ANALYTICAL STUDY OF DIELECTRIC PROPERTIES OF SOIL AT KORBA CITY OF KORBA DISTRICT OF CHHATTISGARH

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ABSTRACT

Prime objective is to this research, Soil is a complex mixture of minerals, water, air, organic materials, and innumerable organisms that have decomposed from once-living objects. Soil features such as physical properties, chemical properties, and geographic properties are extremely significant in agricultural output. A microwave test bench is commonly used to do dielectric constant measurements. The soil characteristic has an impact on grain production. There are several variables to consider, but the moisture content is the most crucial. The qualities of soil are studied in the laboratory, which is highly useful in agriculture.

Keywords: *Microwave, Remote Sensing, Soil Quality, fertility, dielectric, dielectric constant, nutrients, texture.*

Introduction

When exposed to an external electric field, dielectric characteristics of materials are defined as a molecular property that is basic in all materials capable of impending electron migration resulting in polarization inside the material[1], [2].

Remote sensing is the sensing of an object or phenomena from a remote distance, signal, sensor, sensing or the component of remote sensing[3], [4]. Microwave remote sensing has emerged as a new area of study for natural resources over the last two decades. It emphasises the interaction between electromagnetic waves and the research materials[5], [6]. Soil has different properties as physical, chemical and Geographical. In physical properties, soil texture (sand, silt and clay), bulk density, WHC, particle density, porosity, volume expansion, melting point, transition moisture, water content, dielectric constant exists etc.[7], [8]. Now in chemical properties pH, EC, OC, Heavy metals viz Fe, Pb, Mn, Zn, Cr, Micro nutrients metals viz Fe, Mn, Zn, Cu and macro nutrients N, P, K, Le, Mg further Geographical properties is denoted by LALA, i.e., Latitude, Altitude, Longitude, average rain fall. Recently new term is introduced in concerned research is hydraulic pressure[9].

The pH of a soil indicates whether it is acidic or alkaline. For plant growth, eighteen components known as nutrients are required[10]–[12]. Based on the amount necessary, they are categorised as macro- and micronutrients. Plants extract the nutrients they require from the earth as they grow. There is a lot riding on soil's ability to serve as a link between rock, air, water, and life as a natural body (the biosphere). The experimentally obtained values of the complex dielectric constant's real and imaginary components have been presented for sand, silt, and clay samples with varying moisture contents[9], [13], [14]. It is required to artificially replace these nutrients in order to maintain the soil productivity. In present research paper in physical properties following parameters have been studied as well as measured as textural class, bulk density, particle density, water holding capacity, porosity, welting point, transition moisture, hydrant conductivity and colour etc.

Materials & Methods

Soil Sampling:

Soil specimen are gathered from different locations of Korba city of Korba district at Chhattisgarh, a depth spanning from 0 to 20 cm following a crisscross sequence. Five holes were drilled for each sample. After properly integrating all of the preceding soil specimens,