

## Physico-Chemical Analysis of Soil Taken from Ultapani Water Sources, Mainpat Area of Surguja Division of Chhattisgarh, India

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### Abstract:-

This research is a study of the physical and chemical properties of the soil of the water flowing in the Ultapani area of Mainpat, Chhattisgarh, so that we can get information about the chemical elements present in the soil here, which will help in knowing the reason for this water flowing upwards. . We will also try to know the nature of the soil found here in our research. During this research, we will collect soil samples from the research area and determine the presence and quantity of physico-chemical properties such as conductivity, pH-value, *Fe*, *Cu*, *Zn*, *Ca*, *Mg* ([Dewangan et al.,2022](#)), *S*, *N* etc. During the research, we visited the research area, collected samples, studied the physico-chemical properties of the samples in the lab and studied related research papers, articles and books. This research will benefit the villagers of that area in agriculture, it will help to find out the reason for the water flowing upwards. India as well as the world can be told about this wonderful place so that tourists come here and there is progress.

**Keywords :-** Conductivity, pH-value, Iron(Fe), Physical properties, Chemical properties etc.

### INTRODUCTION: -

In Surguja district, Mainpat is a block in the northern region of Chhattisgarh state in India and is located about 55 kilometers from Ambikapur. The geographical distance of the Mainpat is 35 km from Darima airport and about 55 km from district headquarter Ambikapur in Surguja division. The height of the Mainpat hill is about 3560 feet from its base ([Chaohan et al., 2022](#)). The stream of water flows a distance of 200 meters towards the hill by removing the bottom of a small stone from the side of the road ([Dewangan S.K.,2022](#)). In this block, there is a place called Ultapani, in village Visarpani, which is situated 5 km before

Mainpat Kamleshwarpur chowk on the 3 km right side of the Ambikapur, Mainpat road. The altitude of the Ultapani, village Visarpani is 1085 meter above sea level in the world map, latitude of the Ultapani surface water source is located at 22052'40 " N and longitude at 83016'51" E. On field visit survey, we found that the groundwater level is very near to earth surface on the village Visarpani. In this area, there is a dense forest nearby, in some portion of the Mainpat large number of geographical changes are observed.

### **LITERATURE REVIEW:-**

Soil electrical conductivity, referred to as EC, is the ability of soil to conduct (transmit) or attenuate electrical current. EC is expressed in milli-Siemens per meter (mS/m) or at times is reported in deci-Siemens per meter (dS/m) ([Hawkins,2017](#)). Over the years, soil scientists have used EC to measure soil salinity. However, soil EC measurements also have the potential for estimating variations in soil physical properties where soil salinity is not a problem, including texture, moisture, depth of top soil plus others. The important aspect to remember is that anything that affects conductivity in the soil will influence measurements, so it is important to ground reference to understand the driving variable(s) for soil EC measurements ([Liyan,2022](#)). Soil pH is a measure of the acidity or alkalinity of the soil. A pH value is a measure of hydrogen ion concentration. Because hydrogen ion concentration varies over a wide range, a logarithmic scale (pH) is used: for a pH decrease of 1, the acidity increases by a factor of 10. It is a 'reverse' scale in that very acid soil has a low pH and a high hydrogen ion concentration. Therefore, at high (alkaline) pH values, the hydrogen ion concentration is low. Most soils have pH values between 3.5 and 10. In higher rainfall areas the natural pH of soils typically ranges from 5 to 7, while in drier areas the range is 6.5 to 9. Soils can be classified according to their pH value. 6.5 to 7.5—neutral, over 7.5—alkaline, less than 6.5—acidic, and soils with pH less than 5.5 are considered strongly acidic ([Oshunsanya, S. O., 2018](#)) It is concluded that study of soil quality can be carried out by different parameters. Most of the parameters are quite higher or lower than acceptable limits. Therefore, it is very important to put a total ban on the human activities which are responsible for soil quality deterioration ([Kekane et al.,2015](#)). The effect of soil aggregation on soil physical and chemical properties of structured soils both on a bulk soil scale, for single aggregates, as well as for homogenized material. The higher the amount of dissolved organic carbon in the percolating soil solution ([Horn et al.,1994](#)). Proposed indicators include soil depth to a root restricting layer, available water-holding capacity, bulk density/penetration resistance, hydraulic conductivity, aggregate stability, organic matter, nutrient availability/retention capacity, pH, and where appropriate, electrical

conductivity and exchangeable sodium([Arshad, M. A.,et al.,1992](#)). An increase in the degree of compactness resulted in higher penetration resistance, lower air-filled porosity and smaller daily temperature fluctuations, a greater accumulation of roots in the topsoil and shallower rooting depth([Lipiec,et al., 2004](#)).

**Material & Methods:-** We have used experimental Method in our Research as Methodology. During this time we took a soil sample 12 cm deep in the research found in the Ultapani water source, Block Mainpat, district Surguja. Determined the presence and quantity of Physico-Chemical properties such as Fe, Cu, Zn, Ca, Mg, Mn, B, Mo conductivity, pH-value etc. of the sample taken from research area which are as follows table (01) -

**Table 1 :Physio-chemical properties of Ultapani**

Sl.No.	Physio-chemical properties	Unit	Soil Ultapani	Level Description/ Critical Level
01	Electrical Conductivity	Ds/m	0.34	Less than 1.0-Normal
02	pH-value	pH-Scale	6.42	Neutral 7
03	Carbone (C )	Kg/Hactare	0.38	0.75
04	Zinc (Zn)	mg/Kg	0.2	0.6
05	Cupper (Cu)	mg/Kg	0.1	0.2
06	Iron (Fe )	mg/Kg	1.2	4.5
07	Manganese (Mn)	mg/Kg	0.6	3.5
08	Boron (B)	mg/Kg	0.2	0.5
09	Molybdenum (Mo)	mg/Kg	0.1	0.2

## RESULT & DISCUSSION:-

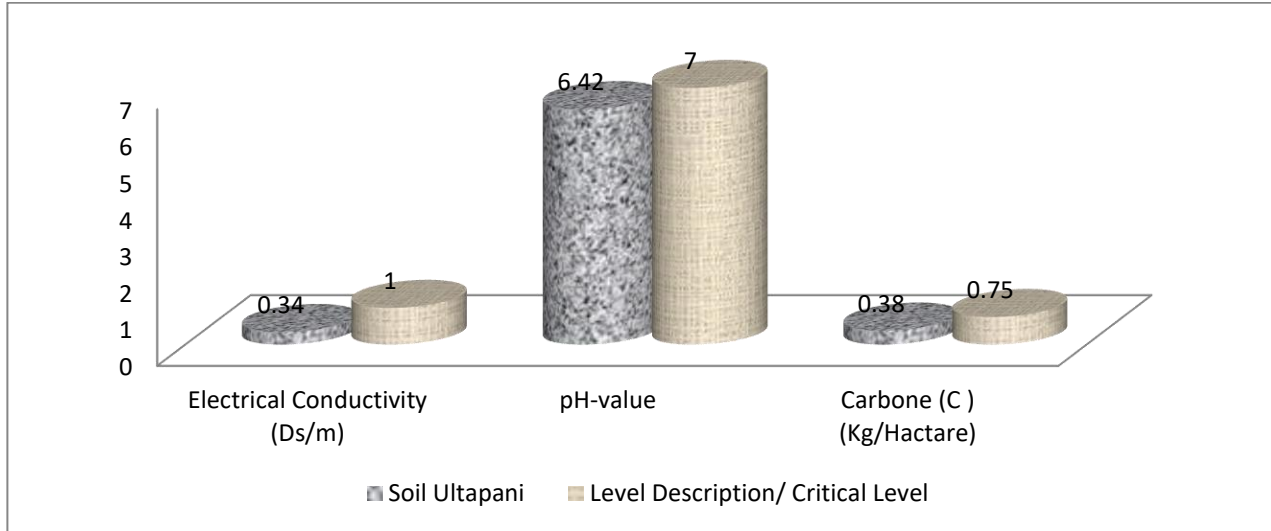


Figure 1 : value of electrical Conductivity, pH-value and Carbone with Critical level

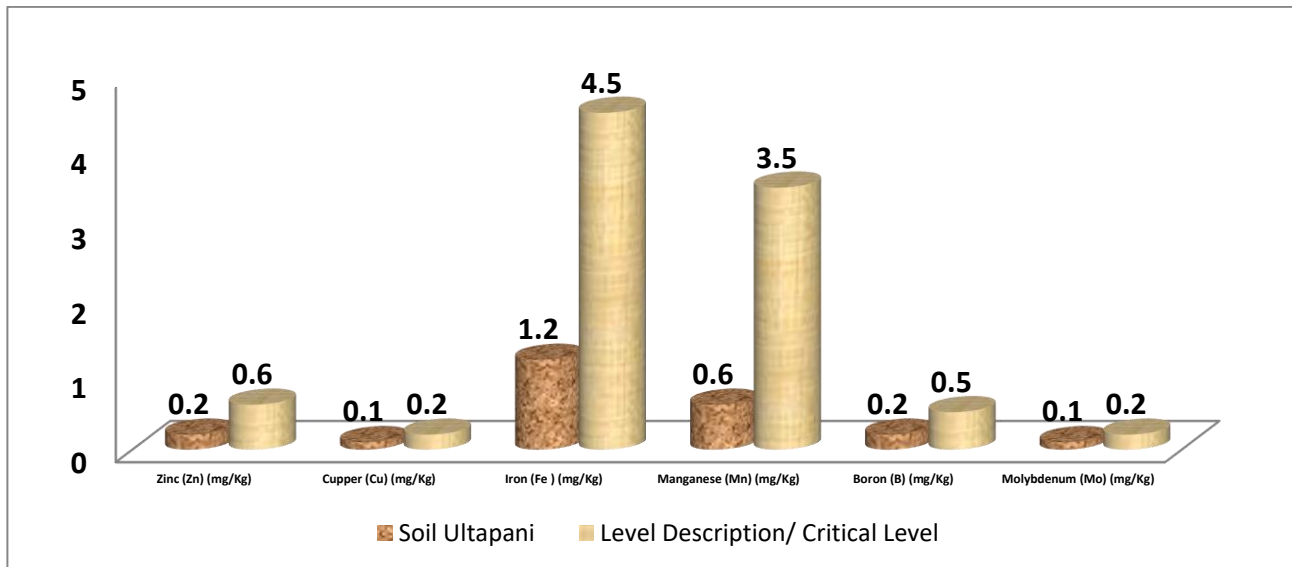


Figure 2 : value of Zn, Cu, Fe, Mn, B, & Mo with Critical level

The conductivity of the soil found in Ultapani water source was only 34% as compared to the critical level of conductivity of the normal level, so this soil would not be saline soil. The pH value of 6.42 was obtained, which means that the soil found in it is neutral. The carbon content was found to be 50% less than the critical level from [Figure 1](#)

The chemical properties of soil found in Ultapani water source were tested and Zn was found to be 33.3% less than the critical level, Cu was found to be only 50% of the critical level, Iron was found to be only 26.6%, similarly Mn, B, and Mo achieved only 17.2%, 40%, and 50% of the critical level. The amount of all these chemical elements is very less, from [Figure 1](#).

**Conclusion:-**

- The conductivity of the soil found in Ultapani source is less than normal, hence the nature of the silt found here is not saline.
- The pH-value of the soil found in Ultapani source is a little less than the critical level, so the soil found here would be very less acidic.
- The amount of chemical elements Zn, Cu, Fe, Mn, B, & Mo in the soil found in Ultapani source was also found to be less than normal.

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