# Physico-Chemical Characterization of farmland Soil used in Some Villages of Ramnagar, Dist: Nainital (Uttarakhand) India

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## Abstract

This Physco-Chemical study of soil is based on various parameter such as PH, Electrical Conductivity, Total Organic Carbon, Available Nitrogen, Available Phosphorus and available Potassium. The present study lead to us the .Soil samples of 10 different villages of tribal area surrounding Ramnagar. The physicochemical properties such as moisture content, specific gravity, PH measurement and estimations of $Mg^{2+}$, $Na^+$, conclusion of the nutrient's quanity of soil of Ramnagar. Dist. Nainital, Uttarakhand State. Soil sampling is the very important step for any soil Analysis. Result show that overage all the villages of Ramnagar have various parameter like EC, PH, OC, N, P, K. This information will help farmers to decide the problems related to soil nutrients amount of fertilizers to be added to soil to make production economic.

**Keywords:** Quality Of Soil, EC, PH, Total Organik Carban, Available P, N, K, Lunawada Taluka.

## Introduction

Soil sampling is the most important step for any soil analysis. Thus, Soil acts as an engineering medium, a habitat for a modifier of atmospheric composition, and a medium for plant growth, making it a critically important provider of ecosystem servicessoil organisms, a recycling system for nutrients and organic wastes, a regulator of water quality, Since soil has a tremendous range of available niches and habitats, it is contains most of the Earth's genetic diversity. A gram of soil can contain billions of organisms, as animal manures and industry by-products may provide various plant nutrients. As a very small fraction of the huge soil mass is used for analysis, , Soil samples of 10 different villages of tribal area surrounding Ramnagar The physicochemical properties such as moisture content, specific gravity, PH measurement and estimations of $Mg^{2+}$, $Na^+$, $K^+$ and $Cl^-$, $HCO^-$, $PO^{3-}$, $NO^{3-}$ %of soil were well studied. The soil fertility is determined by the amount of nutrients it is contains. Nitrogen (N), phosphorus (P), and potassium (K) are three of the most important nutrients needed by plants for highly plant growth. Each contens in a soil profile can be tested for the presence of these nutrients. The results of soil fertility measurements help to determine the suitability of a soil for growing plants. Soil fertility can be related to hydochemistry measurements carried out in the Hydrology Investigation.



**Map: showing Uttarakhand (India)**

## Experimental

The quality test survey of the soil was conducted in 2019. Ten villages from Ramnagar, covering North, South, East and West were selected for this study. A representative soil sample collected from each

village which represent soils of 5 to 10 farm's depending upon area of village. Representative soil samples were collected following standard quadric procedure and taken in polythene bags. In laboratory these samples were analyzed for different chemical parameters following standard methods . AR grade reagents and double distilled water were used for soil analysis. Results were compared with standard values to find out low, medium or high nutrient's content essential for STR.

**Physico Chemical Analysis**

The collected samples were analyzed for major Physical and Chemical soil quality parameter like PH, Electrical Conductivity (EC), Organic Carbon (OC), Nitrogen (N), Organic matter is oxidized with chromic acid e.g Potassium Di-chromate, + $H_2So_4$. This method is widely used in Indian Laboratories. The K and P analysis by standard method. PH was measured using PH meter EC was measured using a conductivity meter, OC was measured using colourimeter, Potassium was measured using Flame photometer, Phosphorus was measured using Spectrophotometer. All apparatus are Systronic make. Examination of soil done by Ramnagar soil analysis lab, Uttarakhand.

**Result and Discussion**

I have collectedal soil sample from different areas of Ramnagar ranges and found that ,the values of soil ranges from 7.1 - 7.8 ,indicating that an alkaline nature of soil while EC values ranges from 0.1 – 0.3 mS/cm (normal EC ranges from 0.02 – 2.0 mS/cm ) and such soil is said to be non-saline Phosphorus is necessary for seed germination and essential for flowering I found the phosphorus ranges from 4.5 – 64.1ppm. (a level of 40 to 60 ppm is desirable for good yields of most crops ).Organic carbon founded in the samples ranges from 0.19 – 1.16 ( normal range 0.5% - 3.0) soil is less than 0.5% mostly present in desert environment. Potassium (K) founded in the samples ranges from 46 – 377 pPM ( normal range 100 – 150 pPM). Zinc observed in the sample ranges 0.642– 2.136 ppm (normal range 3-6ppm). Iron (Fe) founded in the samples ranges from 12.16 - 21.77 ppm ( normal range from 2- 50 ppm ). The manganese composition in the samples is 3.650 – 12.59 ppm. The copper founded in the samples ranges from 1.582 – 4.505.

**Determination of Soil pH**

The most important property of soil is its pH level , If the pH of soil is less than 6 then it is said to be an acidic soil, the pH range from 6-8.5 it's a normal soil and greater than 8.5 then it is said to be alkaline soil. The soil sample taken for the research paper is normal soil.

**Electrical Conductivity**

Electrical conductivity is also a very important property of the soil, it is used to check the quality of the soil. It is a measure of ions present in solution The electrical conductivity of a soil solution increases with the increased concentration of ions. Electrical conductivity is a very quick, simple and inexpensive method to check health of soils. It is a measure of ions present in solution. The electrical conductivity of a soil solution increases with the increased concentration of ions.

**Phosphorus**

Phosphorus is a most important element present in every living cell. It is one of the most important micronutrient essential for plant growth. Phosphorus most often limits nutrients remains present in plant nuclei and act as an energy storage·

**Potassium**

Potassium plays an important role in different physiological processes of plants, it is one of the important element for the development of the plant. It is involved in many plant metabolism reactions, ranging from lignin and cellulose used for the formation of cellular structural components, for regulation of photosynthesis and production of plant sugars that are used for various plant metabolic needs.

**Nitrogen**

Although we can add either organic or inorganic N forms to soil, All most all plants only take up inorganic N (that is, $NO_3^-$-N and $NH_4^+$-N).The sample (2) is very high percentage of sample (9). Is very low.

**Organic Carbon**

The percentage of organic carbon is highly present in soil sample (6).This value is 1.19 is good for plant growth.The result of organic carbon is indicated in -: The quantity and nature of organic carbon is highly dependent upon farming practices and the climatic conditions.

**The Values of Physicochemical Parameters are Presented In Table-I**

| S.N. | Name of Villages | PH | EC | OC | K | Zn | Fe | Mn | Cu | P | N |
|------|------------------|-----|-----|------|-----|-------|-------|--------|-------|-------|------|
| 1 | Peerumdara | 6.8 | 0.2 | 0.62 | 99 | 1.835 | 12.15 | 5.850 | 1.580 | 18.3 | 0.04 |
| 2 | Basai | 6.8 | 0.3 | 1.15 | 95 | 2.135 | 16.84 | 6.770 | 3.635 | 12.7 | 0.07 |
| 3 | Naya Gaun | 6.8 | 0.2 | 0.82 | 55 | 0.704 | 14.90 | 3.651 | 2.381 | 16.0 | 0.04 |
| 4 | Devipura | 6.5 | 0.1 | 1.08 | 320 | 1.352 | 19.30 | 1.258 | 3.321 | 25.1 | 0.06 |
| 5 | Himmatpur | 6.4 | 0.2 | 0.88 | 370 | 1.560 | 21.24 | 5.200 | 4.501 | 64.2 | 0.06 |
| 6 | Dhikhali | 5.2 | 0.2 | 1.19 | 57 | 0.772 | 21.70 | 4.640 | 2.891 | 13.5 | 0.04 |
| 7 | Aamdanda | 6.1 | 0.2 | 0.61 | 89 | 0.804 | 21.34 | 5.130 | 3.102 | 9.2 | 0.03 |
| 8 | Tanda | 6.3 | 0.1 | 0.64 | 75 | 0.801 | 16.60 | 7.150 | 2.031 | 20.2 | 0.04 |
| 9 | Chhoi | 6.2 | 0.2 | 0.54 | 93 | 0.643 | 12.70 | 4.281 | 2.381 | 34.4 | 0.04 |
| 10 | Ramnagar City | 6.4 | 0.2 | 0.50 | 85 | 0.926 | 09.20 | 1.670 | 4.521 | 11.45 | 0.04 |

**Zinc**

The deficiency of Zn occurs when plant growth is limited. Zn is one of the most important micronutrient deficiencies in crops and pastures worldwide and causes large losses in crop production and quality of crops .The limit of Zn for plant growth are 0.60ppm. The high value of Zn in sample (1) , sample (2) and sample(4).

**Manganese**

Mn is very essential for plant growth. The range lies between 0.2 ppm it is critical condition for the soil. The high percentage of Mn is sample (2) and low percentage in sample (4) and sample (10)

**Iron**

It is other essential element in plant growth. The range 4.5 ppm is critical condition. In this range the growth of plant is stopped.The sample (6) is very high percentage of Fe (9). And very low quantity in sample (1).
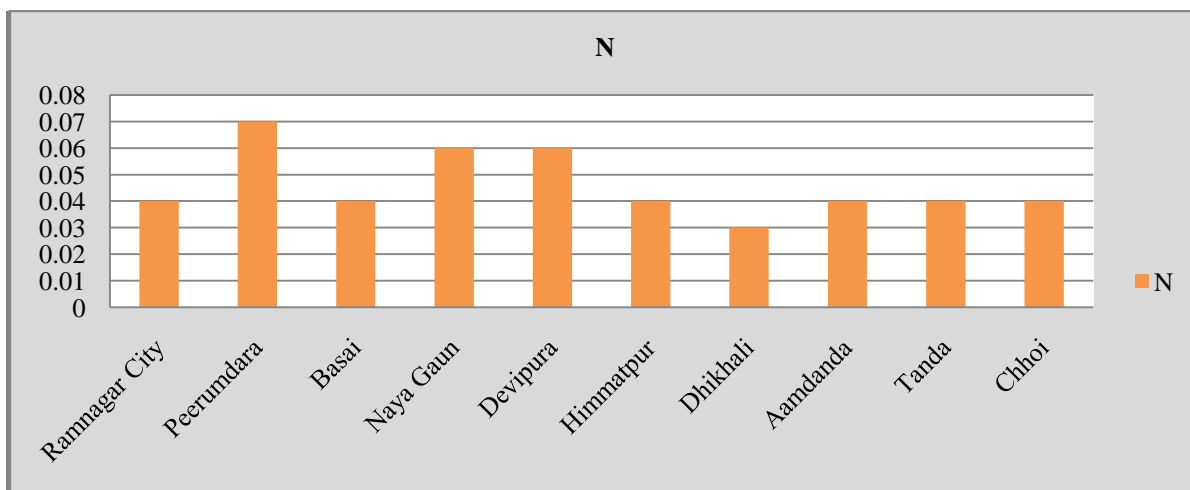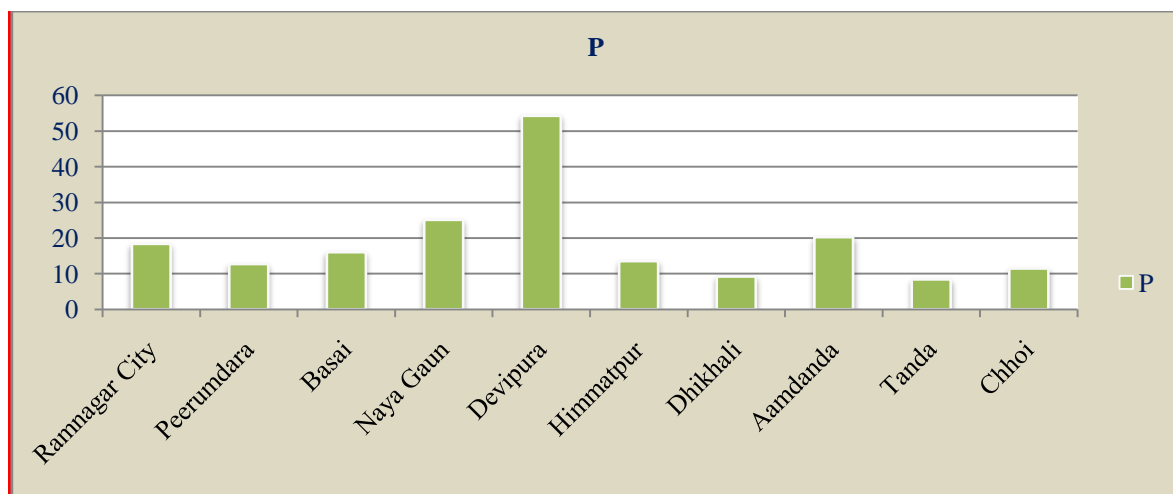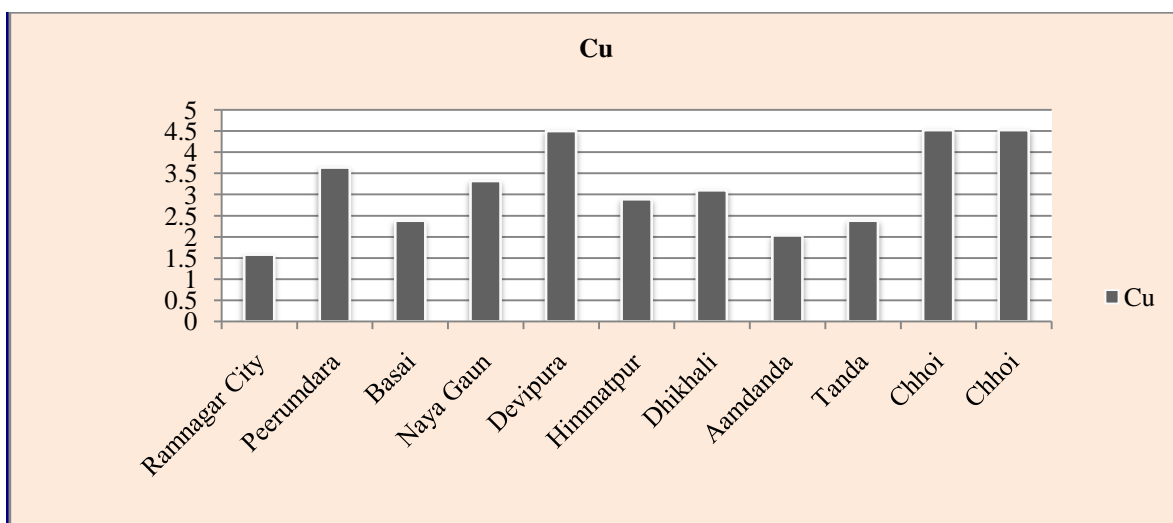
**Copper**

Cu is good for plant the range lies between in 0.2ppm is critical condition.Sample (10) is very high amount of Cu and very low in sample (1).

**The Data Presented is The Comparison of Sampling Sites and The Value of Micronutrien**

**Innovation The Research Concept**

# Innovation The Research Concept
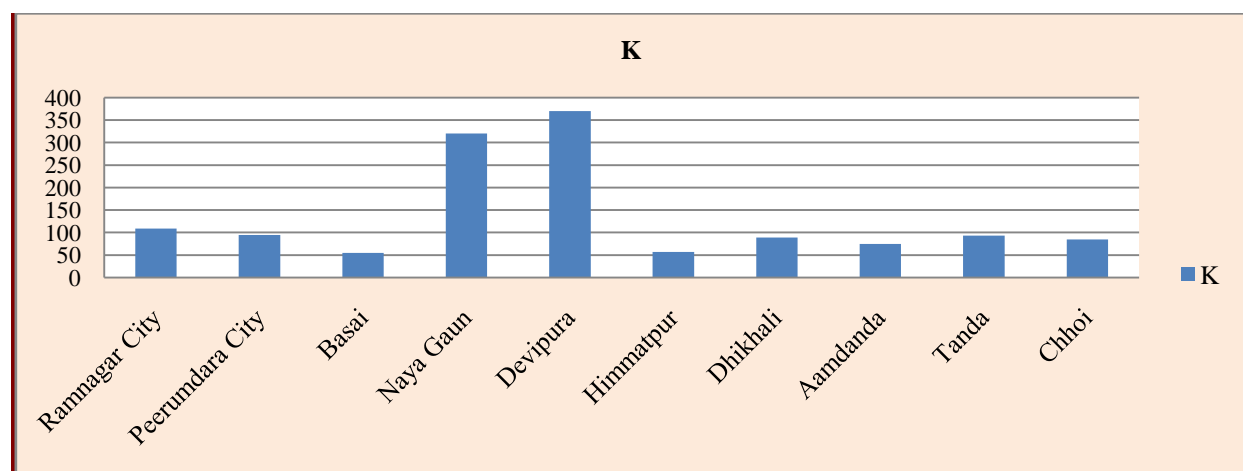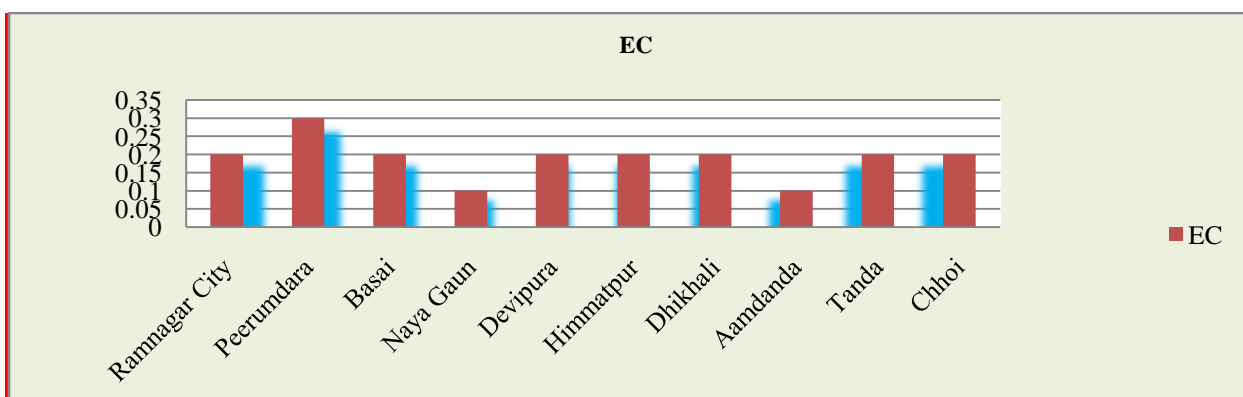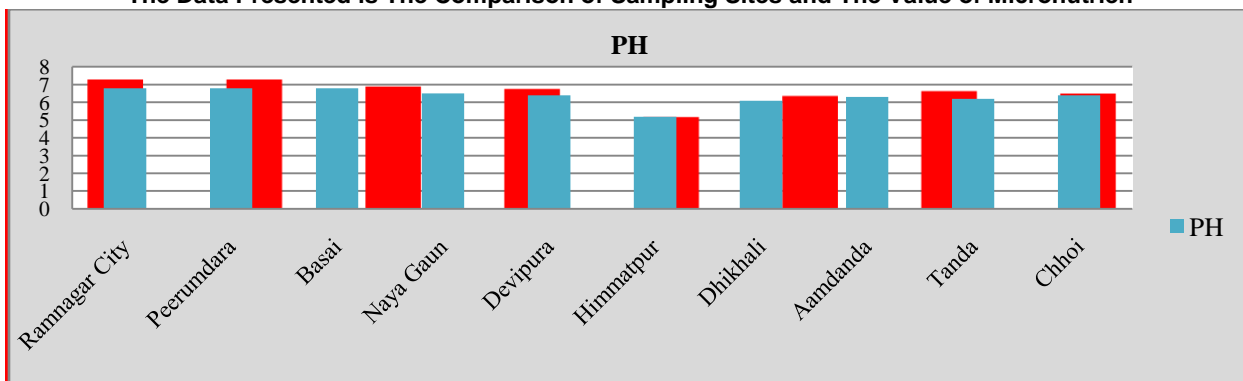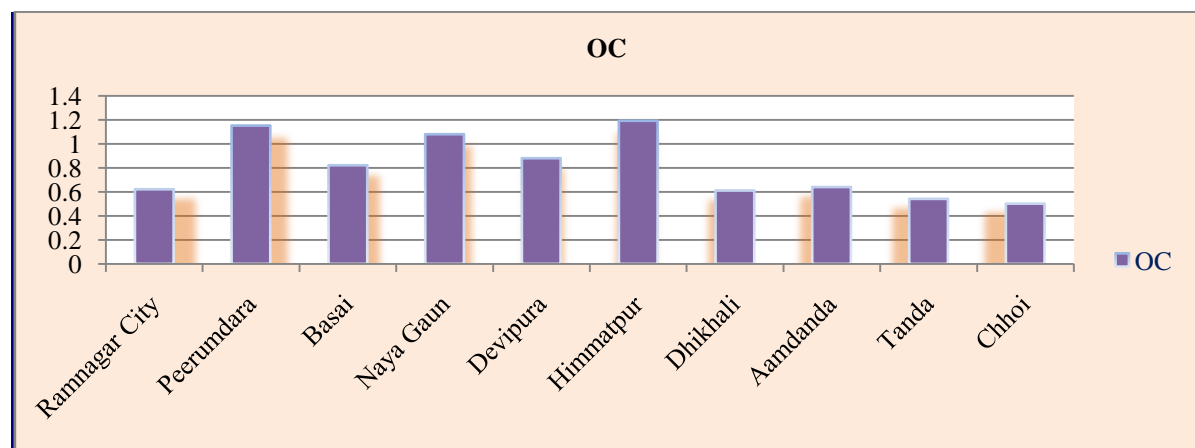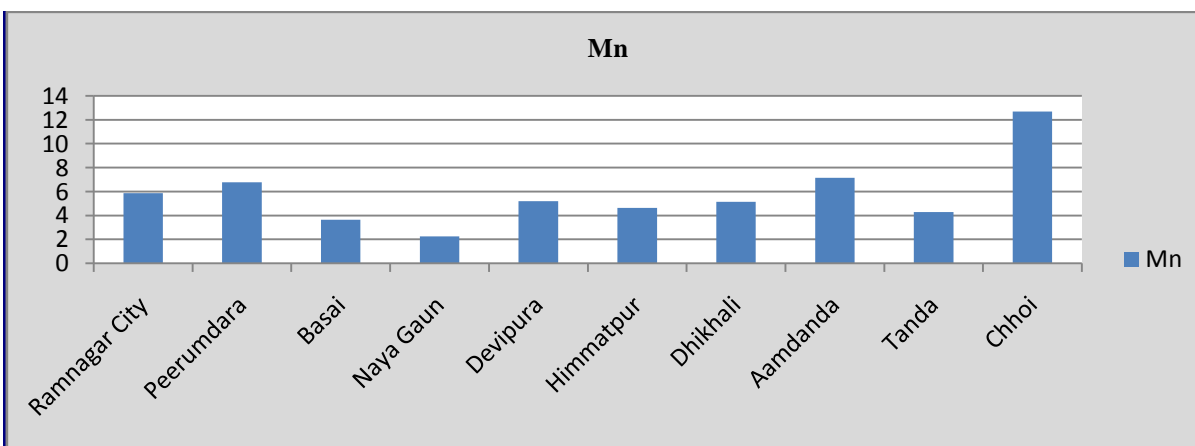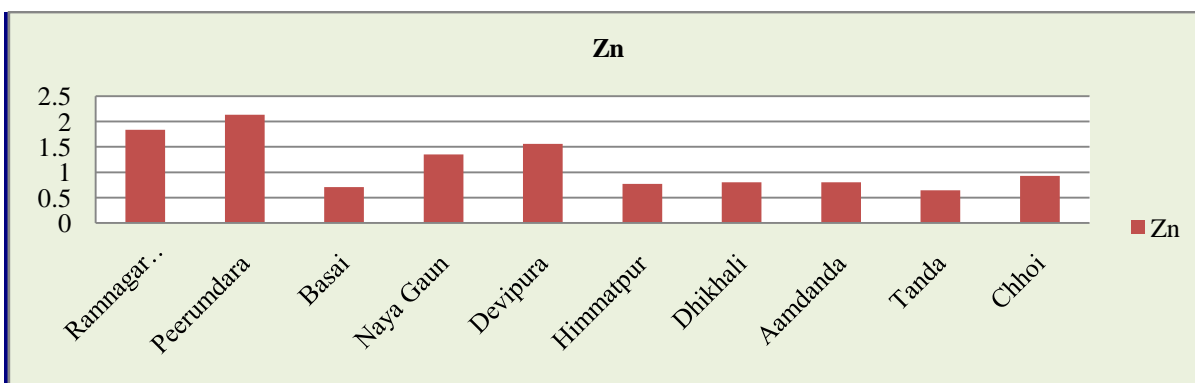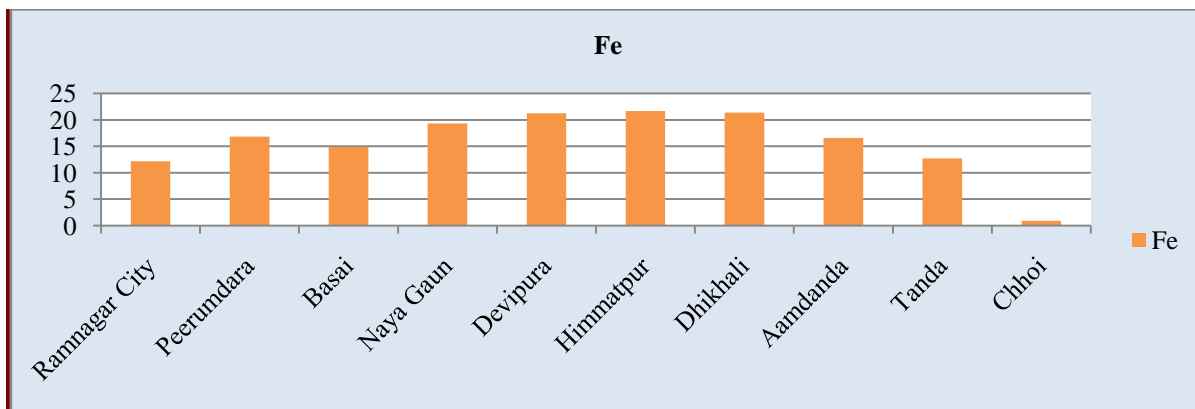






## Conclusion

The aim of the analysis of soil is to know whether the soil suitable or not for plantation .By the above experiment I conclude that the soil of Ramnagar range was approximately good in health for yielding wheat crop ,as the above result shown the value of micronutrient normal in range although some sampling site require the organic fertilizer , urea, DAP ,potash. The allover pH found in the ramnagar area ranges from 7.1 -7.8 ,a pH level that is higher than 7 are said to be alkaline in nature and suitable for growing plant that thrive in a sweet soil as opposed to a sour or acedic soil .In the area of Ramnagar farmers adopt generally two types of agricultural practices that

is rainfed and the irrigated .Indiscriminate use of chemicals and over exploitation of ground water makes the soil of this region less fertile .Excessive use of chemical fertilizer and pesticides causes environmental pollution and affected soil health. When water soluble nitrogen fertilizers are applied to the soil, a good portion of added nutrient does not become available to the plant but is lost to the ground water through runoff. The indiscriminate use of pesticides concern the presence of pesticides residues in our foods and cause pesticides poisoning

**Acknowledgement**

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