



CHAPTER VIII

Edaphic factors



INTRODUCTION:

The alluvial Soil types of Jaunpur vary from loam, Silt. Clayee at some places sandy loam etc. The pH ranges from slightly acidic (pH 6.5) neutral about pH 7.2 and slightly alkaline up to pH 8.2. The Soil is fairly fertile covered with rich growth of grasses and supports for the growth of a variety of plant species.

MATECRIAL AND METHODS:

The randon collections of about 50g Soil samples from 0-15cm depth were collected in triplicate. Sets from 20 different places of the district Jaunpur.

WATECH HOLDING CAPASITY (WHC):

Watech holding capacity of soil samples were determined by stand-ard method described by *Piper (1966)*. The electrical conductivity and soil pH was measured in the suspension of 1:5 Soil: water with the help of pH meter and conductivity meter (*Digital Elico pH meter*) and glass electrode respectively.

The *Walkley & Blacks* rapid titration method *Jackson (1958)* was used to determine the organic carbon and total nitrogen by using Kjeldahl technique described by *Jackson (1958)*.

For the available phosphorous content, 5g soil sample was mixed with 100ml of 5m NaHCO_3 and activated charcoal on a horizontal shaker. The



suspension was filtered through a whatman no 44 filter and the available phosphorous was determined by using phosphomolybdic blue calorimetric method Jackson (1958).

For exchangeable bases (Ca^{2+} K^+) the repeated leaching technique was utilized, 50ml ammonium acetate solution is mixed in to 10g soil sample and shaken on magnetic stirrer for 30 minutes stored them over the night and then filtered. The K^+ and Ca^{2+} content in the filtered were determined with the help of flame photometer (Perkin Elmer Type 12145 A).

For the determination of sulphate. Sulphur 2g. soil sample was digested with 10ml conc HNO_3 filtered. Now added 10 ml of 3% glycerol in to filtered and the volume was made up to 100ml by adding deionized water the SO_4^{2-} content in the above solution was determined by turbidimetric method Rossum & Villarui (1961).

RESULTS:

PHYSICAL CHARACTERISTICS OF SOIL:

The study of physical characteristic of soil around the various study areas have been conducted for three consecutive years from Jan 1999 to December 2001. It include the various soil parameters of immense value such as bulk density, porosity water holding capacity (WHC), pH and electrical conductance and results obtained (Average Values) are discussed below.



BULK DENSITY:

The bulk density of the soil exhibited remarkable variation at the control and affected sites around the various study area. It ranged from a maximum value 1.65 gm^{-3} at the control site of to a minimum value 1.24 gm^{-3} at the affected site. There was a decreasing trend in the bulk density values with decrease in distance of the study site & around the each study area. Thus bulk density of the soils in affected areas is negatively affected.

POROSITY:

Porosity of the soils around the different study areas showed remarkable variation with respect to controlled and affected sites. It has been found to fluctuates between a minimum value 32.56 percent at the affected site to a maximum value 61.54% at the control site of U.C.C.I. during the present course of study, it was observed that the control sites of 3 different study areas exhibited higher bulk density values than that of the affected sites. Therefore, it has been concluded that bulk denesity is decreased with decrease in distance around the source of pollution emissions.

WATER HOLDING CAPACITY (W.H.C.):

The water holding capacity of soil have been observed to ranged between a highest value of 42.47% to a lowest value 28.58% at the control site and affected study areas respectively. However, the WHC of soils of the control sites were greater than that of the soils at the affected sites. It is obvious from



present investigation that the WHC values were negatively affected with the pollution emission and other factors around the various industrial areas.

SOIL pH:

The hydrogen ion concentration (i.e. pH) of the soils around the various study areas have been observed to be slightly alkaline to highly acidic at the control site and affected sites respectively. It ranged from a minimum 5.21 at the affected site to a maximum 7.6 at the control site. The highly acidic pH at K, the affected sites may be attributed to the SO₂, NO₂, and other gaseous emission which may cause the process of acid rains and acidification altering the soil pH from alkaline to acidic range variously.

ELECTRICAL CONDUCTANCE OF SOIL (EC):

The electrical conductance is generally the function of ionic strength in soil. It is generally found that the EC of soil was below one. however, it is adversely affected by the industrial discharges and emission. The EC values ranged from a maximum 0.78 mm/hr at the control site to 0.42 mm/hr at the affected site. It is generally observed that control site possessed higher EC values than the other sites.

CHEMICAL CHARACTERISTICS OF SOIL ORGANIC

CARBON CONTENT:

The organic carbon content gradually reduced with the increase in distance the source of emission. The maximum percentage of organic carbon, $1.48 \pm 0.063\%$ was observed in the soil samples collected from the affected



sites. However, the minimum organic carbon content was recorded 1.15 ± 0.003 for the soil samples from the control site. At the other sites the carbon content value was found to range between the above two values.

TOTAL NITROGEN CONTENT:

The total nitrogen content of the soil samples collected from the pollution affected sites was found to be reduced with respect to control sites. It fluctuates from a minimum value 0.38 ± 0.005 % to a maximum value 0.088 ± 0.006 % at the affected site and control site of respectively.

AVAILABLE PHOSPHOROUS:

The concentration of available phosphorous in soil samples of the various study sites ranged between a maximum value 0.0072 mg g^{-1} at the control site of to a minimum value 0.0042 mg g^{-1} at the affected site. It is obvious from these observation that the soil samples of the affected sites have been reduced for available phosphorous content in comparison to controlled sites.

SULPHATE - S:

During the present course of observations it has been observed that the SO_4 content have been increased in to the soil of the affected sites than that of controlled sites. It was found to range from maximum value of 0.071 mg g^{-1} at the affected site to a minimum value of 0.031 mg g^{-1} at the control site. Other sites possessed SO_4 content between the above limits.



CALCIUM & POTASSIUM:

It has been observed that the concentration of exchangeable cations i.e. Ca^{2+} & K^{+} have been reduced in the soils of affected sites. The maximum content of Ca^{2+} 0.086% and K^{+} 0.088% have been recorded in the soil of lowest content of Ca^{2+} , 0.067% at affected site and that K^{+} , 0.063% at the affected site have been investigated. Thus industrial emission have been reducing effects for the exchangeable cations in soils.

