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Mapping of Soil Macronutrient Status and Analysis of Quality of Irrigation Water of Adhiyamaan College of Agriculture and Research Farm

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Abstract: ***Macronutrients such as N,P,K Play a vital role in increase crop yield by and enhance soil fertility. It is well known that a balanced nutrient supply ensures high crop yields and stable cropping system. Water Quality can be defined as the chemical, physical and biological characteristics of water, usually in respect to its suitability for a designated use. Water can be used for recreation, drinking, fisheries, agriculture or industry. Each of these designated uses has different defined chemical, physical and biological standards necessary to support that use. For example, there are stringent standards for water to be used for drinking or swimming compared to that used in agriculture or industry. Water quality analysis is required mainly for monitoring purpose. Some importance of such assessment includes: To check whether the water quality is incompliance with the standards, and hence, suitable or not for the designated use, To monitor the efficiency of a system, workingfor water quality maintenance, To check whether upgradation / change of anexisting system is required and to decide what changes should take place and To monitor whether water quality is incompliance with rules and regulations.***
Keywords: Nutrients, water and soil analysis and irrigation.

I. INTRODUCTION

Macronutrients are the nutrients we need in larger quantities that provide us with energy: in other words, fat, protein and carbohydrate. Micronutrients are mostly vitamins and minerals, and are equally important but consumed in very small amounts. We generally get our micronutrients along with macronutrients.

Micronutrient plays a vital role in maintaining soil health and also productivity of crops. These are needed in very small amounts. The soil must supply micronutrients for desired growth of plants and synthesis of human food. However, exploitive nature of modern agriculture involving use of organic manures and less recycling of crop residues are important factors contributing towards accelerated exhaustion of micronutrients from the soil. The deficiencies of micronutrients have become major constraints to productivity, stability and sustainability of soils. Soils with finer particles and with higher organic matter can generally provide a greater reserve of these elements whereas, coarse textured soils such as, sand have fewer reserves and tend to get depleted rather quickly.

Accurate measurements of soil macronutrients (*i.e.*, nitrogen, phosphorus, and potassium) are needed for efficient agricultural production, including site-specific crop management (SSCM), where fertilizer nutrient application rates are adjusted spatially based on local requirements. Rapid, non-destructive quantification of soil properties, including nutrient levels, has been possible with optical diffuse reflectance sensing. Another approach, electrochemical sensing based on ion-selective electrodes or ion-selective field effect transistors, has been recognized as useful in real-time analysis because of its simplicity, portability, rapid response, and ability to directly measure the analyte with a wide range of sensitivity. The pH and electrical conductivity (EC) valater quality issues have often been neglected because there are quite a number of good quality water supplies (Mallika *et al*., 2017).

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II. MATERIALS AND METHODS

A field experiment was conducted in ACAR farm in different blocks located at Athimugam village near Shoolagiri taluk, Krishnagiri District, Tamil Nadu state during April - July 2023, to determine assessment of soil macro nutrients on heterogenous soils of ACAR farm. Also 5 different water samples were collected at ACAR farm for analysing the quality of irrigation water. The collected water samples are analyzed by standard procedures to determine the irrigation water quality.

III. RESULT

Essential elements for plant growth are commonly classified as macronutrients or micronutrients based on the amount of the element required for normal growth of plants. Macronutrients are required in large amounts and normally constitute 1000 mg kg^{-1} (0.1%) or more of the dry weight of the plant. A combination of macronutrients and micronutrients give the soil optimum health. The essential macronutrients needed by the soil are: Nitrogen Phosphorous and Potassium. They are most frequently required in a crop fertilization program. The present studies elaborately discuss the soil macronutrients of the ACAR farm.

A. Descriptive Statistics Of Soil Properties

Descriptive statistical parameters of all the soil macronutrients are presented in Table. For each soil sample, Soil properties including available N, P, and K are measured. The descriptive parameter, viz mean, minimum, maximum value and standard deviation were estimated to verify the central trend and spread of the soil parametric datasets.

Table 1: Descriptive statistical parameters of all the soil macronutrients

	Minimum	Maximum	Mean	Std.Deviation
Available N(kg/ha)	181	532	365	105
Available P(kg/ha)	2	24	9	5
Available K(kg/ha)	94	325	56	194

B. Descriptive Statistics Of Irrigation Water Quality

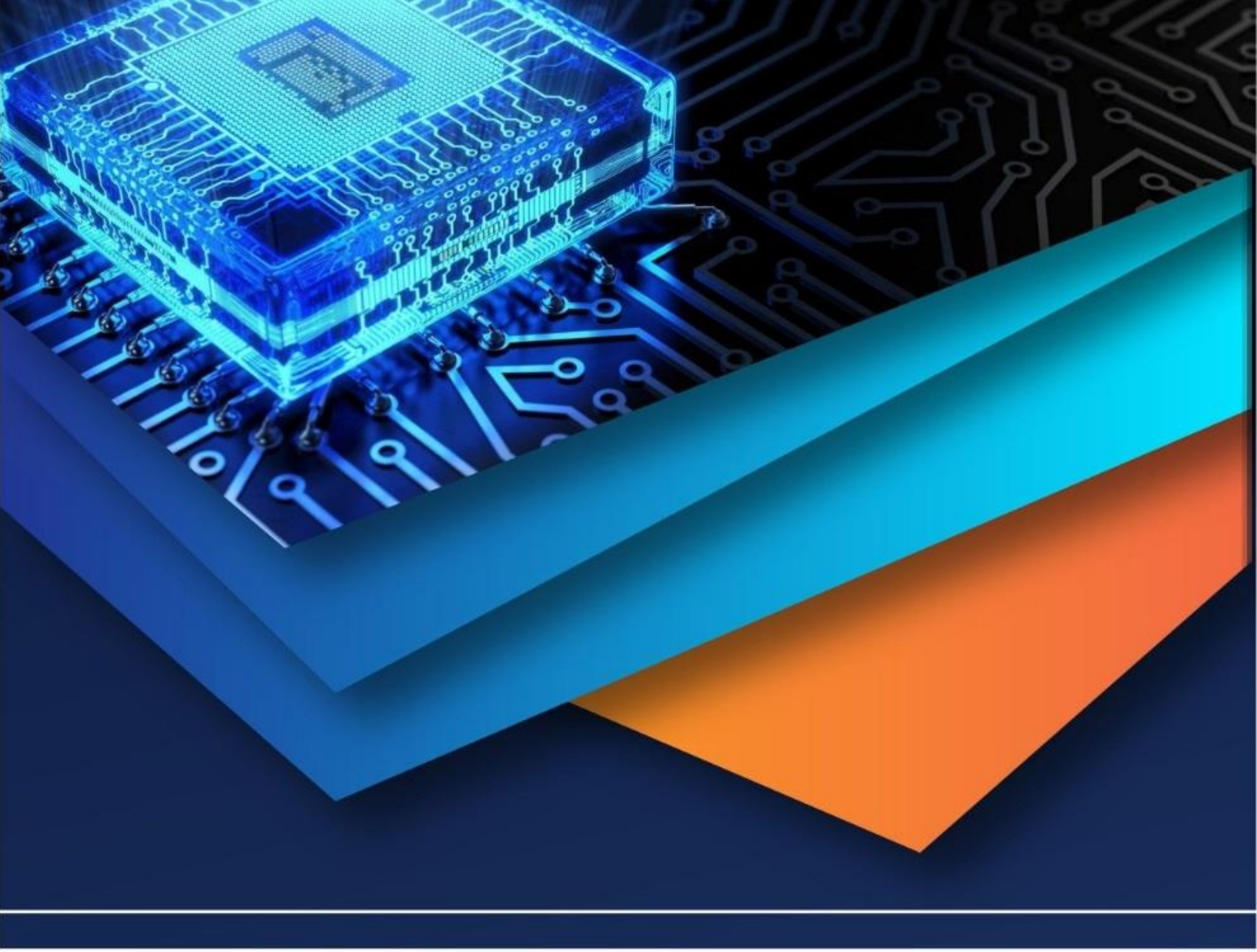
Descriptive statistical parameters of all the Irrigation water quality are presented in Table. For each water quality, The properties including pH, EC and other ionic compounds *viz*,Ca^{2+}, Mg^{2+}, Na^{+}, CO_3^{2-}, HCO_3^{-}, & Cl^{-}. are measured.

Table 2: Descriptive statistical parameters of all the Irrigation water quality

Parameters	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
pH	6.50	7.5	7.7	7.05	6.95
EC	0.50	0.42	0.56	0.51	0.52
Ca^{2+}	9.6	7.2	8	7.0	6.4
$Ca^{2+}Mg^{2+}$					
Na^{+}	1.9	1.7	1.7	1.8	1.8
CO_3^{2}	Absence	2.01	3.1	Absence	0.79
HCO_3^{-}	6.9	1.3	1.3	6.7	4.3
Cl^{-}	7.9	3.9	3.4	3.3	1.9

REFERENCES

[1] Himesh,S., Rao, C.V.C., Mahajan, A.U., (2000) Application of steady state stream water quality model. J.IAEM.27.33-37.
[2] Mallika S, Umamaheshwari R, Krishnamoorthy S. Physico-chemical parameters and bacteriological study of vaigai river water Madurai District, Tamilnadu, India. International Journal of Fisheries and Aquatic studies.2017; 5(1): 42-45.



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