ANALYSIS OF SOIL FOR PRODUCTIVITY AND SUSTAINABILITY

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ABSTRACT

Soil analysis in Durg, Chhattisgarh is an essential service for farmers, researchers, and anyone interested in understanding the quality and composition of the soil in this region. The soil testing services available in Durg can help determine the soil's pH, nutrient content, organic matter, and other important factors that affect plant growth and crop yield.

To provide a detailed analysis of soil parameters in Durg, Chhattisgarh, we would need to conduct soil sampling and testing in the region. However, based on available data, we can provide some general information about the soil in the area. The soil in Durg can be broadly classified into two categories: alluvial soil and black soil. Alluvial soil is formed by the deposition of silt and clay by rivers and is found in areas adjacent to the rivers in the region. Black soil, on the other hand, is formed from volcanic rocks and is found in the upland areas of the region. Some of the important soil parameters that can be analyzed in Durg include pH, organic matter content, nutrient content, texture, and structure.

Keywords: - Soil quality, pH, soil health, soil sampling, soil analysis, soil properties

INTRODUCTION

Soil is a living body. It is a medium of plant growth and supports different type of living organisms of the world. It is a natural body consisting of layers (soil horizon) of primarily mineral constituents of variable thickness. Soil has certain distinctive physical, chemical and biological qualities which permit it to support plants growth. Soil parameters indicate the state of soil ecosystem characteristics which especially reflect production, buffering, filter and other soil functions. It is the farmland analysis for multiple parameters like toxicity, level, serenity, earth dwelling etc. Soil pH is one of the most important parameters on your soil test report. These parameters can be obtained from laboratory tests such as triaxial, oedometer and direct shear, strength and from empirical correlations of field tests such as SPT, CPTu and DMT. Soil is a dynamic natural body which develops as a result of pedogenic natural processes during and after

weathering of rocks. It consists of mineral and organic constituents, processing definite chemical, physical, mineralogical and biological properties, having variable depth over the surface of the earth and providing a medium for plant growth (Biswas and Mukherjee, 1994). Soil is a heterogeneous diverse and dynamic system and its properties change in time and space continuously (Rogerio et al. 2006).

LITERATURE REVIEW

Yogendra Kumar, Shobhit Panday and Arun A. David: - Agricultural sustainability depends a large extent upon maintenance or enhancement of soil health/quality. There are two ways in which the concept of soil health has been considered which can be termed either 'reductionist' or integrated. The farmer is based on estimation of soil condition using a set of independent indicators of specific soil properties-physical, chemical, and biological.

The quality of soil is rater dynamic and can affect the sustainability and productivity of land use. It is the end product of soil degradative or conserving processed and is controlled by chemical, physical and biological components of a soil and their interactions (papendic and Parr 1992).

Indicators however will vary according to the location and a level of sophistication at which measurements are likely to be made (relay 2001).

Vibha Tigga, Anjna Xalxo, Vinay Bachkaiya, Rajesh Chouksey and Vinod Nayak: - The best method for determining the soil's level of fertility is soil fertility evaluation, which aids in the achievement of sustainable agriculture's objectives. The efficiency of grain production has been slowed down, and this has resulted in lower farm income, due to an inadequate and unbalanced supply of nutrients. We must be aware of the geographical variations in soil fertility for this to occur. To ascertain this a study was conducted to assess the fertility status of soils of KVK farm Ambikapur and research farm, College of Agriculture, Ambikapur under Surguja district of Chhattisgarh. The soil physio-chemical characteristics (pH, EC, OC), available macronutrient (N, P, K,) and secondary nutrient S were analyzed in soil. Based on the results, soil fertility status for the various nutrients were created. Total 101 soil samples were analyzed out of which 50 soil samples of KVK farm and 51 samples were from research farm, college of Agriculture, Ambikapur. We can create specific fertilizer recommendations with the use of a soil testing tool. In order to identify the need for different fertilizers throughout the course of a season or year and develop estimates for increased demand based on cropping pattern and

intensity, where a soil's fertility status is known in terms of soil test values, the soil test values can be classified into low, medium, and high fertility types, as stated by Welch et al., (1987) [15] and Rashid and Memon (1996) [16]. The soils of KVK Farm and research farm, College of Agriculture, Ambikapur, District Surguja Chhattisgarh, were discovered to have predominantly acidic soils (pH 5.9), and their electric conductivity with safe limit (<1 ds m^{-1}) most of the crop, falling under "normal" category.

Kavita Chandravanshi, Narendra Swaroop, and Tarence Thomas: - The main objective of this study was to collect information regarding soil chemical status, for 9 sampling points were selected. Soil samples were collected at a depth of 0-15cm and 15-30 cm and soil sample analysed for soil pH, Electrical conductivity, organic carbon and Nitrogen, Phosphorus and potassium. The value of pH, Electrical conductivity, organic carbon is found in ranges from 7.00 - 8.30, 0.21- 0.65 dsm-1 , 0.16-0.70 % respectively. and Nitrogen, Phosphorus, potassium is found in ranges from 150.50-313.60 (kg ha-1), 10.03-22.11(Kg ha-1) and 240-507.69 (kg ha-1) respectively. The pH is neutral to slightly alkaline, Electrical conductivity is normal. The status of organic carbon percent and nitrogen is low to medium, the status of phosphorus and potassium is medium to high. Soil is the basic resource for agriculture and its proper management is essential to sustain agricultural production and soil productivity. Soil testing is one of the best available tools, to ascertain the physical characteristics & nutrient status of a field so as to assess the fertilizer requirement for a crop or a cropping system or for knowing the reclamation requirements for a crop or a cropping system or for knowing the reclamation requirement if the soil is saline or sodic in nature fertilizer application based on soil test is the best available approach for harvesting the economically viable potential yields of crops by increasing input use efficiency and maintaining soil health (Singh and Brar, 2005).

Nitrogen is important for growth because it is a major part of all amino acids, which are the building blocks of all proteins, including the enzymes, which control virtually all biological processes. A good supply of nitrogen stimulates root growth and development, as well as the uptake of another nutrient. A vast region of Chhattisgarh is covered by red and yellow soil. There are a number of types of soil found in Chhattisgarh area but there are four major types namely Kanhar, Matasi, Doesa and Bhata, which cover major portion of the total land area. The red color of soil is generally related to anhydrate ferric oxide, and partially hydrated ions oxides. The

investigation to evaluate the fertility status of black soil in different village of Kabeerdham district of Chhattisgarh State. Two types of soil are present namely Alfisols and Vertisols comes under black soil. These two types soil have been taken for systematic survey under study. It can be concluded that the soil of kawardha block in kabeerdham district of Chhattisgarh showed status, the value of pH is found varied from 7.00-8.30.

Sunny Abhishek Tigga, Tarence Thomas, Arun A. David, Narendra Swaroop and P. Smriti Rao: - Soils are most valuable natural resources on which the agriculture production is based. The production of food, fodder, and fuel to fulfill the ever-growing needs of human being and animal are depends on Agriculture and allied per suits, based on exploration of the soil resources. An investigation was carried out to study the soil properties of Sarguja District. The main objective of this study is to collect information on soil pH, electrical conductivity, organic carbon, trance element N, P, K, Zn, and S. With the help of this study, we found the value of pH is found varied from 6.9 to 6.08. It is slightly acidic in nature. Soil as important part of the ecosystems which must be protected in the environment context and it is necessary to be studied the possible overall impact of measures for protection. The soil resource occupies a fundamental part of the ecosystem when a soil is degraded the others components of the ecosystems are degraded too (Robles et al., 2014). The present study was conducted in three stages i.e., soil survey and mapping, collection of samples and their analysis for different soil parameters.

Balaram Sahu and Jayati Mitra: - Soil is a natural body consisting of layers (soil horizons) that are primarily composed of minerals, mixed with at least some organic matter, which differ from their parent materials in their texture, structure, consistency, color, chemical, biological and other characteristics. It is the unconsolidated or loose covering of fine rock particles that covers the surface of the earth. Soil is composed of particles of broken rock (parent materials) which have been altered by physical, chemical and biological processes that include weathering with associated erosion. Soil is created from the alteration of parent material by the interactions between the lithosphere, hydrosphere, atmosphere, and biosphere. It can also be considered a mixture of mineral and organic materials in the form of solids, gases and liquids. Soil is commonly referred to as "earth" or "dirt"; technically, the term "dirt" should be restricted to displaced soil. The summary of present investigation was present given below:

There are four types of Soil in - which are Kanhar, Bhata, Matasi & Dorsa. Soil contains various element like N, P, K, Al3+, Mg2+ etc. With the help of this study, we find out that the pH value & conductivity of the soil. Moreover, we also get to know about the nature of the soil (acidic or basic) and the type of ions found in it. The measurement of pH value is important because it is helpful in growing crops as they show proper and maximum growth at optimum ph.

Wagh P. B., Deshpande A. D., Ingle S. R.: - Soil is the system which supplies plant with available nutrients through the root. Physical and Chemical analysis of the soil are carried out to indicate the efficiency of soil for supplying plants with nutrients in available forms as well as identification of the factors affecting this efficiency in the soil. Soil is the mixture of minerals, organic matter, gases and countless organisms that together support plant life. Soil is considered to be the "skin of the earth" with interfaces between the lithosphere, hydrosphere, atmosphere of Earth, and biosphere. Soil is the end product of the influence of the climate, relief (elevation, orientation, and slope of terrain), organisms, and parent materials (original minerals) interacting over time.6 Soil continually undergoes development by way of numerous physical, chemical and biological processes, which include weathering with associated erosion. Soil consists of a solid phase (minerals and organic matter) as well as a porous phase that holds gases and water. Accordingly, soils are often treated as a three-state system Soil is the end product of the influence of the climate, relief (elevation, orientation, and slope of terrain), organisms, and parent materials (original minerals) interacting over time. The study of soil is mostly based on the following parameter of soil which is as follows A) Texture B) Fertility C) Color D) Moisture E) Water holding capacity Soil analysis of Lonar village I found that soil of Lonar village is blackish & red in nature which possess good water holding property & moisture as well as organic carbon Beyond that I also found soil of Lonar village has necessary Nitrogen From the above point we can assume that the soil of Lonar village has good fertility for the following crops Soyabean, Wheat, Black gram, Green gram, Cotton.

Dr. Preeti Soni: - The samples were collected as per rules, stored and preserved for testing in the laboratory. The tests for soil and water are done in the lab by various methods like pH meter, turbidimeter, spectrophotometer. The analytical parameter shows that the soil of Madku Dweep is slightly acidic and water also shows acidic nature, so the vegetation found there is more of acid dwelling plants. The Study is of great importance for botanical and pharmaceutical research. The present paper deals with the study of Soil and water analysis of Madku Dweep. The work

has its value because it includes the research area of historical importance. The analysis was gone through a project done by students of M. Sc. Chemistry, during a visit to Madku Dweep for study tour. Madku Dweep is one of the most valuable and religious, historical monuments of Chhattisgarh. The physio - chemical parameter of water were analyzed by the students of M. Sc. Chemistry in the PG Laboratory of Govt. GNA PG College, Bhatapara (C. G.), following the standard method devised by Trivedi and Goel (1984), Atoni (1985) as follows: - Physical Parameter. The water temperature and atmospheric temperature of the river were recorded with the help of maximum and minimum temperature thermometer water. In above study it was found that maximum parameters of water were not under allowable BIS limits. pH, temperature, TDS, turbidity, BOD, COD, DO, Conductivity, Mg, Ca, Ir, Chloride, Alkalinity, total Alkalinity exceeded the BIS limits. The amount of pH, TDS, turbidity, BOD, COD, Mg, Ca, Ir and Chloride was very high and sometimes very low which makes the water unsuitable for use. These all show that the quality of the river water is below the prescribed standards and it is unsuitable for drinking or household purposes without any disinfection process. The soil found here is not too good for agriculture purposes, it needs to be treated with fertilizer application along with disinfectants.

Shaon Kumar Das, Ravikant Avasthe and Aniruddha Roy and N. U. Singh: - A soil analysis is used to determine the level of nutrients found in soil sample. As such, it can only be as accurate as the sample taken in a particular field. The results of a soil analysis provide the agricultural producer with an estimate of the amount of fertilizer nutrients needed to supplement those in the soil. Fertility of a soil can be assessed by analyzing various available nutrients present in the soil. Fertilizer recommendations for various crops and cropping sequences can be made on the basis of fertility status of a soil and targeted yield equations. Besides this, problematic soil can be ameliorated on the basis of soil test values. Proper identification of the sources (point/diffuse) is required before interpretation of the data set. However, soil being the major source of nutrients for crops can also provide support to the plant growth. Hence, soil health and its maintenance are the key issues to sustain crop productivity, which is assessed by the quality indicators and sustenance of the crops grown on them. However, the policy may be framed on the platform based on “strategic and fundamental research” for developing innovative models in agricultural systems.

Karande Sucheta, Gamit Sheela and Prajapati Dhaval: - The soil can be described as the earth's uppermost weathered crust layer in which mixed organisms and the products of their death and decay are present. In present study it was preferred to investigate the soil samples for its chemical analysis and physical analysis. The Seven soil samples were collected from Mehesana and Patan district in different area. Rock debris and organic materials are soil mixture on earth's surface. The soil can be defined as the earth's uppermost weathered layer in which mixed organisms and their death and decline products are found. Parent material, climate, time, and biodiversity including human activities are the major factors affecting soil formation. The soil survey data of Mehsana district clearly indicates that the soils are slightly neutral to moderately alkaline in reaction with low soluble salt content. The soils of Mehsana district were low in organic carbon and available nitrogen, medium in available phosphorus and high in available potassium status. On the basis of overall nutrient index, soils of Mehsana and Patan district are very low in available nitrogen, adequate in available phosphorus.

Ruqin Wang, Linyi University: - At present, Due to the farmer's unreasonable fertilization, the quantity of fertilizer is too large. They attach too importance to the use of chemical fertilizers and ignore the use of organic fertilizer. The application of fertilizer is too simple, and the topdressing is not paid attention to. All of these result in imbalance of soil nutrient, serious soil compaction, productivity of field declining, agricultural production costs increasing, serious pollution of soil and water, and low quality of agricultural products (Meng Hongguang, 2008). We can see that the soil fertility level is high and most of the organic matters are at three levels. The overall level is high and has inconsistent distribution. Nitrogen, phosphorus and potassium contents are different. The results show that the nitrogen supply is enough to meet the short-term nitrogen demand. Soil PH value (Between pH values in 6-7) is suitable for crop growth. But the phosphorus content is low, only 47.38% of the sample in a secondary level or above, and phosphorus deficiency has appeared. Potassium deficiency reaches 37.58%, and there are big differences among six villages and towns. The proportion of nitrogen, phosphorus and potassium is in the misalignment. The key reason is farmers' imbalance utilization of N, P, K fertilizers (Liu Shunguo et al, 2008).

Ranjana Budhathoki: - Soil has a certain distinctive physical, chemical and biological qualities which permit it to support plants growth. Soil quality, thus, may be defined as the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain

plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation" (Karlen et al., 1997). It depends on many things such as soil texture, soil ph., nutrients, organic matter, water holding capacity, microorganism, structure, microclimate, irrigation facility, land fragmentations, soil erosion, agricultural system and practices, diseases and insects, consumption of nutrients by crops, leaching of nutrients etc. Soil organic matter is the solid portion of soil which is formed by the plant's debris and dead animals. It increases humus in soil. High organic matter content in soil indicates high capacity to retain moisture in soil. Phosphorus was found to be low in concentration which is in consistence with the fact that the middle mountain region of Nepal has low phosphorus content and acidic nature. The ph. value ranges from slightly acidic to medium acidic soil.

Rob W Fitzpatrick A. Jamieson and A.A. Monessen: - Soil science is the science or study of soil that involves the application of soil science, especially studies that involve soil morphology, soil mapping (assisted by existing soil maps and spatially held soil data), mineralogy, chemistry, geophysics, biology, and molecular biology to answer legal questions, problems, or hypotheses. Soil science is the term commonly used to study soil as a natural body in the landscape and as a resource to be managed for agricultural production, environmental waste disposal, and construction.

V. Rajeswari* and K. Arunesh: - Soil is an essential key factor of agriculture. The objective of the work is to predict soil type using data mining classification techniques. Methods/Analysis: Soil type is predicted using data mining classification techniques such as JRip, J48 and Naive Bayes. These classifier algorithms are applied to extract the knowledge from soil data and two types of soil are considered such as Red and Black. In this paper, the comparative analysis of three algorithms like Naïve Bayes, JRip and J48 is projected. JRip classification algorithm gives better result of this dataset and is correctly classified into maximum number of instances comparing with the other two. JRip can be recommended to predict soil types.

Sangita Changdeo Dandwate: - A physicochemical study of soil is based on various parameters like soil pH, electrical conductivity (EC), organic carbon (OC), available nitrogen (N), phosphorus (P), potassium (K), and micronutrients (Fe, Mn, Cu and Zn). Five representative samples were obtained and analyzed for its alkalinity content, pH, electrical conductivity, organic carbon, sodium, potassium. A five soil samples were collected at a depth of 0–20 cm and analyzed for soils were neutral to slightly alkaline. The soil test based nutrient management has

emerged as a key issue in efforts to increase agriculture productivity. In recent years agriculture development has been changed from conventional and traditional farming method too more intensive practices using chemical fertilizers and pesticides with irrigation facilities. Conclusively from study area soil sample show medium proportion of organic carbon. The higher nutrient fertility status in irrigation fields might be associated with intensive cultivation and plantation of cash crops like sugarcane, cotton, fruit crops etc. in which use of fertilizers as practiced by the cultivators. Classification criteria the study area soils showed normal ph. The majority of soil samples low status of available phosphorous was found in all soil samples the generated nutrient status information can serve as an effective tool for farmers and policy makers in adoption of site-specific nutrient management practices.

Expedito Milyaso1, Baraka Kichonge, Arthur M. Omari: - In the process of cement production a lot of CO2s is produced, this leads to environmental pollution and contribute to global warming and depletion of ozone layer. Geopolymers are among alternative materials that are examined for the purpose of reducing the production of cement for brick manufacturing. Aluminum and silicon-containing compound (aluminosilicate), most likely geological in origin, could react in a polymerization process with an alkaline solution at ambient conditions to create a geopolymer material. Geopolymer technology has the potential to reduce CO2 emission by 80%, because high temperature calcining applied in cement production is not needed. The primary objective of this study was to analyze soil samples for development of geopolymer materials suitable for manufacturing construction bricks. Different soil samples were collected from different areas in Arusha. Laboratory analysis was done to identify the physical and chemical properties. Arusha soils have shown better properties to be used as geopolymer materials. They have good mechanical properties as well as suitable chemical compositions includingSiO2, Al2O3 and Fe2O3.The chemical composition in Arusha soil is the basic compounds needed in the production of geopolymer materials. Properties observed in Uchira and Holili natural blocks provides a clear understanding of the requirements for production of a geopolymer materials.

Wagh G. S, Chavhan D. M., and Sayyed M. R. G.: - Soil is a natural body of mineral and organic material differentiated into horizons, which differ among themselves as well as from underlying materials in their morphology, physical make-up, chemical composition and biological characteristics. In Pune city due to industrialization and other anthropogenic activity

the soil from its eastern part has been polluted. The sewage water in the Mula - Mutha River flows through the Manjari village and hence it is felt necessary to carry out the soil analysis to understand the pollution levels of the soils in the adjoining area. Soil is an unconsolidated material of the earth's crust in which terrestrial plants grow if water and temperature are adequate with minimum available nutrients. According to Joffe (1949) the soil is a natural body of mineral and organic material differentiated into horizons, which differ among themselves as well as from underlying materials in their morphology, physical make-up, chemical composition and biological characteristics (Solanki and Chavda, 2012). The physico-chemical analysis of the soil samples from Manjari, Hadapsar and Phursungi villages towards SE of Pune city have influence of the uncontrolled solid waste disposal practice as well as industrial effluents. The main crops are sugarcane and onion. Most of the farmers are using excessive chemical fertilizers and the too much dose of such fertilizers in few soils has rendered high values of P and K. The retention of K could also be due the clay minerals formed by chemical weathering of basalts which is the parent material for the soil.

Arushi Makkar, Anshu Sibbal Chatli, Akshita Sharma, Parneet Kaur, Navdeep Kaur, Ekta Goswami: - Soil harbors various organic and inorganic nutrients on which the yield of crop depends. The physicochemical properties of soils collected from various areas of Punjab were studied viz. soil pH, Electrical Conductivity, Organic Carbon, organic matter and Nitrogen percentage. Most of soils were little alkaline having pH ranged from 7.0-8.2. Soil is an uppermost layer of earth's crust and is a mixture of organic matter, minerals and organisms that together support life. The soil forms the intermediate zone between the atmosphere and the rock cover of the earth; the lithosphere. It also forms the interface between water bodies and the lithosphere and thus forming the biosphere (Asema et al, 2015). The increased organic matter content in soil always results in increase in fertility of soil and hence it is useful for improving the output of plants. Soil bacteria and fungi are the start of the soil food web that supports other organisms. The fertile plains of Punjab boast producing about two-third of the food grains annually in India. The highest fertile soils are important for commercial points of view for farmers resulting in increase in economy of the particular region.

Chandak Nisha, Maiti Barnali Pathan Shabana, Desai Meena and Kamlesh Shah: - The natural environment is clean, but due to multifarious activities of man, it gets polluted resulting in what is called environmental pollution. In the present study it was preferred to investigate the

soil samples for its physico-chemical analysis of some parameters. Fifteen representative samples were obtained and analyzed for its pH, EC, Phosphorus, Potassium, Sulfur and Carbon. The soil forms the intermediate zone between the atmosphere and the rock cover of the earth, the lithosphere. It also forms the interface between water bodies (hydrosphere) and the lithosphere and thus forming a part of biosphere. The soil may be defined as the uppermost weathered layer of the earth's crust in which are mixed organisms and products of their death and decay. It was observed that different areas of soil had influences on the physicochemical characteristics of the soils. However, application of more labile organic inputs, liming materials and suitable inorganic fertilizers (N-P-K) would be effective for sustainable man-agement and improving fertility status of the soils. Such type of monitoring of soil sample is beneficial to know the concentrations of various parameters present in soil samples.

Shailesh Kumar Dewangan, Prashant Minj, Pragya Singh, Pooja Singh, Shivlochani: - Red soil is often used for agriculture because it is fertile and well drained. This is especially beneficial for crops that require a lot of nutrients, such as bananas and sugarcane. Red soil can also be used to grow other types of crops, such as vegetables and fruits. It is necessary for us to know the properties of soil. We will study the Physicochemical properties of red soil in our research, the red soil on which we are doing research is found in area of Koranga mal village, block Farsabahar of Jashpur district of Chhattisgarh. We will study the Physicochemical properties of this red soil in our research, which element is found in it, what is its physical properties. During this we will study the physical properties like that Conductivity, pH-value, percentage of Carbon etc. We will study the chemical properties like presence and quantity of Fe, Cu, Zn, Ca, Mg, S, N etc. And try to reach some conclusion. The nature of the red soil found in the Koranga mal village, district Jashpur is not saline as well as neutral. The amount of iron and magnesium in the red soil here is very less. Copper and molybdenum are likely to be found in red soil. The amount of iron in the red soil found in Koranga mal village is about 40% of the normal.

Dasharath P.Patel and Dr.Rajesh D. Modh: - The different elements are essentials for growth and fertilization of plants. Such as carbon, nitrogen, phosphorous, potash and some other materials are essential for plants in proper proportion. The qualities of soil are different at different area and it also fit for different crops. We analyzed thousands of soil samples by using various chemical and instrumental methods for Daskroi-taluka of Ahmedabad District, like pH

metry, conductometry, colorimetric. Here action of soil measured by pH, amount of soluble salt measured by Electric conductivity, organic carbon and phosphorous measured by colorimetric and potash measured by flame photometer. We have analyzed 15592 soil samples under various measurements like pH, electric conductivity, organic carbon, phosphorous and potash. Here our main emphasis towards the soil materials analysis and find out the excess or deficiency in the soil, particularly for the land of Daskroi taluka of Ahmedabad district.

CONCLUSION

After conducting a thorough analysis of the soil for productivity and sustainability, several key conclusions can be drawn:

1. Soil Quality: The analysis reveals the overall quality of the soil, including its physical, chemical, and biological properties. Factors such as soil texture, organic matter content, nutrient availability, pH levels, and microbial activity contribute to soil quality. A comprehensive assessment helps identify the soil's potential for supporting plant growth and determining its long-term sustainability.
2. Productivity Potential: By evaluating nutrient levels and soil composition, the analysis provides insights into the soil's productivity potential. Adequate nutrient availability, balanced pH levels, and favorable soil structure positively impact crop yields and overall productivity. The results help determine whether the soil requires specific amendments or management practices to optimize productivity.

In conclusion, analyzing the soil for productivity and sustainability provides valuable insights into its quality, nutrient status, organic matter content, erosion and compaction risks, environmental impact, and management recommendations. By understanding these factors and taking appropriate actions, farmers and land managers can optimize soil productivity, preserve its long-term health, and contribute to sustainable agricultural practices.

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