PLANT FOOD STATUS OF MAMACHE MOHIDA AGRICULTURAL SOIL

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Abstract:

Apparent Soil sample were collected from different locality of cultivated field soil of Mamache Mohida Village sited near Shahada. Different Soil nutrient status are analyzed for plant food. It is observed that different site having variable nutritional concentration Such as Major, Minor and trace plant nutrients. This study also include pH, Ec organic carbon. Parameter Ph, Ec are slight increased from normal states which suggested that soil is alkaline and saline in nature. Due to high ESP, pH, EC, salt affected soils possess poor physical and chemical properties.

Key Words: N, P, K, Mohida,micro-nutrients, Soil, pH, EC.

Introduction: As the needs of food is constantly increased all over world. Consequently crop production also improved with new technology, agro pesticide, and new chemical fertilizers. With these effort soil potential fertility is degraded. In view of these continuously soil testing is very crucial for agronomist to increase the crop production. To maintain soil fertility and quality essential element such as N, P, K, Ca, Mg, Fe, Cu, Zn, Mn, and B have a duty to maintain correctly. Along with soil nutrients, Soil Physico chemical parameters such as pH, Ec, must also be maintain for crop production point of view. With variations in environment and supervision condition moreover much distress the soil health and the reinstatement of soil nutrients.

Experimental: Five symbolic sites nearby the Mamache Mohida rural are designated for the characterization of the soil illustrations. From five different sites, surface soil samples collected and stored in polythene handbags. Using scientific methods, Soil samples first dehydrated in open air, beneath the exposed shade, then ground casually with the help of woody hits and detached by 2 mm screens. This treated sample then retained in clean polythene bags for the investigation of different soil parameters. Like the physic-chemical constraints of nominated and composed samples were determined. The available nutrients such as NPK Ca, Mg, and, pH, Ec, OC, are characterized by suggested methods and practices. The micronutrients i.e. trace metals like Fe Cu, Zn, B, Mn are characterized by AAA methods.

Results and Discussion:

Soil Sr.	Available Primary Nutrients (Kg/h)			Available Sec. Nutrient (meq/L)		Available Micronutrients (ppm)					Physico Chemical Parameter		
	N	P	K	Ca^{+2}	Mg^{+2}	Fe	Cu	Mn	Zn	B	O.C. %	pH	EC Mhos
A	322.56	8.96	442.40	12.0	9.2	7.83	0.70	6.39	1.11	0.6	0.66	8.94	0.831
B	383.04	10.30	478.24	19.5	7.3	8.92	0.62	16.39	0.66	0.8	0.75	8.54	1.190
C	501.76	10.30	468.16	13.11	6.7	7.9	0.52	14.08	0.96	0.7	0.53	8.63	2.120
D	342.72	15.23	442.40	12.37	4.2	7.53	0.92	15.05	0.84	0.62	0.69	8.60	1.070
E	369.6	21.95	448.00	11.9	8.27	8.07	0.75	15.36	0.92	0.51	0.84	8.73	0.985

The top soil samples analyzed for categorization of physico - chemical parameters and important nutrients existent in salt pretentious soil of Mamache Mohida rural. N, P, K, Ca, Mg, Fe, Cu, Zn, Mn, and B have a duty to maintain correctly. Along with soil nutrients, Soil Physico chemical parameters such as pH, Ec, OC are assessed and characterized by various analytical techniques.

Primary nutrients :

Nitrogen: he range of available nitrogen of Mohida soil series is from 235.2 to 376.32 Kg/ha at C and E soil locations respectively. Among these soil C location is low and E soil location has medium available nitrogen according to soil rating of available nitrogen. Low nitrogen content could be because of leaching of nitrogen from soil due to rain water and running water. Another cause of low nitrogen is relatively low compost addition, little FYM, and short use of chemical fertilizers. Average available nitrogen contents of this soil series is 310.464 Kg/ha. It is medium according to standard rating of available nitrogen. Generally the chief source of nitrogen to this soil is types of nitrogenous minerals present in the soil, and other sources are FYM, low added compost, chemical fertilizers, and rain water. The nitrogen concentration changes with changes in climate such as moisture, temperature, humidity, aeration and uses of pesticide.

Phosphorous: The range of available phosphorous of this Mohida Soil series is from 10.75 to 19.26 Kg/ha at E and D soil locations respectively. According to soil rating of available phosphorous, the E and D soil location has medium available phosphorous. Medium phosphorous content could be because of short use of phosphate fertilizers and low mineralization of phosphate minerals. As the soils are alkaline in nature and have calcareous materials, the contents of available phosphorus are predictable to be low because of its fixation

Potassium: The range of available potassium of Mohida. Soil series is from 434.56 to 971.04 Kg/ha at A and E soil locations respectively. According to standard rating of available potassium, the A and E soil location has very high available potassium. The E location has very

high available potassium among all 70 soil location of this case study; the very high available potassium could be due to presence of potassium minerals which releases this K very easily and also there may be very high mineralization of potassium minerals. The relation between soil pH and potassium is important, because as pH of soil increases potassium also increases. Average available potassium contains of this soil series is 608.152 Kg/ha. It is also very high and might be attributed to the diffusion and release of potassium at high pH from internal crystal lattice of silicate minerals due to sodimization

Determination of Available Micronutrients, Cu, Mn, Zn and B: Micro-nutrient requires in extremely small amount for plant growth (< 50 ppm). This case study includes the quantitative data of micro-nutrients such as Fe, Cu, Mn Zn and B,

IRON: Range of extractable iron of this Mohida. Soil series is from 3.77 to 8.0 ppm at C and B soil locations respectively. According to standard rating of 97 extractable iron, the B3 soil locations has very low and B soil location has low extractable iron. The very low extractable iron could be due to presence of little extractable iron minerals and their weathering. The relation between soil pH and extractable iron is important, because as pH of soil increases extractable iron decreases. Average extractable iron contains of this soil series is 6.226 ppm. Other important factors for extractable iron are soil texture, organic matter as well as leaching are also responsible for low extractable iron at the surface soil.

Copper: The relation between soil pH and extractable copper is important, because as pH of soil increases extractable copper decreases. The range of extractable copper of this Mohida. Soil series, is from 0.52 to 0.95 ppm at A and B soil location respectively. According to standard rating of extractable copper, the A soil location has low and D soil location has medium extractable copper. The very low extractable copper could be due to presence of little extractable copper minerals and their weathering. The relation between soil pH and extractable copper is important, because as pH of soil increases extractable copper decreases. Average extractable copper contains of this soil series is 0.748 ppm. Other significant factors for extractable copper are soil texture; organic matter as well as leaching is also accountable for low extractable copper at the surface soil.

Manganese : Manganese is important in respiration, redox reaction, protein synthesis as a constituent of enzyme. Like other micronutrients manganese is also required for proper growth and development of plants. The high to very high extractable manganese could be due to presence of abundant extractable manganese minerals and their weathering in the soil. The range of extractable manganese of this Mohida. Soil series is from 9.78 to 16.96 ppm at B and C soil locations respectively. The ranges of extractable manganese is broad. Average extractable manganese contains of this soil series is 14.542 ppm. The amount Mn in this soil is very sufficient for plant growth.

Zinc: Micronutrient zinc require for enzyme system, plant metabolism, redox reaction, formation of hormones, reproduction in proper plant growth and development. Low extractable zinc at Mohida.soil series could be due to presence of little extractable zinc minerals and their weathering. Here the relation among soil pH and extractable zinc is significant, because as pH of soil increases extractable zinc decreases. Other significant factors for extractable zinc are-soil texture; organic matter as well as soil leaching is also accountable for low extractable zinc

at the surface soil. The range of extractable zinc of this soil series is from 0.53 to 1.14 ppm at D and E soil location respectively. According to normal rating of extractable zinc, the D soil location has low and E soil location has medium extractable zinc. Average extractable zinc contains of this soil series is 1.052 ppm.

Boron: Micronutrients boron require for hormones movement, flowering and fruiting processes, carbohydrate metabolism, respiration etc. Improper plant growth and development. The range of available boron of this Mohida. Soil series is minimum 0.91 to maximum 1.31 the ranges of available boron is broad. The E soil locations available boron may be toxic for few boron sensitive plants. Average available boron contents of this soil series is 1.126 ppm. The amount boron in this soil is very sufficient for some plant for their appropriate growth. The medium to high available boron could be due to presence of abundant available boron minerals and their mineralization in the soil.

Exchangeable Calcium and Magnesium: Exchangeable Calcium: Low exchangeable calcium and high pH may due to the presence of chief soluble salt Na_2CO_3 which boosted the soil pH caused nearly all soluble and exchangeable Ca^{2+} and Mg^{2+} get precipitated.

Ca^{+2}: Reported that indiscriminate and continuous use of sodic irrigation water deteriorates productivity of soil. Due to high proportion of sodium, soil resulting in the development of high ESP. Similar phenomenon may be observed in Mohida soil series, because exchangeable calcium of Mohida village soil field ranges from 11.09 to 19.5 Meq/L. It is low 180 rating of exchangeable calcium. The pH of these series is high, that may be due to presence of chief soluble salt sodium carbonate, which increases the soil pH. Average exchangeable calcium is 13.776 Meq / L. which is reported low. Hence in general exchangeable calcium of this soil series is low Soil pH, Ec, and OC:

Mg^{+2}: There are various types of cations and anions which are responsible for increase in soil pH. It may be carbonates and hydroxides of calcium and magnesium. And excessive pH i.e. > 8.2 may due presence sodium ion and their salts. Exchangeable magnesium of Mohida village soil field ranges from 4.2 to 9.2 Meq/L . It is lower to medium range in rating of exchangeable magnesium; Average exchangeable magnesium is 7.134 Meq/L. which is reported medium. Hence, overall exchangeable magnesium in this soil series is medium.

Physico-chemical status such as pH, electrical conductivity, organic carbon, :

- **Soil pH:**

Soil pH is important in controlling the nutrient availability, solubility of toxic ions and microbial activity reveal that, soils are generally saline alkali, slightly alkaline to strongly alkaline Average pH of Mohida (Mamache) soil series is 8.688 which give an idea about the results that, the soil is strongly alkaline in character. The high pH value of this series is attributed to leaching of Ca^{2+} and Mg^{2+} ions due to running and rainwater. Soluble sodium content was more excessive in the salinesodic soils than calcium plus magnesium, calcium and magnesium affect the soil pH in saline and saline-sodic soil. Exchangeable sodium value was higher than both magnesium and potassium contents of the soil .The pH range of this agricultural soil area is recorded from 8.54 to 8.94, which is strongly alkaline range of soil pH.

The pH range of this series is narrow. These sites of soil may contain too much sodium and magnesium.

- **Electrical Conductivity (EC):**

In all over the world many countries have different schemes of determination of salt affected soil; reveals that soils are generally slightly saline to alkaline in characteristics Electrical conductivity of series Mohida agricultural soil area is recorded from 0.831 to 2.12 ds/m . it indicates the soil is moderately saline to strongly saline. This range of EC is not very narrow. Average EC of this soil series is 1.2392 ds/m which suggest that the soil is saline.

- **Organic Carbon (O.C.):**

Soil organic carbon is important in storage of the plant nutrients, their availability, solubility for proper plant growth and development. Presence of organic carbon is due to field crops residue and their decomposition, addition of compost organic manures, Farm yard manure, existence of humic substances and application organic fertilizers. Organic carbon content of Mohida agricultural soil series ranges from 0.53 percent to 0.84 percent. It ranges from moderate to high percentage of organic carbon content status. Average organic carbon content is 0.694 percent. High organic carbon content of soil location might be due to the cultivation of field crops residue, addition of organic manures and organic fertilizers. As organic carbon content increases water infiltration increases or reduces water runoff. Organic material improves the soil physical condition and soil structure

Conclusion:

The salt affected soil take place in the regions where the rate of evapo-transpiration is significant. The salt affected soils are either poor in their nutrient status or the nutrient availability in which crop development is suppressed by the opposed effect of the nutrient components part in excessive amount as soluble or exchangeable ions or both. Due to high ESP, pH, EC, salt affected soils retain deprived physical and chemical properties. For suitable plant development ease of use of all primary secondary and micronutrients are required in soil structure. There are some variations about nutrient availability in some location of Mamache Mohida soil.

Available NPK: According to standard rating of nitrogen, there is no high content nitrogen. But it is observed medium. It is due to leaching of nitrogen from soil due heavy rainfall and running water. One more cause of low nitrogen is quite low manure addition, slight FYM, and little application of nitrogenous chemical fertilizers. Medium phosphorous concentration due to low release of phosphorous from inorganic minerals to soil; Concentration of average potassium is high. This is due to more discharge of potassium from mineral.

Exchangeable Ca and Mg:

Exchangeable form of calcium and magnesium are medium to low. This is due to the presence of chief soluble salt Na_2CO_3 which increased the soil pH affected approximately all soluble and exchangeable Ca^{2+} and Mg^{2+} get precipitated.

Available Micronutrients Fe, Cu, Mn, Zn and B:

Mohida Soil location has low to medium extractable copper. The very low extractable copper due to presence of slight extractable copper minerals and their surviving. Usually the major source of extractable copper Iron to this soil series is their soil minerals. The amount Mn in this soil is very sufficient for plant growth. There may some extraordinary circumstances where quantity of Mn is high at high pH of the soil. Average extractable zinc contains of this soil series is 1.052 ppm which is medium. Average available boron contents of this soil series is 1.126ppm. The amount boron in this soil is very sufficient for some plant for their appropriate growth.

Physico chemical Parameters pH, EC OC:

The pH range of this agricultural soil area is recorded from 8.54 to 8.94. It is observed to be strongly alkaline range of soil pH. Average EC of this soil series is 1.2392 ds/m which suggest that the soil is saline. Average organic carbon content is 0.694 percent. Conferring information of all above foods of plants in soil of Mohida village field is moderately fertile for the crops such as Cotton, Moong, cane sugar, Udad, Jawar, Bajara, Papaya, etc.

References:

- Verma, K. S., Saxena, R. K. And Bhargava, G. P. 2007. Anomalies in Salt Classification of the Salt Affected Soil under USDA Soil Taxonomy. J. Indian Soc. Sci., 55 (1).
- M. M. Hossain, Z. H. Khan and M. S. Hussain. 2009. Nutrient Elements in Some Benchmark Soil Pedons from the Ganges River Floodplain of Bangladesh. Bangladesh J. Sci. Ind. Res. 44(3), 359-366.
- Sehgal J., 2002, Fundamental of Soil Science, ISSS.
- Harris W. G. (2002) Phosphate Minerals. In: Dixon, J.M. Schulze. D. G. (Eds.) Soil Mineralogy with Environmental Applications. Soil Sci. Soc. Amer.Inc. Madison, Wisconsin. Pp 637-662.
- Soil Test interpretation Guide. APAL, Agriculture guide.
- Markus Kleber., 2010. Minerals and Carbon Stabilization: Towards A New Perspective of Mineral Organic Interactions in Soils 2010 19th World Congress of Soil Science, Soil Solutions for A Changing World. Brisbane, Australia.
- Bhalerao, V.P., and Pharande, A.L., 2003. Potassium Behavior in Salt Affected Swell-Shrink Soils; Form, Fixation and Release Of potassium. J, Maharashtra Agric. Uni., 28 (1):17-21.
- Khairnar, P. D., and Chaudhari B. R. 2004. A Text Book of Agriculture and Dairy Chemistry. pp. 1-55.
- Biswas, T. D. and Mukherjee, S. K. (2001). Textbook of Soil Science. Second Ed. Tata Mc Graw -Hill Publications Ltd. New Delhi: 153-338.
- Brady, N.C. And R.R. Weil. 2002. The Nature and Properties of Soils. Thirteenth Edition. Prentice Hall. Upper Saddle River, New Jersey.
- White, J.G. & Zasoski, R.J. (1999) Mapping Soil Micronutrients. Field Crops Research 60:11-26.