IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

Study on Chemical Properties of Soil at Different Gram Panchayat of Masuda Block (Ajmer)

Dr. Rekha Israni[1] and Suresh Kumar Joshi[2]
Associate Professor, Bhagwant University, Ajmer, Rajasthan, India[1]
Research Scholar, Bhagwant University, Ajmer, Rajasthan, India[2]
joshisuresh237@gmail.com

Abstract: *In the 21st century, India's agricultural development strategy should focus on increasing the productivity of cultivated land while reducing production costs and enhancing the efficiency of input use, all without harming environmental quality. This research aims to analyze both chemical and physical parameters of soil to create an index of nutrient availability and improve our understanding of factors affecting soil productivity. High crop yields require an ample supply of essential nutrients. Soil plays a crucial role in farming and cultivation, and its physical and chemical properties are fundamental to the effectiveness of various management practices. The physical study of soil is therefore vital, as both its physical and chemical characteristics significantly impact soil productivity. Key parameters studied include soil color, texture, consistency, porosity, pH, cation exchange capacity, redox potential, and electrical conductivity. These parameters are crucial because they affect nutrient availability, plant growth, and biological activity. Soils often exhibit low tensile strength and are highly influenced by environmental conditions. Soil quality and composition have substantial effects on the growth and development of crops such as wheat. Poor soil conditions can lead to problems like nutrient deficiencies, water stress, soil pH imbalances, pest and disease issues, toxicity, weed growth, and soil compaction. Understanding the biological, physical, and chemical conditions of soil is essential for implementing effective management practices. This knowledge will help create awareness among farmers about enhancing economic productivity through improved soil management strategies.*

Keywords: Soil health, physical and chemical properties, consistency, Toxicity

I. INTRODUCTION

Soil is one of nature's most important resources. All living things depend on plants, which in turn grow in soil to meet their daily needs. Soil serves as the medium through which crops grow, providing essential food and raw materials for clothing. Beyond agriculture, soil plays a crucial role in supporting a wide range of living organisms. It is a key component of the terrestrial ecosystem and fulfills many functions essential for sustaining plant growth. The importance of soil as a reservoir of nutrients and moisture for forage and plant species has been recognized since the advent of forest management as a scientific discipline. Any part of the Earth's surface that supports vegetation also has a soil covering. The distribution and development of vegetation largely depend on soil conditions.

Soil formation is both a constructive and destructive process. It consists of particles of broken rock that have been altered by chemical and mechanical processes such as weathering and erosion. Soil is not just a collection of mineral particles; it also includes a biological system of living organisms and other components. Factors such as climate significantly affect soil formation.

Contrary to the common belief that soil is merely a lifeless mass of minerals, healthy soil is alive and dynamic, teeming with microorganisms. The top layer of soil, or the soil surface, is particularly rich in nutrients and supports a high level of biological activity. Soil profiles vary distinctly from place to place in terms of depth, color, and composition. Soil is a natural body of mineral and organic material organized into horizons. Its mineral composition, organic matter content, and overall environment are determined by its chemical properties. Understanding soil chemistry and its processes is crucial for developing innovative resource management strategies and for regulating the behavior of terrestrial ecosystems on both regional and global scales. Modern concepts of soil quality emphasize the ability to sustain plant

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

and animal productivity, enhance water and air quality, and contribute to overall plant and animal health. Soil health and quality have evolved with increased understanding of soil attributes, which are controlled by physical, chemical, and biological components and their interactions.

Rapid population growth and the subsequent rise in per capita needs have led to deforestation, industrial development, and pollution problems. These environmental issues have reached a level where it is challenging tomitigate pollution without costly technologies and equipment, which in turn affects economic production and global competitiveness. Therefore, the focus now must be on environmentally friendly production through green chemistry and sustainable technologies to ensure economical and clean environmental practices.

The fast pace of industrial growth has resulted in serious problems such as ozone depletion, biodiversity loss, global warming, soil erosion, land degradation, and deterioration of air and water quality. Given the ongoing environmental decline, sustainable development has become a global priority. It is crucial that environmental andeconomic development progress in harmony to achieve sustainable growth.

Observing nature reveals how it has provided simple technologies to humanity. For years, trees have produced health care medicines, pigments, gums, cotton, and various other products without requiring significant capital investment or causing environmental pollution. Soil is vital for everyone, either directly or indirectly. It is the natural foundation for agricultural products and a delicate ecosystem. As one of the country's most important natural resources, understanding soil characteristics is essential for developing optimal land use plans to maximize agricultural production.

AREA OF STUDY

Masuda is a town located in the Ajmer district of the Indian state of Rajasthan. It is situated in the western part of Rajasthan, approximately 150 kilometers southwest of the city of Jaipur, the capital of Rajasthan. Masuda is known for its historical significance and cultural heritage, including ancient temples and forts. Masuda has a rich history dating back centuries. The town has been influenced by various rulers and dynasties, contributing to its cultural diversity. Masuda is known for its vibrant culture, which is a blend of Rajasthani traditions and customs. The town celebrates various festivals with enthusiasm, including Diwali, Holi, and Teej. The local cuisine reflects the flavors of Rajasthan, with dishes like Dal Baati Churma and Gatte ki Sabzi being popular. Masuda and its surrounding areas offer several tourist attractions for visitors. These include historical sites such as forts, temples, and step wells. The Masuda Fort, dedicated to Rao Shakti Singh, is one such landmark. Other attractions include the Nayaneshwar Mahadev Temple and the Kharwa Fort. The economy of Masuda primarily revolves around agriculture, with farming being the main occupation of the local population. Crops such as wheat, barley, mustard, and pulses are grown in the region.

II. RESEARCH MATERAILS AND METHODS

Geographically, Masuda in Rajasthan is situated at approximately 26.27°N latitude and 74.72°E longitud. The soilsamples have been collected from 8 different gram panchayat of masuda block .In each gram panchayat two village are selected for sampling and sample obtained from two different depth 0-15 cm and 15-30 cm , totally 16 soil sample were collected .Soil sample were collected with the help of khurpi , spade , and meter scale. Samples have been collected in clean and sterilised polyethylene bag of 1kg capacity. Standard methods with precise instruments are used to test the samples. All the chemicals and solvents are of AR grade.The study has been initiated from Jan 2023 to July 2023 in period to check the various chemical parameters.

Soil chemical properties and their respective methods for analysis :

First, we delve into the soil's pH level, a crucial indicator of its acidity or alkalinity, measured with precision using a pH meter in a 1:2 ratio.

Next, we explore the soil's electrical conductivity, a key factor in understanding its ability to facilitate nutrient uptake, measured with a conductivity meter in a 1:2 ratio.

We then uncover the soil's organic carbon content, a vital component of its fertility, determined through the titration method.

Further, we calculate the soil's organic matter percentage, a critical metric of its overall health, using the formula %OM = %OC × 1.724.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

The available nitrogen content is then revealed, a essential nutrient for plant growth, measured using the potassium permanganate method.

Additionally, we determine the available phosphorus content, a vital nutrient for plant development, using a spectrophotometer.

The available potassium content is also uncovered, a crucial nutrient for plant growth, measured through a flame test.

Furthermore, we examine the exchangeable calcium and magnesium levels, essential nutrients for plant growth, measured using ammonium acetate/EDTA.

Finally, we assess the available sulfur content, a vital nutrient for plant health, measured through a turbidity test."

Table 1 : Contain Chemical properties of soil :

Gram panchayat	DEWAS						HANUTIYA					
Village	AMARPURA			DEDPURA			DHANI KHERA			GANESHPURA		
parameter	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mea n	0-15 CM	15-30 CM	Mean
Soil pH (1:2)	7.3	7.41	7.355	6.8	7.2	7	7.41	7.56	7.485	7.32	7.48	7.4
Electrical conductivity(1: 2)	0.65	0.69	0.67	0.74	0.82	0.78	0.51	0.59	0.55	0.8	0.83	0.815
Organic carbon	0.45	0.31	0.38	0.51	0.39	0.45	0.78	0.61	0.695	0.75	0.53	0.64
Organic matter	0.8	0.61	0.705	0.95	0.83	0.89	1.23	1.09	1.16	1.25	1.03	1.14
Available nitrogen	210.2	201.3	205.75	220.2	210.8	215.5	245.2	234.6	239.9	235.4	229.6	232.5
Available phosphorus	11.03	10.04	10.535	11.08	10.8	10.94	12.04	12.98	12.51	11.45	10.9	11.18
Available potassium	430	412	421	568	545	556.5	438	429	433.5	490	485	487.5
Exchangeable calcium	4.3	3.6	3.95	5.81	5.23	5.52	5.37	4.95	5.16	6.95	6.05	6.5
Available Sulphur	3.28	3.17	3.225	3.59	3.47	3.53	2.61	2.53	2.57	4.03	3.95	3.99
Exchangeable magnesium	13.81	13.61	13.71	13.65	13.54	13.595	14.03	13.91	13.97	14.15	14.03	14.09

Table 2 : Contain Chemical properties of soil

Gram panchayat	KIRAP						LODIYANA					
Village	KALAHERI			SHYAMPURA			JAISINGHPURA			KHOONTIYA		
parameter	0-15 CM	15-30 CM	Mea n	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean
Soil pH (1:2)	7.2	7.29	7.245	7.25	7.37	7.31	7.03	7.15	7.09	7.13	7.23	7.18
Electrical conductivity(1: 2)	0.34	0.38	0.36	0.28	0.36	0.32	0.82	0.88	0.85	0.92	0.96	0.94

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

Organic carbon	0.65	0.52	0.585	0.53	0.38	0.455	0.68	0.51	0.595	0.82	0.71	0.765
Organic matter	1.05	0.93	0.99	1.15	0.95	1.05	0.88	0.69	0.785	0.75	0.63	0.69
Available nitrogen	280.3	270.4	275.4	265.3	251.3	258.3	228.8	215.3	222.05	219.3	211.7	215.5
Available phosphorus	13.81	13.12	13.47	12.98	12.2	12.59	13.02	12.75	12.885	13.4	12.85	13.125
Available potassium	632	617	624.5	590	576	583	445	431	438	512	493	502.5
Exchangeablecalcium	6.03	5.75	5.89	8.17	7.37	7.77	7.35	6.85	7.1	8.85	8.15	8.5
Available Sulphur	2.1	2.03	2.065	2.18	2.09	2.135	3.16	3.03	3.095	3.69	3.51	3.6
Exchangeable magnesium	15.78	15.69	15.74	14.85	14.71	14.78	15.41	15.32	15.365	13.61	13.41	13.51

Table 3 : Contain Chemical properties of soil :

Gram panchayat	SATHANA						SHIKHRANI					
Village	LACHHMIKHERA			SATHANA			NAGAR			MOKHAMPURA		
parameter	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mea n	0-15 CM	15-30 CM	Mea n	0-15 CM	15-30 CM	Mea n
Soil pH (1:2)	7.31	7.45	7.38	7.21	7.33	7.27	7.8	7.62	7.71	7.54	7.68	7.61
Electrical conductivity(1:2)	0.31	0.45	0.38	0.61	0.68	0.645	0.48	0.53	0.505	0.59	0.69	0.64
Organic carbon	0.48	0.21	0.345	0.69	0.55	0.62	0.58	0.41	0.495	0.72	0.58	0.65
Organic matter	1.4	1.11	1.255	1.23	0.97	1.1	1.12	0.89	1.005	1.18	0.92	1.05
Available nitrogen	218	208.11	213.055	258.03	243.05	250.54	263.07	253.03	258.1	233.16	221.13	227.1
Available phosphorus	11.09	10.02	10.555	13.02	12.04	12.53	12.05	11.07	11.56	11.03	10.05	10.54
Available potassium	389.11	172.22	280.665	398.09	385.28	391.69	408.19	389.15	398.7	436.24	421.48	428.9
Exchangeable calcium	7.2	6.8	7	6.9	6.2	6.55	5.9	4.3	5.1	6.28	5.07	5.675
Available Sulphur	3.5	2.9	3.2	3.9	2.7	3.3	3.8	2.9	3.35	3.22	2.28	2.75
Exchangeable magnesium	13.41	13.09	13.25	13.65	13.51	13.58	14.69	14.52	14.61	14.31	14.18	14.25

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

Table 4 : Contain Chemical properties of soil :

Gram panchayat	BARI						SHERGARH					
Village	INDARGARH			BADA ASSAN			FATAHGARH			LAMBA		
parameter	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean	0-15 CM	15-30 CM	Mean
Soil pH (1:2)	7.21	7.41	7.31	7.22	7.34	7.28	6.85	6.97	6.91	6.94	7.08	7.01
Electrical conductivity (1:2)	0.59	0.68	0.635	0.43	0.49	0.46	0.33	0.38	0.355	0.29	0.38	0.335
Organic carbon	0.62	0.51	0.565	0.58	0.38	0.48	0.89	0.67	0.78	0.95	0.85	0.9
Organic matter	0.98	0.74	0.86	0.87	0.79	0.83	0.93	0.82	0.875	0.94	0.76	0.85
Available nitrogen	222.08	211.01	216.5	223.04	216.03	219.5	245.09	228.05	236.57	252.1	244.11	248.105
Available phosphorus	11.06	10.09	10.58	12.9	11.7	12.3	14.01	13.03	13.52	13.01	12.06	12.535
Available potassium	455.23	444.19	449.7	468.04	449.02	458.5	412.01	396.06	404.035	498.17	478.12	488.145
Exchangeable calcium	7.8	6.2	7	7.5	6.6	7.05	8.22	7.44	7.83	8.28	7.55	7.915
Available Sulphur	2.84	1.92	2.38	2.36	2.11	2.235	2.46	2.22	2.34	2.55	2.33	2.44
Exchangeable magnesium	15.39	15.17	15.28	15.04	14.79	14.92	13.45	13.27	13.36	13.31	13.11	13.21

III. RESULT

These were the results after doing the test :.

- **Soil pH**: Highest mean pH at Nagar (7.71) and lowest at Fathagarh (6.91). The pH increase with depth is likely due to salt leaching from upper to lower soil layers. Similar findings by Mehta et al. (2012), Maheshwari & Sharma (2013), and Gill et al. (2012).
- **Electrical Conductivity**: Highest mean EC at Jaisinghpura (0.94 dS m^{-1}) and lowest at Shyampura (0.32 dS m^{-1}). Low EC suggests good drainage, removing bases via percolation. Similar results reported by Ram et al. (2010).
- **Organic Carbon**: Highest mean at Shergarh (0.9%) and lowest at Sathana (0.345%). Organic carbon decreases with depth due to higher plant residue and manure in surface layers. Similar observations by Maheshwari & Sharma (2013) and Gill et al.
- **Organic Matter**: Highest mean at Lachhimkhera (1.2555%) and lowest at Khoontiya (0.69%). Organic matter decreases significantly with depth. Similar results found by Kumar et al. (2014).
- **Available Nitrogen**: Highest mean at Kalaheri (275.4 kg ha^{-1}) and lowest at Amarpura (205.75 kg ha^{-1}). Nitrogen decreases with depth, higher in surface layers due to organic carbon content and periodic fertilizer application. Similar trends noted by Urmila et al. (2018).
- **Available Phosphorus**: Highest mean at Fathagarh (13.52 kg ha^{-1}) and lowest at Amarpura (3.95 kg ha^{-1}). Phosphorus is higher in surface layers and decreases with depth. Similar findings by Meena et al. (2010).
- **Available Potassium**: Highest mean at Jaisinghpura (624.5 kg ha^{-1}) and lowest at Lachhimkhera (280.665 kg ha^{-1}). Potassium levels are higher in surface horizons, decreasing with depth. This trend is due to weathering,

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

organic residue release, K fertilizer application, and capillary rise. Similar results by Urmila et al. (2018) and Sharma & Chaudhary (2017).

- **Exchangeable Calcium**: Highest mean at Khoontiya (8.5 Cmol (p+) kg^{-1}) and lowest at Amarpura (3.95 Cmol (p+) kg^{-1}). Calcium content decreases with depth. Similar trends observed by Athokpam et al. (2010).
- **Exchangeable Magnesium**: Highest mean at Ganeshpura (3.99 Cmol (p+) kg^{-1}) and lowest at Kalaheri (2.065 Cmol (p+) kg^{-1}). Magnesium content decreases with depth. Similar results found by Mehta et al. (2012) and Gillet al. (2012).
- **Available Sulphur:** Highest mean at Kalaheri (15.74 ppm) and lowest at Lamba (13.21 ppm). Sulphur levels vary from 13.28 to 17.32 ppm. Similar results reported by Urmila et al. (2018).

IV. CONCLUSION

The soil properties across the different villages reflect both the variability in soil management practices and natural soil processes. The highest mean soil pH was observed in Nagar (7.71), suggesting an alkaline trend withdepth, likely due to salt leaching. Electrical conductivity was highest in Jaisinghpura (0.94 dS m^{-1}), indicating higher salinity, while the lowest was in Shyampura (0.32 dS m^{-1}), implying better drainage. Organic carbon and organic matter were highest in Shergarh (0.9%) and Lachhimkhera (1.2555%), respectively, decreasing with depth due to surface organic inputs. Available nitrogen peaked at Kalaheri (275.4 kg ha^{-1}) and was lowest at Amarpura (205.75 kg ha^{-1}), reflecting higher nutrient availability in surface layers. Available phosphorus and potassium were highest in Fathagarh (13.52 kg ha^{-1}) and Jaisinghpura (624.5 kg ha^{-1}), respectively, decreasing with depth. Exchangeable calcium was highest in Khoontiya (8.5 Cmol (p+) kg^{-1}) and lowest in Amarpura (3.95 Cmol (p+) kg^{-1}), while exchangeable magnesium was highest in Ganeshpura (14.09 Cmol (p+) kg^{-1}) and lowest in Kalaheri (13.51 Cmol (p+) kg^{-1}). Available sulphur levels ranged from 13.21 ppm in Lamba to 15.74 ppm in Kalaheri. These patterns underline the importance of soil management practices and natural processes in influencing soil nutrient availability and quality.

V. ACKNOWLEDGEMENTS

I am immensely grateful to all those who contributed to the completion of this research endeavor. Their support and guidance were invaluable throughout the entire process. I extend my deepest appreciation to my supervisor, Dr. Rekha Israni maam (Bhagwant University Ajmer) , for their exceptional mentorship and unwavering support. Their expertise, encouragement, and constructive feedback were instrumental in shaping the direction of this research. Special thanks to Bhagwant University Ajmer lab for providing access to necessary resources, facilities, and equipment essential for carrying out this research effectively. In conclusion, I extend my heartfelt thanks to everyone who contributed to this research project. Your support and encouragement have been instrumental in its successful completion

REFERENCES

[1]. Athokpam, Herojit Singh, Singh, R.K. Umakanta,Chongtham,Nandini,Singh,R.K. Kumarjit and Singh, N. Gopimohan (2010) Forms of potassium and their relationship with physico- chemical properties of acidic soils in Manipur State. Agropedology, 20(2), 189-193

[2]. Chaudhari K G.2013. Studies of the physicochemical parameters of soil samples Advances in Applied Science Research ; 4(6):246- 248

[3]. Ganorkar R P, Chinchmalatpure PG 2013. Physicochemical Assessment of Soil in Rajura Bazar in Amravati District of Maharashtra (India) International Journal of Chemical, Environmental and Pharmaceutical Research MayDecember. ; 4(2&3):46-49

[4]. Ku. Smita Tale*and Dr. Sangita Ingole 2015. A Review on Role of Physico-Chemical Properties in Soil QualityChem Sci Rev Lett, 4(13), 57 – 66

[5]. Kumar, A., Mishra, V.N., Srivastav, L.K. and Banwasi, R. (2014) Evaluation of soil fertility status of available major nutrients(N,P&K)andmicronutrients (Fe, Mn, Cu & Zn) in Vertisols of Kabeerdham district of Chhattisgarh, India. International Journal of Interdisciplinary and Multidisciplinary Studies, 1(10): 72- 79.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, November 2024

[6]. Li, P.; Zhang, T.; Wang, X.; Yu, D..2013 Development of biological soil quality indicator system for subtropical China. Soil Tillage Res. , 126, 112–118

[7]. Mahajan S., Billore D.2014. Assessment of PhysicoChemical characteristics of the Soil of Nagchoon Pond Khandwa, MP,India. Res. J Chem Sci. ; 4(1):26-30.

[8]. Maheshwari, Rohini and Sharma, Indu Rani (2013) Soil Status in Relation to Blast Disease in Bundi District of Rajasthan, INDIA.InternationalJournalofPure& Applied Bioscience, 1(1): 13-19

[9]. Masto, R.E.; Chhonkar, P.K.; Purakayastha, T.J.; Patra, A.K.; Singh, D. 2008.Soil quality indices for evaluation of long-term land use and soil management practices in semi-arid sub-tropical India. Land Degrad. Dev. ,19, 516–529

[10]. Meena, H.B., Giri, J.D. and Mishra, H.K. (2010) Nutrient availability in soils as affected by physiographyinChittorgarh district, Rajasthan. Agropedology,20(1), 85-87

[11]. Mehta, K.M., Shankaranarayana, H.S. and Jaisinghani, C.J. (2012) Study of Pedo Genesis of soils of Bundi district (Rajasthan). Soil Science and Plant Nutrition, 8:5, 32-38.

[12]. Mlitan A .2015 . Impact of Treated Wastewater on Some Physicochemical Parameters Soil and Its Fungal Content. International Journal of Environmental Science and Development. ; 6:5

[13]. Nabiollahi, K.; Taghizadeh-Mehrjardi, R.; Eskandari, S.2017. Assessing and monitoring the soil quality of forested and agricultural areas using soil-quality indices and digital soil-mapping in a semi-arid environment. Arch. Agron. Soil Sci. , 64, 696–707.

[14]. Nabiollahi, K.; Taghizadeh-Mehrjardi, R.; Kerry, R.; Moradian, S.2017. Assessment of soil quality indices for salt-affected agricultural land in Kurdistan Province, Iran. Ecol. Indic. , 83, 482–494.

[15]. Neeta More, Mukul Barwant& Archana Hargude 2020. DETERMINATION OF SOIL COMPOSITION – WITH RELEVANCE TO THE PHYSICAL AND CHEMICAL NATURE OF

[16]. BLACK SOIL SAMPLE. International Journal of Applied and Natural Sciences (IJANS) Vol. 9, Issue 4; 1–14

[17]. Obade, V.D.P.; Lal, R.2016. A standardized soil quality index for diverse field conditions. Sci. Total Environ. 541, 424–434

[18]. Prakash L, Patel.2014. Correlation Study of Soil Parameters of Kutch district Agriculture Land. International Journal of Scientific and Research Publications. ; 4:5.

[19]. Ram, R.L., Sharma, P.K., Jha, P., Das, S.N. and Ahmed, N. (2010) Characterization and classification of soils of Nagarjunasagar catchment in Shorapur taluk of Gulbarga district, Karnatakastate.Agropedology,20(2), 112-123.

[20]. Shivan A.M, Nagendrappa G.2014. Chemical Analysis of Soil Samples to Evaluate the Soil Fertility Status of Selected Command Areas of Three Tanks in Tiptur Taluk of Karnataka, India Journal of Applied Chemistry. Ver. I. ; 7(11):01- 05

[21]. Sparks, D.L.; Page, A.L.; Helmke, P.A.; Leoppert, R.H.; Soltanpour, P.N.; Tabatabai, M.A.;Johnston, G.T.;Summer, M.E.1996. Methods of soil analysis. In Soil Science Society of American Journal; Book Series No. 5; ASA and SSSA: Madison, WI, USA

[22]. Urmila,Purohit,H.S.,Singh,D.,Meena,S.C.,Jain,H.K.,Kumar,AmitandVerma,S.N.(2018)Effectoftill ageonphy sico- chemical indices of soil in maize based cropping sequence of southern Rajasthan. International Journal of Chemical Studies, 6(4): 2490-2493

[23]. Wagh G. S. and Sayyed, M. R. G. 2013.Assessment of Macro and Micronutrients in Soils from Panvel Area, Maharashtra, India.Universal Journal of Environmental Research and Technology Available Online at: www.environmentaljournal.orgVolume 3, Issue 1: 72-78