic soil: — These soils can be observed in bad areas discharge in most of the shallow soils where the water is collected in many quantities and permanently for a sufficient period of time to show the effect of Gleying operations on the soil.

C — Kalimorfk soil: — are found in the soil soils where the raw materials are composed of limestone rocks and sometimes called these groups the name of calcareous soils.

Third: Azonal Soils

It includes immature tufts and incomplete development of its section, which is the steep slope of the slope or continuous addition to the rock mounds, it includes dune sand dunes and renewable tropics as well as soils on the steep slopes, which are always in the youth stage. There may be Azonal soils in many parts of the world. They are found under different types of climate, under different vegetation cover and different climatic conditions, which are not required to be located in areas determined by climate conditions or biological factors. In other words, a good development either because of rejuvenation or modernity composition or because of the raw materials and terrain or any other factor prevents the development of the characteristics of the sector with its known layers and this soil four types:

A. Lithosols: — developed over hard rock resistant to weathering factors where the process of soil

formation is very slow, shallow rocky soils with a few soft rock breakers.

B. Allurial Soils: — Developed over the floodplains of the rivers are renewable soil because of what rivers bring during the periods of flood of the material Tmoyeh is very rich soil and spread in all types of soils.

C. Mountain Soils: — Shallow soil is subject to erosion, especially those located on the slopes and mountain slopes.

D. Rego Soils: — Developed over non-contact materials such as sand dunes and organic soils.

Conclusions

1. The climate has an important role in the formation of soil and the main factors involved in its composition are the state of humidity (precipitation — evaporation — temperature — wind).

2. The climate is one of the most active factors in the formation and formation of soil as the soil is affected in the climatic conditions directly during the stages of development.

3. Soil composition and evolution are directly affected by the quality of the terrain and the degree of slope of the surface.

4. Man is not considered an important factor in the formation of soil as much as it is a useful factor for it has increased the human change of soil by increasing the population on the surface of the globe.

5. Soil erosion is the process by which soil constituents are removed and transported by wind, running water and ice.

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