Reclamation of water logged soils:

The focusing will be on some important points such as:

1- Definition of water logged soils.

2-Types of water logged soils.

3-The area of water logged soils.

4- Reclamation of water logged soils.

Definition of water logged soils: They are soils affected by continuous or seasonal logging by surface water or due to capillary effect of groundwater if the level of ground water is close or near the soil surface.

The soil called water logged if 10% of soil pores occupied by soil air or 90% of pores are occupied by water.

Waterlogged soils occur when there is an excessive accumulation of water in the soil profile, leading to anaerobic (low oxygen) conditions. This can result from:

Poor drainage systems

Heavy rainfall

High water table

Impeded natural drainage

Issues Caused by Waterlogging

Waterlogged soils can lead to several agricultural and environmental problems:

Poor Plant Growth: Oxygen deficiency adversely affects root respiration, leading to reduced growth and crop yields.

Nutrient Deficiency: Excess water can leach nutrients from the soil, making them unavailable to plants.

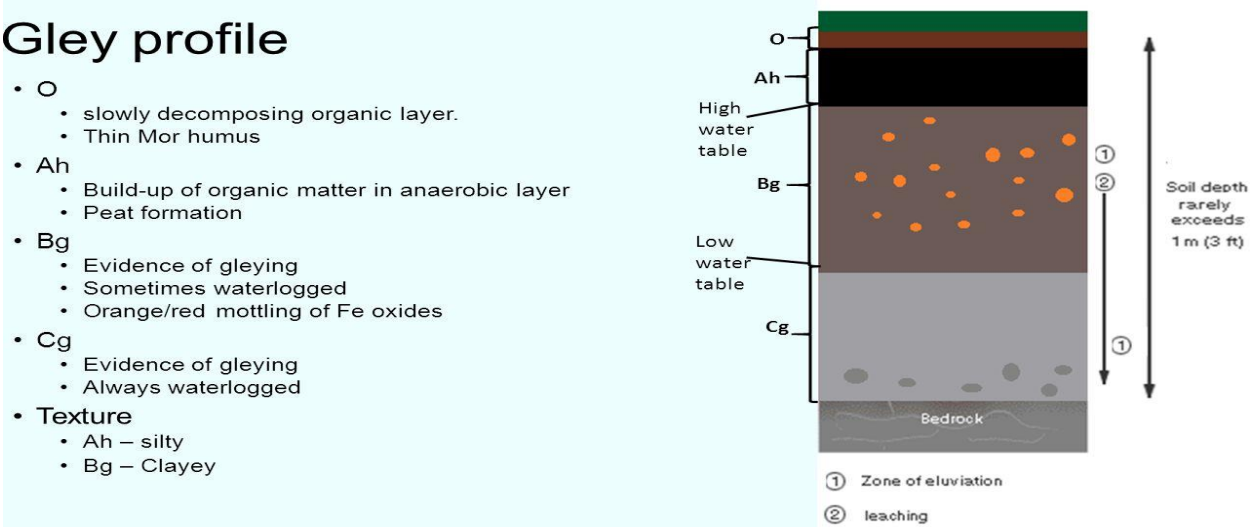
Soil Salinization: Waterlogging can lead to salt accumulation on the surface, particularly in arid and semi-arid regions.

Increased Pest and Disease Pressure: Saturated soils often create ideal conditions for pests and diseases to flourish.

Types of water logged soils:

There are many types of water logged soils:

1-Gley soil: It is a type of water logged soil saturated with water for long time or period. The A-horizon contains partially oxidized organic material. It is also having gley horizon which colored by Fe and Mn precipitation. The Gley soil called peat soil or Muck soil if contains huge(large) amount of organic materials.



2-Paddy soils: It is suitable for rice cultivation, which needs the following managements:

A-leveling.

B-Plowing the moist soil.

C-Maintain 5-10 cm of water above soil surface for 4-5 months and plant must be exist.

D-Drying the soil before harvesting.

E-logging the soil for 8 months after harvesting.

3- Subaquatic soils some of these soils called acid sulphate soils which contains ferrous sulfate. Which changes to sulfuric acid after drying or drainage.

4- **Marsh soils**:

marsh, characterized by poorly drained mineral soils and by plant life dominated by grasses. Because the delta is deposited by sediment settling from the river water, the land that is built will be poorly drained at its driest and will often be underwater.

5.Riverine Flood Waterlogging

It is a type of waterlogging which occurs during the rainy seasons, where floods come to nearby lands from the river because it carries excess water. The water is waterlogged in the land and leads to the death of a number of plants or crops.

6.Seasonal Waterlogging

Sometimes during the rainy seasons, runoff water might accumulate into the lowlands and depressions, leading to waterlogging.

7. Sub-soil Waterlogging

It is another type of waterlogging which occurs when water tables rise up high, especially during the rainy seasons, causing waterlogging.

The area of water logged soils in the world = (1200 million) ha, while the area of water logged soil in Iraq =35000 km^2. The marsh soils of Iraq are existing in Basra

,Misan and Zikar governorates and 88% of the marsh soils were not cultivated. The redox potential of water logged soil is between 200-400 millivolts, while for normal soils is ranged between 300-800 millivolts.

RECLAMATION OF WATERLOGGING

Several techniques can be employed to reclaim waterlogged soils effectively:

a. Drainage Systems

Surface Drainage: Installation of ditches or channels to direct excess water away from the field.

Subsurface Drainage: Use of tiles or pipes buried below the surface to remove excess moisture.

b. Soil Aeration

Tillage Practices: Deep tilling can help break up compacted soils, improving aeration and drainage.

Subsoiling: A method that involves breaking up compacted layers below the surface without disturbing the topsoil.

c. Crop and Soil Management

Crop Rotation: Planting crops that tolerate wet conditions can help manage water levels and improve soil structure.

Cover Crops: Use of deep-rooted cover crops can enhance soil drainage and increase organic matter.

d. Chemical Amendments

Gypsum: Incorporating gypsum can help improve soil structure and facilitate drainage in clay soils.

Organic Matter: Adding compost or organic matter helps improve soil porosity and structure, enhancing drainage.

4. Monitoring and Maintenance

Ongoing monitoring of soil moisture levels, nutrient status, and crop performance is critical for successful reclamation. Regular maintenance of drainage systems and adjustments to management practices as needed can ensure long-term productivity.

5. Benefits of Reclamation

Improved agricultural productivity and crop yields.

Enhanced soil health and ecosystem resilience.

Better water management in agricultural landscapes.

EFFECT OF WATER LOGGING ON PLANTS GROWTH

Some important effects of waterlogging on plant growth are given below:

- The air in the soil pore is replaced by water, leading to oxygen deficiency and hence reduce the plant growth
- In waterlogged soil transport of gases is reduced disturbing normal growth.
- Limited exchange of gases increase amount of CO_2 which affect transpiration and water absorption.
- In absence of oxygen, microbes produce toxic substances such as methane and effects growth of plants.
- In waterlogged soil major from of nitrogen is ammonia which is toxic to crops
- Under waterlogged condition the concentration of phosphorus, iron, manganese, silicon increase and that of Zn decrease. The increase in ferrous ion concentration is toxic to many crops.

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