STUDY ON CHARACTERISTICS OF HYDRIC SOILS AND ITS CLIMATIC FACTORS

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ABSTRACT:-

Hydric soils provide numerous important services for people, fish and wildlife such as protecting and improving water quality, providing habitats for fish and wildlife, storing flood waters, maintaining surface flow during dry periods and reducing soil erosion. The prolonged presence of water creates conditions that favour the growth of specially adapted plants and promote the development of characteristic (hydric) wetland soils. The hydric soil is a soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile that favour the growth and regeneration of hydrophytic vegetation (USDA - SCS, 1991). A soil is inundated when the water table is at or above the soil surface. A soil is flooded if the water is moving across the soil surface as in a slough or on a floodplain.A soil is ponded if the water is sitting on top of the soil with no movement to an outlet, as is the case with some depressions. A soil is saturated if the water table is within six inches of the soil surface for sandy textured soils or within 12 inches for loamy or clayey textured soils. These water table depths for each textural category will support a capillary rise of water to the soil surface. If the duration of saturation or inundation is long enough (greater than several weeks during the growing season), the oxygen content in the topsoil water will be exhausted. The subsequent anaerobic conditions in the soil result in an accumulation of organic matter and the reduction and movement of iron which produce a soil morphology that is identifiable in the field (hydric soil indicators).

INTRODUCTION:-

Hydric soils are the areas where water covering the soil is present either at (or) near the surface of the soil throughout the year (or) including during the growing season. Water saturation determines the soil development and the types of plant and animal communities living in and on the soil. Water lands occur naturally on every continent. The main wet land (hydric soils) types are swampy, marshy, bog and few.Hydric soils are found in wetlands. They develop in areas that are saturated and anaerobic for periods long enough for redoximorphic features to form, and/or for organic C to accumulate, all within 30 cm of the soil surface. Hydric soil field indicators are soil layers having well-defined colours, specific quantities of redoximorphic features, and organic C contents, that are used to identify hydric soils in the field. The Hydric Soil Technical Standard describes how a hydric soil without field indicators can be identified using measurements to determine if the soil becomes saturated and anaerobic.

Water saturation (hydrology) largely determines the soil, develops the types of plants and animals communities living in and on the soil. Hydric soil may support total aquatic and terrestrial species. The prolonged presence of water creates conditions that favours the growth of specially adapted plants (hydrophytes) and promote the development of characteristic hydric soils. The water in wet lands (hydric soils) is either fresh water, brackish (or) salt water. Wet lands can be tidal or non-tidal. The largest wet lands include the Amazon River basin, the West Siberian plain, the **Pant Anal** in South America and the Sunderbans in the Ganges–Brahmaputra delta. The UN Millennium Ecosystem Assessment determinedthat environmental degradation is more prominent within wet land systems than any other ecosystem on earth. Constructed wet lands can be used to treat municipal and industrial waste water as well as storm water runoff. They may also play a role in water sensitive urban design.

Wet lands (hydric soils) vary widely and cause regional and local differences in soils, topography, climate hydrology, water chemistry, vegetation and other factors including human disturbance. Indeed, wet lands are found from the tundra to the tropics and in every continent except Antarctica. Two general categories of wet lands are recognised : coastal on tidal wet lands and inland (or) non – tidal wet lands. Coastal / tidal wet lands in the United States, as their name suggests are found along the Atlantic , Pacific , Alaskan and Gulf coasts. They are closely linked to our nation's estuaries where sea water mixes with fresh water to form an environment of varying sanities. The salt water and the fluctuating water bodies combine to create another difficult environment for most plants. Consequently, many shallow coastal areas are un-vegetated mud flats (or) sand flats. Some plants, however, have successfully adapted to this environment.

Certain grasses and grass like plants that adapt to the saline conditions form the tidal salts marshes that are formed along the Atlantic, Gulf and Pacific coasts. Mangrove swamps with salt loving shrubs or trees are common in tropical climates such as in Southern Florida and Puerto Rico. Some tidal fresh water wet lands form beyond the upper edges of tidal salt marshes where the influence of salt water ends.

NEED OF STUDY:-

Wet lands (hydric soils) are considered to have unique ecological features which provide numerous products and service to humanity. The major services includecarbon-sequestration, flood control, ground water recharge, nutrient removal and biodiversity maintenance. Wet lands (hydric soils) are important in supporting species diversity because wet lands provide an environment where photosynthesis can occur and where the recycling of nutrients can take place. They play a significant role in the support of food chains. Ramgar on 28th Jan 2020 was declared a wet land (hydric soil). Ten more wet lands (hydric soils) of India get international importance tag in a major recognition towards Government of India's effort towards conservation, restoration and rejuvenation of its wet lands. The aim of the Ramgar list is to develop and maintain an international network of wetlands which are important for the conservation of global biological diversity and for sustaining human life through the maintenance of the ecosystem components , processes and benefit.

The Government of India has recently launched in July the new " NAL SEJAL" which aims to provide piped water connection to every house hold by 2024.The hydric soils evolved over

time with advances in soil science and wetland resource management. Hydric soils are identified in the field by examining morphological characteristics, including organic matter accumulation and redoximorphic features that form in response to prolonged periods of saturation and anaerobic conditions. The Hydric Soil Technical Standard (HSTS) was developed to provide a quantitative procedure for evaluating the hydric status of a soil based upon direct measurements of saturation, anaerobic conditions, and precipitation normality. In practice, the HSTS is used for (a) identifying hydric soils when a field indicator of hydric soils may not be present (e.g., naturally problematic or disturbed soils); (b) evaluating the current functional hydric status of a soil; (c) developing new field indicators of hydric soils; and (d) proposing changes to existing field indicators of hydric soils. The HSTS procedures have progressed over several decades with new approaches to soil analysis, including novel methods to document anaerobic conditions. The following review describes the development of the hydric soils concept and provides guidance for measuring each HSTS component. Practical approaches for collection and submission of HSTS data to the National Technical Committee for Hydric Soils, the group responsible for approving approaches to hydric soil identification in the United States, are also discussed. Expanding the understanding and application of the HSTS promotes technical accuracy, transparency, and efficient decision making in support of hydric soil and wetland resource management.

CONCLUSION:-

Wet lands (hydric soils) in India account for 4.7% of the total geographical area of the country. These wet lands provide numerous ecosystem goods and services, but are under stress. Reasons for wetlands loss in India are urbanisation, land use/land cover changes and pollution. There is no proper regulatory frame work for conservation of wet lands in India. Future research should focus on institutional factors influencing their conditions. Hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics.

In 2007, the UNESCO estimated that global climate change is expected to become an important driver of loss and change in wet land ecosystem. These findings are important for India which has been experiencing the flood drought flood cycle for the last two decades. In the past six months, Ministry of Environment Forest and Climate Change has prepared a four prolonged strategy for the restoration of wet lands which includes preparing a base live data , wet land health cards, enlisting wet land mitras and preparing targeted and management plans. The ministry would be working closely with the state wet land authorities to ensure wise use of these sites.

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