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Comparative Study of Soil Samples and its Physico Chemical Parameter from Wadwani Tehsil

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Abstract: India is one of the populated countries and Indian economy is highly depending on agriculture field. Indian farming is the main source of income for most of the population. So farmers are always curious about yield prediction. To increase yield production many factors are responsible like soil, weather, rain, fertilizers and pesticides. In the present study we are investigate the soil samples for its physico-chemical analysis in Wadwani Tehsil. The main purpose of present study is analyse the fertility level of the soil with the help of pH, EC, Organic Carbon, Nitrogen, Potassium, Phosphorous, Sulpher, Zinc etc. and recommend essential nutrients necessary in Wadwani Tehsil Marathwada region Maharashtra. Six representative samples were obtained and analysed for its pH, EC, Phosphorus, Potassium, and other important nutrient useful for agricultural.
Keywords: Soil Properties, Nutrient Parameter, pH, EC, P, K, S, Zn, Mn, Beed.

I. INTRODUCTION

Soil is a formed from mixture of various ingredients including minerals, dead and living organisms (organic materials), air, and water[1]. All ingredients are mix or react with each other one another, making soil one of our planet's most dynamic and important natural resources. Soil is the biologically active material, porous medium that has developed in the uppermost layer of Earth's crust. Soil is one of the principal substrata of life on Earth.

As world population is increased constantly simultaneously food production demands rise, keeping our soil healthy and productive is of paramount importance. India is agricultural country so soil productivity is essential to agricultural growth, food security and support of the livelihoods of the poor[2]. Agriculture is the one of the important pillar for economic growth in India and also most of the developing countries. The basis of sustainable agriculture is to maintain a constant, highest possible level of soil fertility, which is one of the main conditions for long-term increasing of agricultural productivity[3]. Thus its essential to farmers can check proper ingredients in his soil, an important factor in the proper balancing of soil organic matter for production[4-7]. Soil fertility is the capacity of soils to supply essential nutrients to plants. Essential means that without them plants, microbes or animals would not be able to complete their life cycles. The physical and chemical properties of the soil are essential nutrients are major factor for the crops production for maintaining the earth atmosphere. In soil various nutrients are present including nitrogen, phosphorous, potassium, zinc, iron, manganese, copper etc. Among all this parameters nitrogen, phosphorous and potassium plays vital role for crop production[8]. Previously, we reported physico-chemical analysis of some important parameters in Wadwani Tehsil[9]. Recently it's essential to check all the parameters in soil because when it increased the nutrients amounts which will affect the human life and this will be various dangerous for next generation[10-11]. Herein, we described and analyse the fertility level of the soil with the help of pH, EC, Organic Carbon, Nitrogen, Potassium, Phosphorous, Sulpher, Zinc etc.[12] in Bahegavhan Wadwani tehsil, Beed district (MS) India.

II. SOIL TYPES

Basically soil can be classified depend on their texture, colour, moisture etc. In our previous paper we are mentioned detail about soil types, some of are

Alluvial soil,	Red soil
Black soil / Regular soil,	Laterite soil
Desert / arid soil	Mountain soil
Forest soil	Peaty / marshy soil

In Marathwada region mostly observed Black soil / Regular soil. This soil is high water retaining capacity which is swells and will become sticky when wet and shrink when dried.

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III. MATERIALS AND METHODS

A. Study Area

The soil samples were collected from the area Bahegavhan Wadwani tehsil of Beed district (MS) India. The Wadwani tehsil is located on the east part of Beed district in Maharashtra state of India (Fig. 1). It has god history about cloth mfg. industry. It lies between 18^{o} 59' north latitude to 76^{o} 02' east. The temperature here average 26.5 ^{o}C. When compared with winter, the summers have much more rainfall.

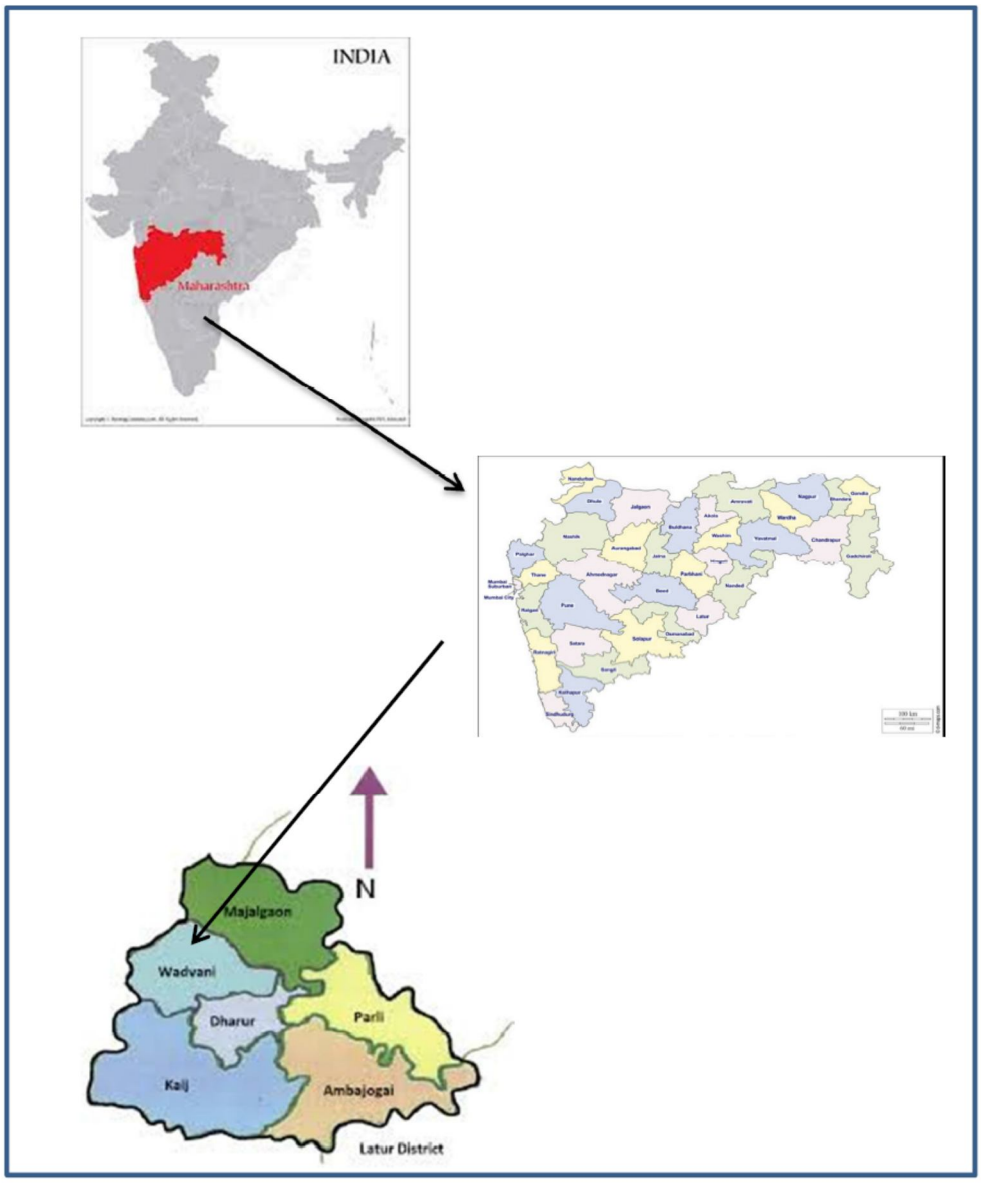


Figure-1: Schematic diagram of study area. (The figure was adopted from Google.)

IV. SOIL SAMPLING

Soil samples were collected randomly in Bahegavhan, Wadwani tehsil from six different farmer agricultural soils, respectively. The different parameters of soil samples are collected from Dindayal Shodh Sansthan, Krushi Vidnyan Kendra, Ambejogai. The physicochemical parameters were analysed by different standard methods, the physicochemical factors like pH, electric conductivity, and organic carbon etc. nutrients availability in the soils. The soil pH, EC and organic carbon were estimated by the standard procedures as described by Jackson (1973)[13]. The micronutrients in these soil samples were extracted with DTPA solution (Lindsey and Norvell, 1978)[14]. The soil nutrient index was calculated according to the procedure given by Parker (1951)[15].

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V. RESULTS AND DISCUSSION

Table 1: Soil sample were collected from following Farmers fields

Sr. No.	Sample Name	Name of Farmer Name	Village
1	BW-1	Siddheshwar Rajendra Jadhav	Bahegavhan -Wadwani
2	BW-2	Gudduprasad Narayan Jadhav	Bahegavhan -Wadwani
3	BW-3	Ramprasad Rohidas Jadhav	Bahegavhan -Wadwani
4	BW-4	Bhagirath Prakash Maske	Bahegavhan -Wadwani
5	BW-5	Vachistha Dhondiba Warwade	Bahegavhan -Wadwani
6	BW-6	Dattu Shamrao Munde	Bahegavhan -Wadwani

The collected six farmer soil samples (Table 1) were analysed for major Physical and Chemical soil quality parameter like pH, Electrical Conductivity (EC), and Organic Carbon (OC), Nitrogen (N), Potassium (K) and Phosphorus (P), Sulphur (S), Zinc (Zn), Boron (B), Iron (Fe), Manganese (Mn), Copper (Cu) analysis by standard method (DIRD Pune 2009).

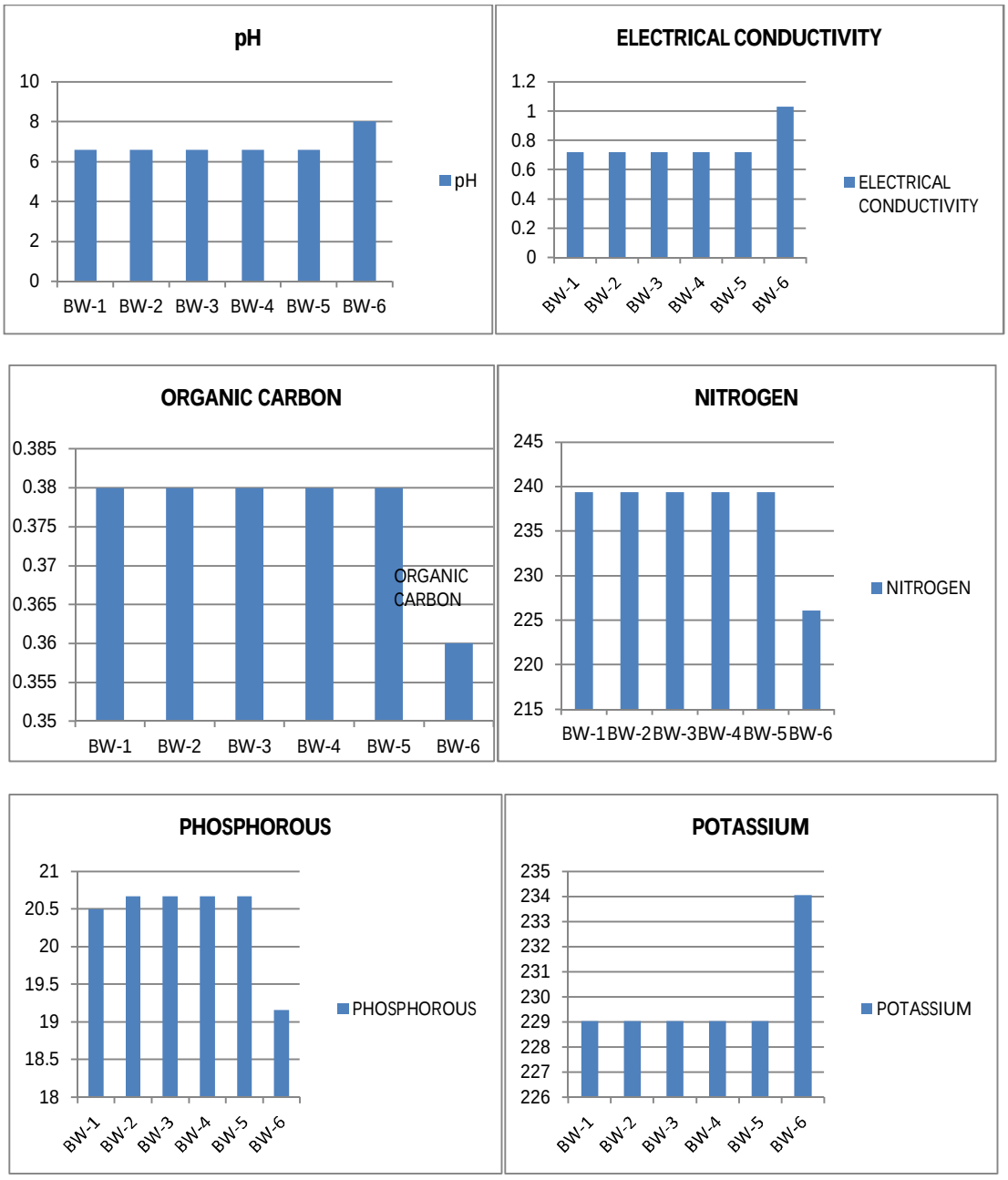
Table 2: Physiochemical Parameter of soil samples

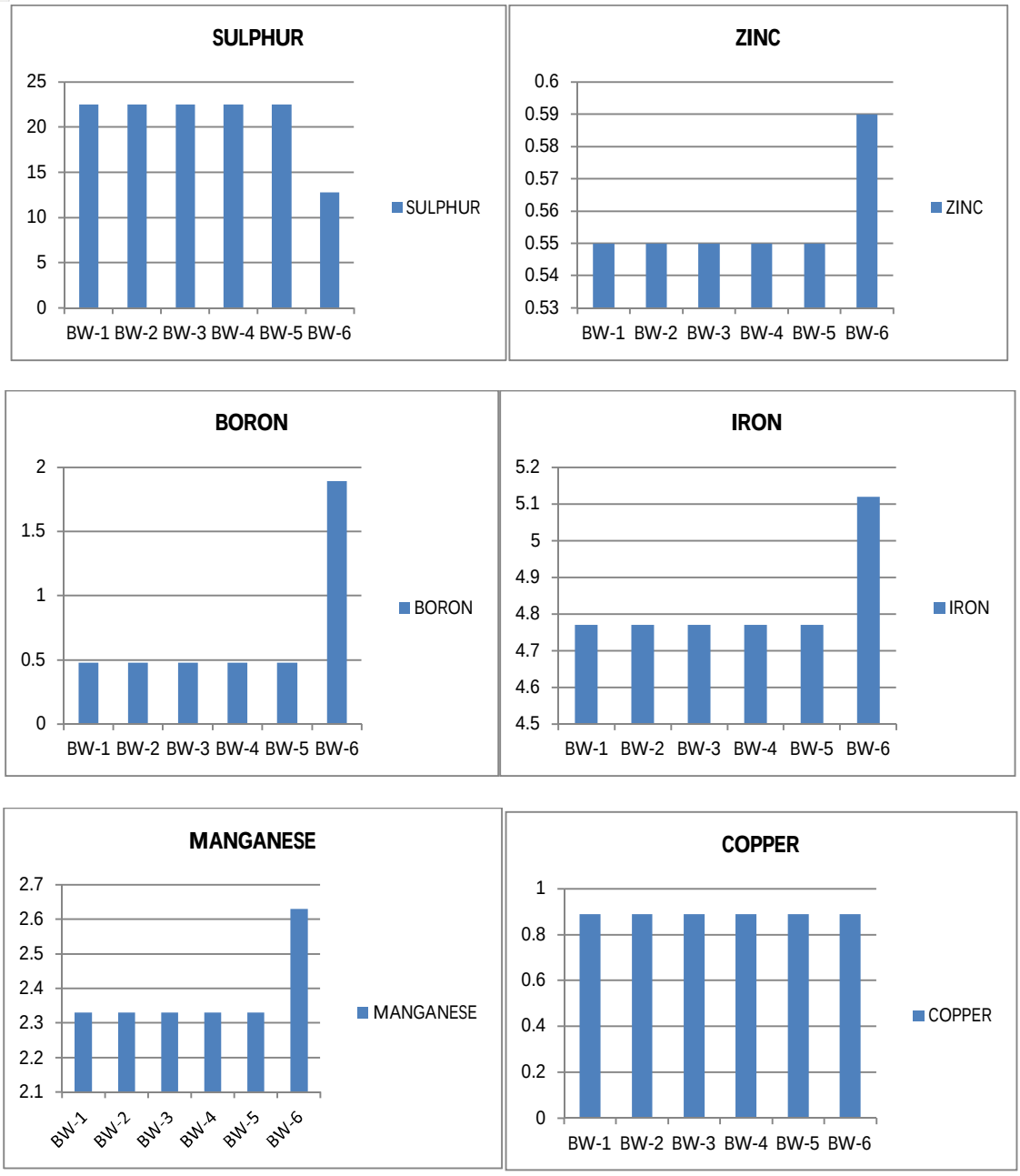
Parameter	Sample Name					
	BW-1	BW-2	BW-3	BW-4	BW-5	BW-6
pH	6.59	6.59	6.59	6.59	6.59	8.02
Electric Conductivity (ds/m)	0.72	0.72	0.72	0.72	0.72	1.03
Organic Carbon %	0.38	0.38	0.38	0.38	0.38	0.36
Nitrogen (N) kg/ha	239.36	239.36	239.36	239.36	239.36	226.06
Phosphorous (P) kg/ha	20.50	22.67	20.67	20.67	20.67	19.16
Potassium (K) kg/ha	229.04	229.04	229.04	229.04	229.04	234.06
Sulphur (S) ppm	22.50	22.50	22.50	22.50	22.50	12.78
Zinc (Zn) ppm	0.55	0.55	0.55	0.55	0.55	0.59
Boron (B) ppm	0.48	0.48	0.48	0.48	0.48	1.89
Iron (Fe) ppm	4.77	4.77	4.77	4.77	4.77	5.12
Manganese (Mn) ppm	2.33	2.33	2.33	2.33	2.33	2.63
Copper(Cu) ppm	0.89	0.89	0.89	0.89	0.89	0.89

We had collected six farmers' soil samples from Bahegavhan-Wadwani tehsil areas Beed district. We found that values of pH (Table 2) in this area range from 6.59 to 8.02 indicating an BW-1 to BW-5 are slightly acidic and BW-6 is alkaline in nature of soil. Electrical conductivity is one of the key properties of the soil; it is used to check the quality of the soil. Electrical conductivity is measure of number of ions present in soil. The collected samples EC values range observed from 0.72 to 1.03 (ds/m) (normal EC ranges from 0.0 to 2.0 ds/m) and such soil indicated that, BW-1 to BW-5 are average but sample no. BW-6 is injurious soil fertility for the agriculture. The high ES values could be due to low rainfall in this Wadwani taluka which does not washes cations from the soils and due to this EC values become high. Phosphorus is also important nutrients which present in every living cell. So Phosphorous is important micronutrient essential for plant growth. Soil organic carbon is important nutrient for plant growth, biological and physical health of soil, and is buffer against harmful substances observed carbon is 0.36 to 0.38%. The observed values indicate that, carbon percentage was lower. The nitrogen content in soil sample no. BW-1 to BW-6 is lower observed range from 246 to 303 kg/ha. The deficiencies of Phosphorous symptoms are purple stems and leaves, yields of fruit and are poor. The observed values of phosphorous range between 19.16 kg/ha to 22.67 kg/ha. Potassium is used in many plant metabolism reactions, ranging from lignin and cellulose used for the formation of cellular structural components, values range between 229 to 234 kg/ha.

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Sulphur is used in Formation of chlorophyll that permits photosynthesis through which plants produce starch, sugars, oils, fats, vitamins and other compounds. The observed in values is 12-22 ppm. Zinc is used in agriculture to stand crop yields to meet the demand for food in a growing population. The zinc values observed in range 0.55-0.59 ppm it indicates that, zinc nutrients in BW-1 to BW-6 was deficiency in soil. Boron is element for plant development, growth, crop yielding in plants, observed value from 0.48-1.89 ppm. Iron chelates are used to boost chlorophyll production in leaves. The collected sample, iron values observed from 4.77-5.12 ppm. Manganese (Mn) is an important micronutrient for plant growth and development and sustains metabolic roles within different plant cell compartments, observed in 2.33-2.63 ppm. The value becomes good, than recommended value which indicates good Manganese. Copper is used in regulates the photosynthetic electron transportation, observed 0.89 ppm it indicates that, BW-1 to BW-6 are good for crop production. The comparative studies of all parameters are shown in below.





VI. NUTRIENTS RECOMMENDATION

On the basis of above data the recommended nutrients are required for the fertility of soil. For an ideal nutrient level, the moderate high level of nutrients is selected according to the existing nutrients (Table 3).

Table 3: The standard nutrients required

Sr. No.	Sample Name	Normal Level	Sr. No.	Sample Name	Normal Level
1	pH	7, Neutral	7	Sulphur (S)	> 10 ppm
2	E. C.	0-2 dS/m	8	Zinc (Zn)	> 0.6 ppm
3	Organic Carbon	0.51-0.75 %	9	Boron (B)	> 0.5 ppm
4	Nitrogen (N)	280-560 kg/ha	10	Iron (Fe)	> 4.5 ppm
5	Phosphorous (P)	10-25 kg/ha	11	Manganese (Mn)	> 2.0 ppm
6	Potassium (K)	145-337 kg/ha	12	Copper(Cu)	> 0.2 ppm

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VII. CONCLUSION

The physicochemical parameters are important to agricultural for plant growth increase crop productivity, sustainability, crop nutrient and water use efficiencies. From the results of the work, it can be concluded that the pH of soil samples BW-1 to BW-5 were slightly acidic and BW-6 is basic, conductivity of BW-1 to BW-5 is average and BW-6 is injures , organic carbon and N: P: K values of all soil samples were found to be good for crop productivity. The other nutrients like S, Fe, Mn and Cu are sufficient for soil fertility. The Zn and Mn are lower fertility status in relation to availability of micronutrients. In contrast to deficiency of Zn and B in soil may cause decline in crop yields and total productivity in future.

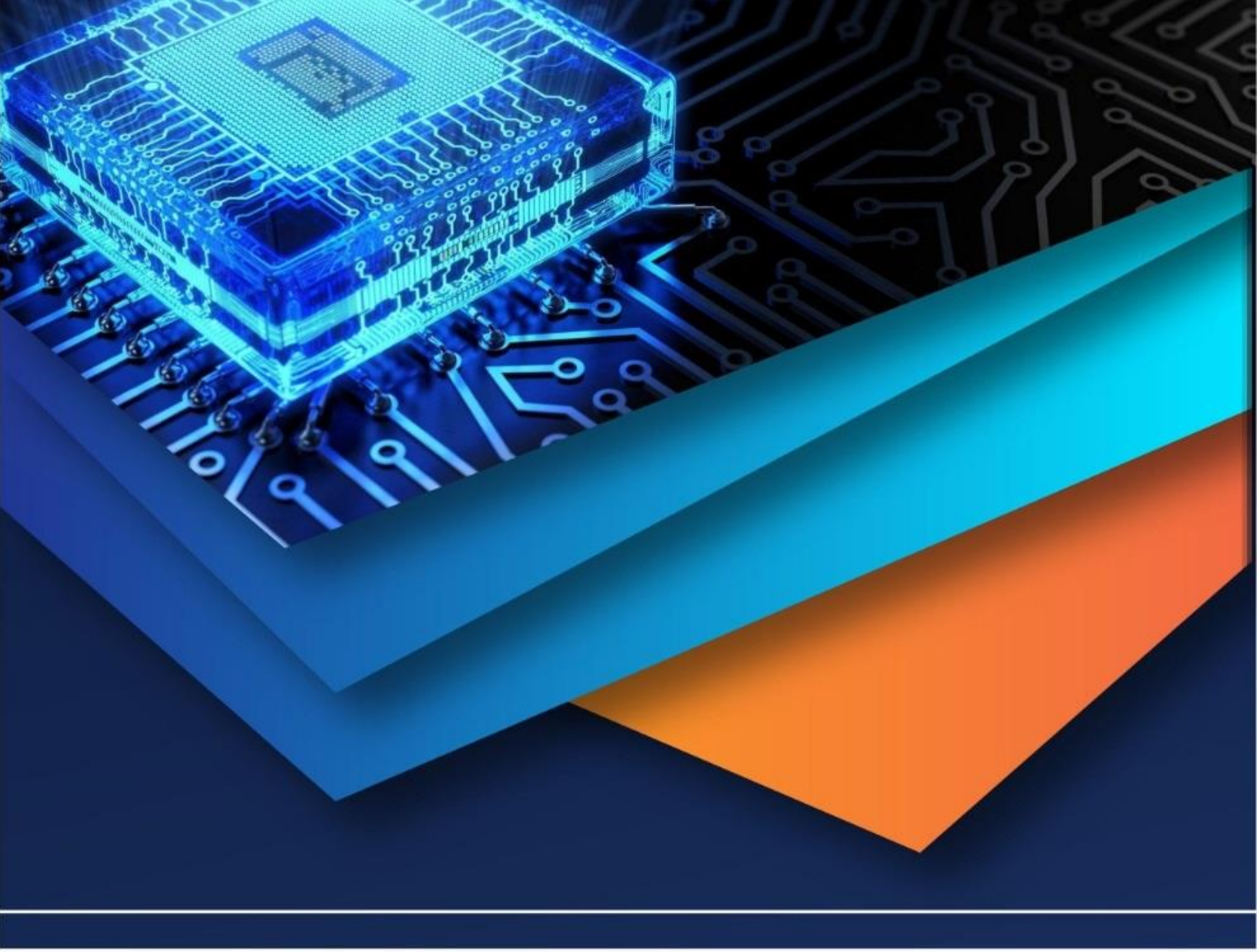
VIII. ACKNOWLEDGMENT

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REFERENCES

[1] Shuo Li, Wenjum, Songehao J. C., Peng Jie., Zhou Y., Zhou S. 7; 2015, 7029-7043.
[2] Miller R. W, Donahune R. L., New Jersey-07362, 1995, 67-68.
[3] Gruhn P., Goletti F., Yudelman M. Food, Agriculture, and the Environment Discussion Paper 32, 2000.
[4] Bhattacharyya T., Pal D. K., Mandal C., Velayutham M., current Science, Vol 79-5, 2000, 655-660.
[5] Chaudhari P.R., D. V. Ahire, Journal of chemical,Biological and physical sciences, vol 3, No. 2, 2003,1382-1388,.
[6] Patil J. D., Shingate A. K., J. Indian Soc. Soil sci, 1982,7(3).
[7] Solanki H.A., Chavda N. H., Life Science Leaflets, Vol8, 2012, 62-68.
[8] Bellinaso H., Dematte A. M. J., Romeiro S. A. Scielo, Revista Brasileira de Ciencia do Solo, 2010, 34 (3).
[9] P. V. Shitre., G. V. Shitre, The International journal of analytical and experimental modal analysis, ISSN NO:0886-9367, Volume XIII, Issue X, October/2021, 1626- 1631.
[10] Blumenthal, U.J., Peasey, A. G., World Health Organisation, 2002.
[11] Chavan N. S., Jawale C. S., Int. Res. J. Environment Sci., 2(7), 2013, 69-75.
[12] Gore R. D., Nimbhore S. S., Gawali B. W., International Journal of Engineering Research and General Science, 2015. 3 (6) 866- 872.
[13] Jackson, M. L., Prentice Hall of India Private Ltd. New Delhi, 1973.
[14] Lindsey, W.L. and Norvell, W.A. Soil Science Society of America Journal, 42, 1978, 421-423.
[15] Parkar, F.W. Agronomy Journal, 43, 1951, 151-152.

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