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Physico-Chemical Properties of Soil in and Around Loni Area

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ABSTRACT

The aim of the study was to determine the soil properties from Loni area .The soil physicochemical parameters were evaluated such as temperature, water holding capacity, pH, conductivity, soluble salts, organic matter, alkalinity, copper, zinc, manganese, molybdenum, calcium, sodium and potassium from twelve different sites. The parameters were observed as, temperature ranged from 20.0 to 24.4°C, pH in between 7.4 to 8.1, water holding capacity in between 2.4 to 6.4%, EC ranged from 0.13 to 0.63 µS/cm, soluble salts in between 48.75 to 235.12%, alkalinity ranged from 70.15 to 109. 8 mg/100 g, organic matter in between 0.6 to 0.85%, alkalinity ranged from 70.15 to 109.8 mg/100 g, Cu in between 10.0 to 423.12 mg/100 g, Zn ranged from 2.11 to 20.4 mg/100 g, Mn ranged from 12.9 to 47.5 mg/100 g, Mo in between 10 to 96.5 mg/100 g, Ca ranged from 6.7 to 81.3 ppm, Na ranged from 12.7 to 86.5 ppm and K ranged from 0.7 to 8.72 ppm. Also correlation was carried to find out relationship in between the parameters. A positive correlations observed in between 45 unions (48%) and 46 unions (52%) as negative correlations. Highly positive correlation was noticed between Conductivity-Soluble salts (r=0.99), Cu-Zn (r=0.84), Ca-Na (r=0.77) and Organic matter-Molybdenum (r=0.72). The results and correlation are discussed in the present study.

Keywords: Soil, Physico-chemical properties, Correlation, Loni area

INTRODUCTION

Soil is the uppermost layers of the earth's crust and one of the most important natural resources for the life on the earth. Soil is the natural medium for growth of plants. Soil differs from the parent material in the morphological, physical, chemical and biological level. The components of soil are mineral, organic matter, water and air, which are useful for plant growth. It is the fundamental resource supporting to agriculture and forestry, as well as contributing to the aesthetics of a green ecosystem. Soil becomes a major determinant of atmospheric composition and therefore earth's climate. Soils contain an important pool of active carbon that plays a major role in the global carbon cycle [1,2].

Soil is the most important non-renewable resource for people's food and livelihood. In a developing country, where the majority of the population is still dependent on forest and agriculture, hence the maintenance and improvement of soil quality is a prime concern. The plant growth is directly dependent on soil conditions. The soil and its resources are deteriorated due to increasing population and pollution. Recent research has provided information on the status of the soil properties. The soil nutrients vary with respect to land use and management. The general factors affecting soil quality is elevation, land use and parent materials. The nutrient level in agricultural land may also vary significantly from land to land and location to locations. Farming systems have depend and influence on soil properties, such as organic matter, pH, major and minor nutrients and bio-organisms in the soil. Land use and soil management practices can significantly influence soil organic dynamics and micronutrients from the soil [3-6].

Characterization of soil helps in determining the soil potentials and identifying the constraints in crop production besides giving detailed information about different soil properties. Thus the studies on physico-chemical properties of the Loni area soils could help to understanding the basic characteristics of soils and the constraints associated with the management of soils. The soil properties and their potential capabilities are useful for further development and maintenance of soil and cropping pattern. The soil properties, cropping pattern, agronomic practices, fertilizers and pesticides helps to farmer for better crop and soil balancing. Hence, the present study was assigned to know soil characteristics from Loni area which would be useful to increase crop yield and maintain soil health.

MATERIALS AND METHODS

Study area

The study has been carried out in the Loni rural region, Ahmednagar District, Maharashtra. Study area is located in 19°24-28' E longitude to 74°35-37' N latitude. It experiences an average rain fall of 58 cm and mostly dry area. The soil is black cotton soil along with the Pravara river basin. Also canal and well water facilities are available.

Collection of soil sample

The soil samples were collected from twelve different sites of village Loni (Table 1). The collection was made during dry monsoon. At each sites, soil samples was taken from different field survey number. The study sites was fixed, digged at about 30 cm deep 'V' shaped pit and the samples were collected from margin of 'V' shaped pit with the help of large scalpel. The collected samples were made into four same sized parts and then removed two opposite parts. The process was repeated until the sample retains 1.5 kg. Each of sample then were labeled, numbered with date of collection, survey number, name of village, type of field, etc. [7].

Table 1: Location of sampling sites

Sr. No.	Location	Code of Sites
1	Loni-Sangamner Road	S-1
2	Loni-Kolhar Road	S-2
3	Loni Canal Side	S-3
4	Loni-Pathre Road	S-4
5	Loni-Junior College	S-5
6	Loni river (Opening)	S-6
7	Loni river (Middle)	S-7
8	Loni river (End)	S-8
9	Loni-Babhaleshwar Road	S-9
10	Loni-Nirmalpimpri Road	S-10
11	Loni- Lontek temple Area	S-11
12	Loni-Sugar factory Area	S-12

Soil analysis

The collected soil samples were analyzed for various physico-chemical parameters using standard methods (Table 2). All the parameters were analyzed in triplicate. It included temperature, water holding capacity, pH, conductivity, soluble salts, organic matter, alkalinity, copper, zinc, manganese, molybdenum, calcium, sodium and potassium were determined [7]. The soil samples are subjected for the estimation of cupper (Cu), Manganese (Mn), Zinc (Zn), through the Atomic Absorption Spectrum (AAS) [7].

Table 2: Methods used for estimation of soil properties

Sr. No.	Parameters	Methods
1	Temperature °C	Soil thermometer
2	Water holding capacity %	Ceramic Pressure Plate
3	pH	pH Meter
4	Conductivity (µS/cm)	Conductivity Meter
5	Soluble salt (%)	Single Solution
6	Organic matter (%)	Dichromate Oxidation
7	Alkalinity (mg/100 g)	Volumetric
8	Copper (mg/100 g)	Atomic Absorption Spectrum (AAS)
9	Zinc (mg/100 g)	Atomic Absorption Spectrum (AAS)
10	Manganese(mg/100 g)	Atomic Absorption Spectrum (AAS)
11	Molybdenum (mg/100 g)	UV-Visible Spectrophotometric

12	Calcium (ppm)	EDTA Titrimetric
13	Sodium (ppm)	Flame Photometer
14	Potassium (ppm)	Flame Photometer

Statistical analysis

The analysis of variance was performed using MS/Excel/2007. The mean values were calculated and subjected for tabulation. A correlation coefficient 'r' was evaluated and presented in Table 3.

Table 3: Physico-chemical properties of soil with the study sites

Sr. N0.	Parameters	Sampling stations											
		S-1	**S-2**	**S-3**	**S-4**	**S-5**	**S-6**	**S-7**	**S-8**	**S-9**	**S-10**	**S-11**	**S-12**
1	Temperature °C	24.0	20.0	22.0	24.4	21.9	22.5	23.8	20.1	21.2	23.2	22.7	23.3
2	Water holding capacity %	4.2	5.2	3.5	6.4	5.3	5.5	6.2	4.4	4.4	5.5	2.4	3.4
3	pH	7.9	7.8	7.8	7.5	7.6	8.0	7.9	7.8	7.7	7.8	7.7	8.1
4	Conductivity (µS/cm)	0.21	0.29	0.18	0.26	0.17	0.13	0.15	0.16	0.63	0.24	0.32	0.20
5	Soluble salt (%)	77.62	108.75	68.25	96.75	66.1	48.75	54.75	60.37	235.12	91.5	120.1	75.75
6	Organic matter (%)	0.78	0.74	0.69	0.76	0.60	0.85	0.73	0.79	0.69	0.75	0.69	0.85
7	Alkalinity (mg/100 g)	79.3	100.65	79.36	107.8	79.3	108.8	70.15	100.65	91.5	100.65	91.5	109.8
8	Copper (mg/100 g)	10.0	275.2	172.5	14.0	19.2	21.4	24.3	172.5	432.5	10.00	41.2	350
9	Zinc (mg/100 g)	5.20	6.20	15.00	15.00	3.21	6.21	5.00	2.11	7.21	4.30	4.76	20.4
10	Manganese(mg/100 g)	47.5	18.7	32.1	21.4	37.5	19.5	14.2	47.5	18.5	12.9	28.50	23.90
11	Molybdenum (mg/100 g)	14.0	10.00	43.5	59.5	24.2	72.5	43.5	72.5	37.5	54.5	21.00	96.5
12	Calcium (ppm)	13.2	45.4	72.4	07.5	06.8	06.7	07.7	25.2	71.1	81.3	77.4	71.1
13	Sodium (ppm)	17.2	31.2	85.2	41.3	12.7	15.6	13.5	52.5	82.2	86.4	86.5	84.5
14	Potassium (ppm)	04.2	8.72	03.3	00.8	00.8	00.7	01.2	00.8	04.2	07.1	06.2	00.8

RESULTS AND DISCUSSION

The values of physicochemical parameters are presented in Table 3. The temperature was found to in between 20.0 to 24.4°C. The value of pH was found to be 7.4 to 8.1. Water holding capacity was ranged from 2.4 to 6.4%. The electric conductivity value was ranged from 0.13 to 0.63 µmoh/cm. Range of soluble salts was 48.75 to 235.12%. Alkalinity was ranged from 70.15 to 109.8 mg/100 g. The organic matter was in between 0.6 to 0.85%. Copper was in between 10 to 423.12 mg/100 g. Zinc was ranged in between 2.11 to 20.4 mg/100 g. Manganese was ranged from 12.9 to 47.5 mg/100 g. Molybdenum was in between 10 to 96.5 mg/100 g. The calcium was ranged in between 6.7 to 81.3 ppm. The sodium was ranged in between 12.7 to 86.5 ppm. The potassium was ranged in between 0.7 to 8.72 ppm.

Temperature

Temperature of the soil is an important property which influences the physical, chemical and biological processes. The present work revealed that the temperature was ranged from 20.0 to 24.4°C from site S-2 and S-4, respectively. Soil temperature fluctuates with season, time of day and local climatic conditions. The major source of soil heating is solar radiation and heat generated by the biochemical activities of the soil [8]. A rise in temperature of soil accelerates chemical reaction, reduces solubility of gases and decrease pH of soil. Soil temperature varies in response to exchange processes that take place primarily through the soil surface [9]. Temperature plays an important role in germination of seeds, an impact on the growth of plants and the activity of the microorganisms [10].

Moisture is an important physical property of soil. The absorption of nutrients is depends on the moisture of the soil. The difference in the water holding capacity might be due to variation in clay and organic carbon content and heterogeneity of parent material. The water holding capacity varies station to station. In the study it was ranged from 2.4 to 6.4% from sampling site S-11 and S-4, respectively. The water content of soil is also related to its texture and structure. The soil moisture commonly depends on particle size, clay minerals, organic matter and ground water condition [11]. Wetness depends on the porosity of a soil. Soil has a high porosity generally have larger water content [12]. Good water holding capacity shows the good physical condition of soil [13]. The soil water holding capacity is essential to the evaluation of regional soil water balance [14]. A maximum water holding capacity reveled from red and black soils [15]. The sandy soil quickly recharged the soil moisture but it enable to hold as much water [16]. The decomposition of organic matter is mainly depending on the soil moisture. If water becomes too low, a plant becomes stressed. Water is present in more in soil; it is not available to plants due to high degree of salinity.

pH

pH is most important physico- chemical property of soil. It has great effects on solute concentration and absorption of soil. It is important consideration for farmers including either alkaline or acidic conditions. The present work showed pH of the soil was ranged from 7.7 to 8.1 from the site S-5 and S-12, respectively. It indicted the soil is neutral. pH is a most important physical property of soil and encouraging the plant nutrient accessibility. It has great effects on solute concentration and absorption in soil [17]. Soil pH is an important consideration for farmers and gardeners for several reasons, that many plants and soil life forms prefer either alkaline or acidic condition [18]. If the pH is less than 6 then it is said to be an acidic soil, the pH ranged from 6-8.5 it's a normal soil and greater than 8.5 then it is said to be alkaline soil. The pH of cotton soils was found to be in the range of 7.5-8.4 [19]. It is a good indicator of balance of available nutrients in the soil [20]. pH is an important parameter which helps in ensuring availability of plants nutrients e.g. Fe, Mn, Zn and Cu are more available in acidic than alkaline soils [21]. It also helps in maintaining the soil fertility and to quantify the amendments used for amelioration [22]. pH is a good sign to maintain equilibrium between nutrients in soil. It is also an indicator of plant and other living organism, available nutrients, cation exchange capacity and organic matter content. The effect of pH on nutrient balance has observed that high pH of soil can affect the micronutrients content present in soil [23]. At low pH values solubility of micronutrients is high while at high pH solubility and availability of micronutrient to plant is declined [24]. A pH of the soil increased with the depth. The extremely high and low values of pH often lead to failure of crop due to ionic strength imbalance [19]. The high pH can be attributed to the leakage and spread of alkaline effluent generated from the industries and it was well know that high sodium content gives rise to high pH in the soil [25]. Soil infiltration problem also associated with high pH. Most soil of the Loni region of Maharashtra was neutral to moderately alkaline.

Conductivity

Electric conductivity (EC) is very quick, simple and inexpensive method to check the health of soil. It is measure of ions present in solution. The EC of soil solution increases with increased concentration of ions. EC varies with depth, slope of land surface, high permeability, high rain fall, responsible for leach out alkali and alkaline base [26]. The present investigation showed the EC was ranged from 0.13 to 0.63 µS/cm from the site S-6 and S-9, respectively. It is measures the soil properties such as soil texture, cation exchange capacity, drainage condition, organic matter level, and salinity and subsoil characteristics [27]. It is used to estimate the soluble salt concentration in soil and is commonly used as a measure of salinity [28]. It was reported that soil removal by leveling changes the concentration of salts in root zone [29]. The EC of soils varies depending on the amount of moisture held by soil particles. It is useful in monitoring the mineralization of organic matter in soil. The EC is less than 1 (µS/cm) it is a normal soil, 1-2 (µS/cm) then critical for germination, 2-3 (µS/cm) critical for growth of salt sensitive crops and greater than 3 (µmoh/cm) it is severely injurious to crops [21]. The Loni soil showed normal on the basis of EC.

Organic matter

Soil organic matter is an important property of soil. If the soil is poor in organic matter then it enhances the process of soil erosion. The soil organic matter is useful for the agricultural practices. It may be added in the soil in the form of animal manures, compost, etc. In present investigation the organic matter was ranged from 0.60 to 0.85% from the site S-5 and S-12, respectively. The presence of higher organic matter in the soil can be another possible reason for lowering of the pH [30]. Soil organic matter has decreased from surface to subsoil due to leveling [31]. The decomposition rate of organic matter has a tendency to increase as weather warm and to furnish maximum plant growth [32]. Organic matter commonly increases water content, available water in sandy soil and both air and water flows [33]. Soil organic matter supplies essential nutrients and has unexcelled capacity to hold water and absorb cations [34]. It also functions as a source of food for soil microbes helps to control their activities [35]. The organic matter in a soil can be maintained the structure of soil. It affects the available water capacity and infiltration rate. It is a source of nitrogen and other essential nutrients for crops which enhances the usefulness of soil for agricultural purposes. Organic matter is also an important factor affecting management and soil quality. The carbon and nitrogen (C:N) ratios, lignin and polyphenolic content of plant material can significantly affect its decomposition rate.

Soluble salts

Fertilizers are the salts that contain various plant nutrients. High soluble salt causes plant drought stress. Soluble salts are dissolved inorganic solutes. The present study revealed minimum 48.75 and maximum 235.12% soluble

salts from the site S-6 and S-9, respectively. The soluble salt contain cation such as sodium (Na^+), potassium (K^+), calcium (Ca^+), and magnesium (Mg^{2+}) along with anions chloride (Cl^-), sulfate (SO_4^{2-}), nitrate (NO_3^-) bicarbonate ((HCO_3^-) and carbonate (CO_3^{2-}). High soluble salts in the soil will compromise plant health and yield. In growing media, common soluble salts are calcium, magnesium, sodium, chloride, sulfate and bicarbonate. Smaller quantities of potassium, ammonium, nitrate and carbonate are also found. Sources of soluble salts in soils and soilless media include commercial fertilizers, animal manures, soil organic matter, composts, runoff from areas where salt or ice-melt products have been used and irrigation water that is high in dissolved salts.

Alkalinity

Alkalinity is a measure of saline or salt effected soil, the pH of these soils is greater than 7.The study emphasized alkalinity in between 70.15 to 109.8 mg/100 g from the site S-7 and S-12, respectively. Alkaline soils are having of high pH (>8.5) and have a poor soil structure with low infiltration capacity. Alkaline soils are difficult to take into agricultural use. Rain water stagnates on the soil easily and in dry periods irrigation is hardly possible. Soil alkalinity is connected with sodium carbonates in the soil. So these soils are possessing low alkalinity which are useful for vegetation. Farmer should select alkalinity resistance crop in such type of soil [36].

Copper

Copper (Cu) is micronutrient in soil for plant. It is naturally occurring element in the soil and it can be found as a metal or ore. A Cu content was ranged in between 10.0 to 432.5 mg/100 ml from the site S-1 and S-9, respectively. Some sites were reported low copper contents that may be copper deficient soil. A soil having high in organic matter and weathered, also sandy soil are likely to be deficient in copper. A deficiency of Cu causes serious stunting of growth in plants and reduces yield. A high Cu in a soil regarded as a plant poison. The Cu probably functions as an enzyme activator and micronutrient for the normal growth of plant. Copper acts as catalyzer in photosynthesis, respiration, several enzyme systems and protein metabolism [37].

Zinc

Zinc (Zn) is an essential micronutrient for the plant. Soils are capable of supplying adequate amount of zinc to plant via the fertilizers. Zn exits naturally in rocks. The amount of Zn present in the soil depends on the parent materials of soil. Present study showed Zn content in between 2.11 to 20.4 mg/100 g from the site S-8 and S-12, respectively. It was slightly higher than the prescribed standards. Zn deficient plants are sensitive to attack of pathogen and suffering from fungal root diseases [38,39]. Zn is micronutrient and increases resistance to fungal root diseases. Zn is essential for production of auxins, activates enzymes in protein synthesis, regulations and consumption of sugar, starch formation and root development and chlorophyll formation [40].

Manganese

Manganese (Mn) is a plant micronutrient. A healthy and productive soil, the concentration of Mn should be 10-50 mg/kg. The present study revealed Mn was ranged in between 12.9 to 47.5 mg/100 g from the site S-10 and S-1, respectively. Commonly it was higher than prescribed standards. Mn is enzyme activator and involved in metabolism of organic acids. Mn with the Fe plays role in the formation of chlorophyll. Mn deficient plants are favored the oxidation of iron, ascorbic acid and glutathione to their respective oxidized forms. Mn deficient soil found to be various areas [41].

Molybdenum

Molybdenum (Mo) is essential element for higher plants and micronutrient for crops. It is tress element found in soil and required for growth of biological organisms and transition element. Molybdenum content ranged in between 10.0 to 96.5 ppm from the site S-2 and S-12, respectively. Molybdenum does not occur naturally free metal on earth and found in various oxidation states in minerals. Molybdenum containing enzymes are common bacterial catalysts, useful for the biological nitrogen fixation, removal of body waste, used in alloys and electrodes.

Calcium

Calcium (Ca) is present in adequate amount in most of the soil. Calcium is a component of several primary and secondary minerals in the soil. These minerals are the original source of available forms of calcium. Calcium is not considered as leachable nutrient. Calcium content in the present investigation was ranged in between 6.7 to 81.3 ppm

in the site S-6 and S-10, respectively. In agriculture Ca is essential for soil porosity, plant cell growth, neutralized the excess acid of alkaline, amphoteric, stringent cell wall structure. The normal range of Ca^{2+} in irrigation water should be 0-20 cmol/l, while that of Mg^{2+} should be between 0-5 cmol/l [42]. The relatively lower magnesium compared to the calcium may be good because Mg deteriorates soil structure particularly where waters are sodium dominated and highly saline. The high level of Mg usually promotes a higher development of exchangeable Na in irrigated soils and the negative effect of high Na content in soil. The Magnesium content of water is also considered as important qualitative criteria in determining the quality of water for irrigation because more magnesium in water will adversely affect crop yields, as the soils become more alkaline. Generally, calcium and magnesium maintain a state of equilibrium in most waters [42]. The combined effect of these two ions is in their countering the negative effect of the sodium by lowering the SAR as shown above.

Sodium

Soil provides sodium (Na) to plants. There is natural accumulation of sodium in soil from fertilizers, pesticides, runoff and breakdown of minerals which increase salts. Sodium content in the present task reneged in between 12.7 to 86.5 ppm from the site S-5 and S-11, respectively. Sodium is not a plant nutrient and not play role in the soil health. High sodium indicates salinity problem. Excess Na also reduces the uptake of other by plant. High Na can be remediated by watering more frequently and applying gypsum [43].

Potassium

The presence of potassium (K) in the soil is in the form of bonded potassium between the layers of soil. The present data revealed K content as minimum 0.7 and maximum 8.72 ppm from the site S-6 and S-2, respectively. Potassium is not an integral part of any major plant component but it plays a key role in the physiological process, plant growth, protein synthesis and maintenance of plant water balance [44]. It involves in many plant metabolism reactions, ranging from lignin and cellulose used for formation of cellular structural components, to regulation of photosynthesis and production of plant sugars [27]. Potassium is found in its mineral form and affect plants division, carbohydrate formation, translocation of sugar, various enzyme actions and resistance to certain plant disease [8]. The high content of available potassium on surface soil may be attributed to the application of potassium fertilizers and manures addition [45]. Potassium fixation occurred when soil dry and the potassium is bonded between layers of clay. It decreases with an increase in depth of soil [46]. Soils that have adequate potassium allow plants to develop rapidly and outgrow plant disease, insect damage and protect against winter freeze damage [28]. In the nitrogen levels balancing, the potassium plays an important role. Potassium is observed by plants in larger amounts than any other mineral element except nitrogen and in some cases, calcium [47]. Water loss in plant is control by potassium. Increase in potassium availability in Kaolinite soil increased the grain yield of winter sorghum [48].

Table 4: Correlation coefficient 'r' between physicochemical parameters of soil

	Temp	WHC	pH	Cond	SS	OM	Alka	Cu	Zn	Mn	Mo	Ca	Na	K
Temp	1.0	0.16	0.12	-0.24	-0.25	0.20	-0.14	-0.53	-0.24	-0.19	0.16	-0.48	-0.10	-0.24
WHC		1.0	-0.18	-0.20	-0.20	0.05	0.05	-0.36	-0.34	-0.40	0.11	-0.47	-0.62	-0.23
pH			1.0	-0.38	-0.37	0.72	0.18	0.16	0.16	-0.10	0.48	-0.16	-0.06	-0.14
Cond				1.0	0.99	-0.31	0.05	0.60	0.61	-0.27	-0.25	0.49	0.45	0.43
SS					1.0	-0.31	0.06	0.06	0.61	-0.21	-0.25	0.49	0.45	0.42
OM						1.0	0.64	0.08	0.16	-0.09	0.72	-0.23	-0.03	-0.22
Alka							1.0	0.24	0.26	-0.26	0.55	-0.02	0.26	-0.02
Cu								1.0	0.84	-0.13	0.20	0.41	0.47	0.15
Zn									1.0	-0.07	0.41	0.33	0.50	-0.15
Mn										1.0	-0.17	-0.08	-0.17	-0.25
Mo											1.0	-0.05	0.25	-0.57
Ca												1.0	0.77	0.54
Na													1.0	0.33
K														1.0

Temp: Temperature; WHC: Water Holding Capacity; Cond: Conductivity; SS: Soluble Solids; OM: Organic Matter; Alka: Alkalinity; Cu: Copper

CONCLUSION

A correlation coefficient 'r' of various physicochemical parameters was calculated (Table 4). In the study, positive correlations observed in between 45 unions (48%) and 46 unions (52%) as negative correlations. A highly positive correlation was observed in between Conductivity-Soluble salts (r=0.99), Cu-Zn (r=0.84) followed by Ca-Na (r=0.77) and Organic matter-Molybdenum (r=0.72). So it is revealed that the correlation studies of the soil quality parameters have a great significance in the study to prediction and planning of crop pattern. The above method calculating correlation showed that it is quality used tool for the quick assessment of soil. The correlation of the physicochemical parameters varies soil to soil, season, location, pollution, uncontrolled population, agriculture pollution load, soil and rock condition, water habitats, etc.

Zn: Zinc; Mn: Manganese; Mo: Molybdenum; Ca: Calcium; Na: Sodium; K: Potassium

Conventional agriculture has been largely dependent on intensive chemical inputs which play an important role in improving food productivity to meet human demands. In recent years, most of the farmers are using the excess amount of fertilizers and pesticides. Due to excess use of chemicals soil quality decreases. Small crop also affected due to large use of fertilizers and pesticides. So it becomes essential to analysis of soil parameter. Above information help to farmers for use integrated nutrient management practice to maintain optimum concentration of all the essential nutrients for plants. At present, the majority of our land resources are degraded. Therefore, it is important to maintain the soil health for food security and increasing agricultural production.

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