Analysis of Farmland Soil from Bank of Kayadu River Pimperkhed, Dist.Nanded

BhokareP.R.[1],Wankhade R.R.[2], Awate P.J.[3]

[1,2]Asst. Professor, *Department of Chemistry,*
[3]Asst. Professor, *Department of Zoology,*
[1,3]*L.R. Bharti Arts, Commerce & Smt S.R.Bharti Science College, Arni*
[2]*B. B. Arts, N. B. Commerce and B. P. Science College. Digras,*

ABSTRACTS

Soil fertility is a crucial factor to consider when it comes to growing crops and plants in a agricultural land. Most of the growing crop and other food plant depend on the health of soil and its fertility. River plays an important role in making the soil nutrient rich. There is a crucial link between soil fertility and rivers, during the flood, a thin layer of fine soil and silt gets deposited over the land, thereby forming rich alluvial soil which is highly fertile and nutrient-dense for the plants. Nutrient rich soil is a main source needed for healthy growth of crop plants. Soil provides structural stability for plants and retains and relinquishes water and the nutrients necessary for plant growth. Soil analysis provides information which is important for maximizing nutrient use efficiency and agricultural productivity. Soil properties that are sensitive to change in the management can be used as indicator.

In the present study it was preferred to analyze the nutrients contain in soil sample of farmland soil near bank of Kayadu River. The five samples were collected from different sites of the study area of in October 2022. The analysis of soil was carried out for the study of various parameters like nitrogen, Potassium, Phosphorous, Magnesium, Calcium, Moisture, pH, EC, & Organic carbon.

The study revealed that all the five samples of selected area of Pimparkhed village are moderate to rich in mineral contents. The pH of the soil samples was on slightly alkaline side, ranged from 6.7 to 7.4 but within the limit of 6.5-7.5 which is good for growth of plant roots. The EC values ranged from 0.5mS/m to 0.7mS/m. And indicating low salinity status of the soil. OC content all the samples were of high rating ranged from 4.1 % to 5.1 %. Available nitrogen ranged from 75kg/ha to 125 kg/ha; available phosphorous ranged from 2 kg/ha to 12 kg/ha and samples were nitrogen and phosphorous deficient. Potassium ranged from 44.1 kg/ha to 93.2 kg/ha and samples were of medium rating except one sample which is of high rating with respect to potassium.

Key words : Pimparkhed village, Soil quality, Micronutrients, Physico-chemical parameters.

INTRODUCTION

Soil productivity encompasses soil fertility plus the inherent and management-related factors affecting plant growth and development. The productivity of soil is mainly depending upon nutrients content in it. Soil mediates many of the ecological processes that control water and air quality and that promote plant growth. Soil is one of the most precious natural resource, which requires several years to develop an inch of soil and it provides a medium for plant growth to meet our food and fibber need.Soil fertility is a crucial factor to consider when it comes to growing crops and plants in a agricultural land. Most of the growing crop and other food plant depend on the health of soil and its fertility. River plays an important role in making the soil nutrient rich. There is a crucial link between soil fertility and rivers, during the flood, a thin layer of fine soil and silt gets deposited over the land, thereby forming rich alluvial soil which is highly fertile and nutrient-dense for the plants.

Soil is main and fundamental component of agricultural activity so that it is important and necessary to understand the basic needs of soil.[12]Soil filters water, decomposes waste, stores heat and exchanges gases and hence has great bearing on environmental balance[3].It is a complex mixture of minerals, water, air and organic matter and soil is also called as "skin of the earth." The quality and health of soil is important for

both agricultural sustainability and environmental quality which connected to the plant, animal and human health. Soil analysis is well recognized as a sound scientific tool to assess the status of available micronutrients in soils and their relationship with various physico-chemical properties Considerable research work has been done regarding the study of Nutrients and Physico-Chemical assessment of various types of soil in Maharashtra as well as in India have been attempted by several investigators[3,4,5]. Khadake P.A. reported soil analysis and its environmental impact on Nanded city of Maharashtra State [6].

The status of micronutrients in soils district Bhimber and their relationship with various physico-chemical properties were investigated by WajahatNazif,et.al[7].It is a real time to carry out the physico-chemical analysis of soil because as with the increasing use of chemical fertilizer to the soil, it is difficult to control the adverse effect of the chemical fertilizer to the soil, land, animal and the human being.[1,2]Soil fertility and productivity are the key pillars for food production and soil quality is of equal significance in the background of soil degradation caused by many factors. Soil is a naturally occurring porous medium that supports the growth of plant and roots by retaining air, heat, water and nutrients and provides mechanical support to the plant.[12] Factors that affect the availability of soil nutrients include leaching. Soil erosion, soil pH, denitrification, volatilization, nitrogen immobilization and crop nutrient uptake. Crop growth is influenced by aerial and soil environment.

Suitable environment is necessary for better germination, growth and yield of crops. The soil is a complex organization being made up of some six constituents' namely inorganic matter, organic matter, soil organisms, soil moisture, soil solution and soil air. Roughly, the soil contains 50-60% mineral matter, 25-35% water, 15-25% air and little percentage of organic matter.[11] The higher nutrient availability is favorable when soil has higher water holding capacity, proper aeration and less soil strength or mechanical resistance. The six elements nitrogen, phosphorous, potassium, magnesium, calcium and sulphur which are required in large quantities are labeled as macronutrients. Most of the soils supply enough calcium, magnesium and sulphur hence the soil scientists called these elements as secondary nutrient elements. The other three elements nitrogen, phosphorous and potassium are called as primary nutrients and are not usually available in large amounts which is enough for best growth and therefore are added through fertilization.

Soil of Maharashtra state is categorized as poor to moderate in fertility and they are widely in genetic, morphological, physical, chemical and biological characteristics. It is well known fact that the periodical analysis of soil provides the up-to date information about the nature and the composition of the soil.Considerable research work has been done in Maharashtra as well as in India, regarding the study of Nutrients and Physico-Chemical assessment of various types of soil,A.A.Patil[8],R.P.Ganorkar[9],R.P.Ganorkar[10]. Keeping these points in view, investigation was carried out to analysis of soil samples of Pimparkheda village in Hadgaon Tehsil of Nanded District in Maharashtra, India.

MATERIAL AND METHODS
STUDY AREA

The five sample was collected from farmland near Kayadu river, Pimparkheda is a village in Hadgaon Tehsil in Nanded District of Maharashtra State, India; which is shown in Fig.-1. It belongs to Marathwada Region Aurangabad Division. Moderate rain fall in this region and well known for Cotton, Soya bean, Banana and other Rabbi crops. The sources of water for this area is Kayadu river, well water and tube well water.
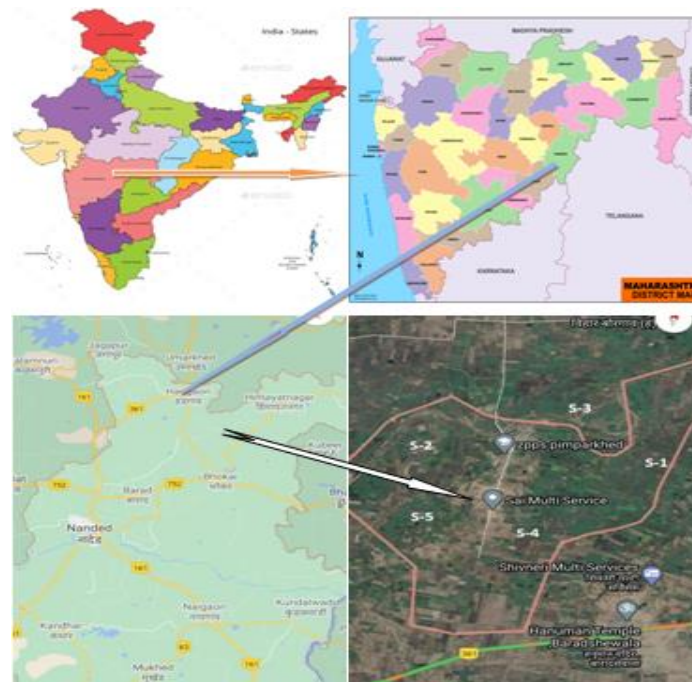
Figure1:-Location map of Study area
Bank of kayadu River Pimparkheda, Tq.Hadgoan Dist. Nanded.

SAMPLE COLLECTION

Five samples were collected from the study area (farmer's field) in the month of December2021. Soil samples were collected randomly at 5 to 15 cm depths with five plots, in well sterilized polythene pouches. Soil sample were collected from following Farmers fields-

Sample-1 collected from Mr. Subhash Kale's farm.

Sample-2 collected from Mr.Munjaji Kale's farm.

Sample-3 collected from Mr. Shyam Rathod's farm.

Sample-4 collected from Mr. Shivraj Wakode's farm.

Sample-5 collected from Mr.Rajeah Swami's farm.

PHYSICO-CHEMICAL ANALYSIS OF SOIL SAMPLES

The soil samples were Collected and dried for about 24hrs.Grinded more finely. Methods use for estimation of various parameters is as fallows, like Determination of Moisture was by Weighing Method, pH by Digital pH Meter, EC by Conductometer, OC, Ca, N, P, Ca by Titration Method, Determination of Mg was done by EDTA Titration Method. Determination of Potassium (K) by Flame Photometry.

RESULT AND DISCUSSION

Color of Soil

The soil sample S1, S2, S3 were Black, S4, S5 Faint Black in color.

Moisture

Value of moisture contain ranges from 2.1% - 8.1%.The result shows that only the moisture of sample S2 is more as compared to other samples.

pH

The range of pH is found in between 6.7 – 7.4. The sampleS2,S3 are slightly alkaline sample as compare toS1,S4,S5 soil sample which is in medium alkaline nature.

Organic Carbon

Organic carbon were recorded in the range of 4.10 – 5.10 %.The soil sample S2,S3 has high percentage of organic carbon. Sample S3 have moderate and sample S1,S5 has less organic carbon.

Nitrogen

Nitrogen content in the soil ranged from 75- 125 kg/hector. All the sample has nitrogen deficient and it is seen in sequence S5<S4<S1<S3<S2.

Phosphorous

Phosphorous content in the soil sample ranged between 2.0- 12.0 kg/hector. The soil sample S4 has more phosphorous content as compared to other sample.

Potassium

Potassium content in the soil sample ranged between 44.1 – 93.2kg/hector. The soil sampleS3 have more potassium content as compared to other samples.

Magnesium

The Magnesium content in the soil sample ranged from 1.5 – 2.3 %. It is seen in sequenceS1<S2<S4<S5<S3.

Electric Conductance

The Electric Conductance values varies from 0.5 – 0.7ms. It is seen that soil sample S1,S3 have more amount of Electric Conductance as compared to other sample.

Calcium

The Calcium content in soil sample ranges from 1.9 – 2.7 %.It is seen in sequence S4<S1<S5<S2<S3.

Alkalinity

The alkalinity was observed in the range between 750–1120mg/lit. And it is in the range S5<S4<S3<S1<S2.

Calcium Carbonate

The Calcium Carbonate content in soil samples ranges from 5.50-7.25 %.It is seen that soil sample S3have more amount of Calcium Carbonate as compared to other soil samples.It is seen in sequence S3<S1<S2<S4<S5.

CONCLUSION

The physico chemical analysis of soil provides necessary information to set the target of nutrient application. The soil samples are slightly alkaline and the pH is in S4<S5<S1=S3<S2 order hence the Suggestion to use of compost manure. In the soil sample S1 and S2 the magnesium is less. In the soil sample S3 phosphorous is less as compare to other sample. In soilsample S3 and S2 the organic carbon and in all soil samples nitrogen is less.

Table 1 :Physico chemicals parameters of soil samples.

S. No.	Parameters	S1	S2	S3	S4	S5
1	**Color**	Black	Black	Black	Faint Black	Faint Black
2	**Moisture (%)**	6.3	8.1	2.7	2.1	1.8
3	**pH.**	7.1	7.4	7.1	6.7	6.9
4	**Organic Carbon (%)**	4..3	4.9	5.1	4.7	4.1
5	**Nitrogen (kg/hector)**	110	125	115	90	75
6	**Phosphorous(kg/hector)**	9.5	5.5	2.0	12	7.0
7	**Potassium (kg/hector)**	54.1	44.1	93.2	78.5	87.2
8	**Magnesium (%)**	1.5	1.7	2.1	1.8	2.3
9	**Electro Conductance(ms)**	0.7	0.6	0.7	0.6	0.5
10	**Calcium (%)**	1.9	2.3	2.7	1.8	2.1

11	**Alkalinity(mg/L)**	1050	1120	950	780	750
12	**CaCo$_3$(%)**	5.70	5.90	5.5	7.10	7.25

References

1. **Kulkarni A.N., Balkhande J.V., Waghmare B. D., Ratnakart P.U. and Kanwatr V. S**., Studies of some physic chemical factors of teak forest from kinwat area, Nanded, *Int.J. Life science*, 437-438(2011)**.**
2. **Raut P.P. and Ekbote P.D**., Physico chemical analysis of soil from Babhulgaon region, dist. Yavatmal (MS), Int. J. of basic and applied research special issue, 112-116(2012).
3. **Methur R. and Sudan P.,** J. Chem. Pharm. Res.,3(3)(2011)290.
4. **Kumar M. and Babel A. L**., Indian Journal of Agricultural Science,3(2011)97.
5. **Nazif W., Perveen S. and Saleem I.,** Journal of Agricultural and Biological Science,1(2006)35.
6. **Khadke P.A., BhosleA.B.andYennawar V. B**, ResearchFront,1(1)(2013)73.**Wajahat N., Sajida P. and Iftikhar S**., Journal of Agricultural and Biological Science,1 (2006) 35. 4.
7. **PatilA. A. and Ahire D. V.**, *J. Chem. Bio. Phy. Sci. Sec. C*, 3(1), 840(2013).
8. **Ganorkar R. P. andChinchmalatpure** P. G., Int. J. Chemical, Env. And Pharmaceutical Research,4(2&3), 46(2013).
9. **10.Ganorkar R. P. and KhanN.H.,***International Journal of Chemical and Pharmaceutical Analysis*,1(4), 190(2014).
10. **11**.**Gurdeep, Chatwal, R., and Harish Sharma,** (2005). A text book of environmental studies I edition, Himalaya publishing house, pg-281.
11. **12.Atulkumar H. Patel**(2015).International Journal of Science and Research, Vol 4
12. (7)pg-1994-1997.