Studies on different soil parameters under investigated areas of Jaunpur District (U.P.)

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ABSTRACT

The fertility of soil directly influenced by its physico-chemical as well as biotic contaminants. The physical properties like soil separates and texture, structure, weight and density, porosity, permeability, colour etc. chemical contaminants involving organic and inorganic matters and the biological factors like bacteria, fungi, nematodes and other micro-organisms assess the fertility potency of soil. Out of these the physical and the chemical factors are highly significant.

In the present investigation an attempt has been made to convert the favourable soil conditions according to the infrastructural environment of the area for farming.

Key words: Soil parameters, Fertility, Jaunpur district.

INTRODUCTION

The present investigation is a part of infrastructural study of the project undertaken. Soil possesses many characteristics physical properties¹⁻³ like soil separates and texture, soil structure, porosity, permeability, density etc. Mineral fraction of soil consists of particles of various sizes. The particles of different kinds are called soil separates. They differ not only in their size but also in their bearing on some of the important factors affecting plant growth, soil aeration, workability, movement and availability of water and nutrients.

Sandy soils consist of loose and friable particles of 0.10-0.002mm diameter. Silt has the diameter range 0.02-0.002mm. They show little

physico-chemical activity but finger grades play important role in some chemical processes. They are very fertile and have great water holding capacity. Such soils are good for agriculture. The smallest particle of soil is known as clay, having diameter range below 0.002mm. Clay soils have fine pores, poor drainage and aeration and thus they have highest water holding capacity. The clay acts as store house for water and nutrients. Structure is very important in plants growth relationship, as it chiefly influences the amount and nature of porosity and regulates the moisture air region in the soil. Average density of soil is 2.65 gm/ml. The porosity of soil depends upon the texture and structure compactness and organic contents of soil. Porosity of soil increase with increase in the percentage of organic matter in the soil.

Soil contains various inorganic and organic chemical compounds and exhibit certain significant properties³. The description of weathering process clearly shows that compounds of Al, Si, Ca, Mg, Fe, K and Na are chief inorganic constituents of soil. The chief organic component of soil is humus which chemically contains amino acids, proteins, purines, pyrimidines, aromatic compounds, hexose sugars, alcohols, fats, oils, waxes resins, lignin and some pigments.

Many chemical properties of soil centre around soil reaction. As regards their nature, some soils are neutral; some are acidic and some basic. It is described in terms of hydrogen ion concentration. A pH value of 7.0 indicates neutrality, a value above this alkaline and the value below 7.0 refers acidic nature of soil. Normally the pH value of soil lies between 2.2-9.6 in India.

Recently, the physico-chemical and biological parameters of different soils leading to the formation of better soil condition for farming have

been active interest⁴⁻¹⁰. In view of the importance of these soil parameters, the present work was undertaken in the hope of making better soil condition for farming in our thrust area.

MATERIAL AND METHODS

The sampling of soil has been done by the usual techniques¹¹. The proper methods⁶⁻¹⁰ were adopted for the measurement of various soil properties. The soil of the area under study was put to analysis on the basis of percentage of sand, silt and clay. The entire area from the nodal point was divided into four sectors namely Arjunpur, Kachhaura, Ratasi and Baharipur. These areas belong to Badalpur Tahsil of Jaunpur district (U.P). India. Form each sector 15 soil were taken for the measurements of different soil parameters. The average value of each soil parameter from each sector such as percentage compositions, density, porosity, organic maters, total pore space and pH was measured and calculated which area listed in Table 1,2,3,4.

Investigated areas	% sand	% silt	% clay
Arjunpur	20	50	30
Kachhaura	23	52	25
Ratasi	25	48	27
Baharipur	22	49	29

 Table 1: Percentage of sand, silt and clay in the principal textural classes of the investigated areas

Table 2: Density and porosity of soils of the investigated areas

Investigated areas	Bulk density g/c.c.	particle density g/c.c	% pososity
Arjunpur	1.22	2.44	41.8
Kachhaura	1.63	2.01	35.2
Ratasi	1.40	2.46	43.7
Baharipur	1.56	2.52	38.2

Investigated areas	Organic matter (%)	Marco space (%)	Micro space (%)	Percentage of total pre space
Arjunpur	5.6	31.4	20.6	52
Kachhaura	5.2	28.2	20.8	49
Ratasi	5.8	31.8	20.2	52
Baharipur	6.8	32.2	22.8	55

Table 3: Organic matter content and total pore space in different investigated areas

Table 4: Depth wise categorization of soil pH and clay percentage of the investigated areas

Investigated areas	Depth (cm)	рН	clay percentage
Arjunpur	0-10	6.1	30
Kachhaura	0-10	5.7	25
Ratasi	0-10	7.1	27
Baharipur	0-10	6.5	29

RESULTS AND DISCUSSION

The investigated areas namely Arjunpur, Kachhaura, Ratasi and Baharipur have the sand percentage 20,23,25 and 22 respectively. The silt percentages in the same zones were found to be 50,52,48 and 49 while the clay percentage were 30,25,27and29 respectively (Table 1). The slit ingredients had the highest share while the sand content was the lowest.

The scanning of the data regarding the density of soil reveal that the bulk density is lowest (1.22) in Arjunpur while it is highest (1.63) in Kachhaura. The particle density is found to be 2.01 in Kachhaura and 2.52 in Baharipur showing unequal distribution of sand, silt and clay (Table 2). From the Table 3 it can be inferred that the organic matter concentration affect significantly the pore spaces. The micropore space of soil having less concentration of organic matter is small while the corresponding value with higher concentration of organic matter is large. The pore spaces provide proper apportunity for water, nutrient flow and aeration. The fertility of the soil depends upon the soil characters which is basically controlled by the macro and micropore spaces. The average value of clay percentage was such that it was highest 30% in Arjunpur while lowest 25% in Kachhaura. The average pH value of the four villages lies with in a narrow range (Table 4). The soils of the village's kachhaura. Arjunpur and Baharipur were found to be slightly acidic (pH 5.7-6.5) while that of Ratasi was near neutrality (pH 7.1). These findings are in accordance with the requisites of clay soil. All the parameters discussed above have a coherence with each other. A regular use of phosphatic fertilizers and pyrites followed by paddy cropping may convert the soil of Kachhaura, Arjunpur and Baharipur to an ideal condition for better farming.

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