Soil Fertility and the factors that affecting by:

What is the mean of **Soil fertility**: **The capacity of soil on supply nutrient elements by quantities and the forms that appropriate for plant growth and this is reflected in the positive growth of the crop and production.**

Among the factors affecting the fertility of agricultural land are:

1 – Degree of soil acidity (pH - Soil):

The valuable of pH soil agricultural ranges between 3.5 (the soil most acidity) and between 10.5 (the soil most alkaline). And valuable the pH most common soils agricultural most production ranging between (5.5 to 8.2), and soil acidity its affect in plant growth and development through its impact on the readiness of the nutrients elements in the soil, which are needed for plant growth, and the values between the (6-7) is best suited to take advantage of the nutrients elements by most plants.

2 –Soil texture and metal installation:

The solid phase system of the soil it consists from two parts they, ingredients mineral and components organic, the section metal distributed by size to grains of the sand, silt and clay and locution about him “soil texture “ and from which can identify on properties the soil physical and chemical, and the components of organic it’s old organic materials have a resistant to decomposed or the materials and organic leavings that don’t decomposed yet.

3 - Soil content of organic matter:

The organic matter it’s the remaining substances from living organisms, such as plants or animals regardless look about degree decomposition which include plant remnants like roots, leaves, remnants of crop backward about harvest, the remnants of animal dead residuals and living macro-organisms that present in the soil distance after death which it's called microbes or germs, and it composed from number of nutrient elements, the most important carbons, hydrogen, oxygen, nitrogen, sulfur and phosphorus and other from mineral elements.

4 - Soil content of dissolved salts:

Dissolved salts effect on the soil either through the soil solution concentration thus, it's called soils saline, or about a plus rate of sodium on surface complex the soil it is called soils sodic. Consists dissolved salts from chlorides, sodium sulphate, calcium and magnesium in basically, and bicarbonate, nitrate, borate in secondary.

5 - Soil content of total carbonate:

From the most important phenomena which features by dry areas and semi dry soil it is the gatherings existence from lime thus, launch on her limestone soil, and from the most important problems of lime stone it's the height pH of the soil which affect at readiness necessary nutrient elements for the plant, where that the increasing of soil degree acidity pH leads to increasing the rate of ammonia volatile from this fertilizers, so must observance the following at limestone soils :

A- Caution from the increase of humidity at the soil, where that the increase of water at the soil lead to disintegration calcium carbonate and launch ions of bicarbonates and hydroxyl and that lead to increase the soil pH as follows:

$CaCo_3 + H_2O \rightarrow Ca^{+2} + HCO_3 + OH$

B-its prepare to addition some of acidic interaction materials for this type of soils for help to increase soil fertility, as such can addition sulfur agricultural (that well be allowed to use at organic agriculture) for this soils which oxidizes under circumstances appropriate from heat and moisture by bacteria from genus (Thiobacillus) component acid sulfuric as follows:

$2S + 2H_2O + 3O_2 \rightarrow 2H_2SO_4 + 282$ Kcal

Sulfuric acid that output from this process its lead to decrease soil pH degree, which lead to increase readiness macro and micro nutrient elements to be easy absorbed from the plant.

6-Ventilation:

Consists the soil air from nitrogen, oxygen and second dioxide carbons with some inert gases, the soil air it's occupy the space that existing before the soil water, The importance of soil air can be explain it by the following:

1 - The lack of oxygen in the soil affects the viability of the roots in the absorption of nutrients, as it turns a lot of nutrients in them to unsuitable forms for absorption by the plant during the reduction process.

2 - Lack of oxygen affects the enzymatic activity at the plant, from affect at bio operations inside plant.

3 - Oxygen deficiency affects carbohydrate representation in the roots of plants, as less oxidation process and that leading to the formation of some alcohols like ethyl alcohol because fermentation and its effect on plant growth negatively.

4 - The oxygen deficiency reduces the oxidation of organic matter in the soil or added to it as a result of the lack of activity micro-organisms that are analyzed, leading to the accumulation and the accumulation of degradation products are often toxic to plants when increasing concentrations such as ethylene, methane, hydrogen sulfide gas, cyanide and some organic acids such as acetic acid, oxalic acid, lactic and citric acid.

5 - Oxygen deficiency leads to the obstruction of roots growth and elongation of plants growth, as the tops of root hairs are more sensitive to lack of oxygen for the rapid of meristem cells division there in.

7-Soil content from humidity:

Soil content from moisture affect on behavior chemical interactions and vitality and properties this interactions in soil, as well as their impact at growth crops agricultural and productivity where that water lots from the benefits including:

- Water is a major factor in the process of photosynthesis.
- Water is a suitable for dissolving and movement of nutrients in the soil, and absorbed by the plant and its movement within the plant.
- Water in the soil affects the representation of nitrogen and protein synthesis by the plant, as well as affects the ratio of root / top and thus affects the root and vegetative growth and production of various plants.

8-The organisms present in the soil:

The organisms can be division in the soil to two basic groups its:

A- Microscopic biology and they include: bacteria, some fungi and actinomycetes and algae.

B- Non microscopic biology it includes: worms earth, nematodes, insects, spiders, snakes and rats.

One of the major groups of soil living, as the following:

1 – Biology vegetable: these include:

First: Bacteria: these include:

- Nitrification bacteria - Nitrobacter
- Sulfur oxidizing bacteria - Thiobacillus
- Bacteria root knot- Rhizobium
- Bacteria cellulose degrading - Cellulomonas

Second: fungi: and include:

- Rhizopus
- Mushroom
- Fungi causing wilting plants, including: Pythium, Phytophthora and Fusarium
- Fungi producing antibiotics including: Aspergillus and Penicillium

Third: Actinomycetes: it includes: Actinomyces and Streptomyces and Nocardia

Fourth: Algae.

2 - Biology animal (Fauna): these include:

- The big animal's macro-fauna it includes: worm earth, ants, insects, snakes and rats.
- The Small animal's micro-fauna it includes: protozoa like Euglypha, Uroleptus and Tetramitus.