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ANALYSIS OF SOIL QUALITY FOR ENVIRONMENTAL IMPACT ASSESSMENT – A RESEARCH STUDY

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ABSTRACT : Only through the maintenance and improvement of soil quality will environmental sustainability be attained. Soil quality is regarded as the functioning of the soil. Its evaluation is based on the dynamic properties of soil management in sustainable development. The inherent and dynamic components take into consideration a broad picture of soil quality and the hard soil quality assessment problem. It assessed the skills to use and integrate the experienced agro-ecological soil assessment in order to forecast the quality of the soil. The integration of large and intricate soil quality management bases, models, tools and procedures is feasible and supported within the frame of the current decision support systems. This chapter outlines key developments in soil quality control and should not include advice on universal soil quality and sustainable management. Soil quality management strategies, laying intensity and optimizing the formation of soil entail identification of arable soils.

Keywords: soil quality, environmental sustainability, soil assessment, soil impact

1. INTRODUCTION

Soil is the natural world's crucial part, it's like plants, animals, rocks, earth and rivers, like lochs. Different specimens of plants are affected by their dispersion and their habitat. It monitors the movement of water and chemical compounds into the air and provides atmospheric gas sources and storage (such as oxygen and carbon dioxide). Soil is a natural resource of our greatest importance. For the livelihood of the earth, it is highly important. The homage to plant development is damaged by human activities such as thermal construction, buildings, roads and expansion. The soil strata, on the other hand, are deliberately polluted due to industrial contamination. The soil has changed dramatically with its features. The quality of the soil is determined by its physical and chemical qualities. As a basis for soil assessment, earlier topographical maps and cadastral maps have been carried out [1].

Soil surveys provide interesting information on natural, site and scope. A strategy used to attenuate or eliminating such impacts is the EIE which combines the environmental effects of the project for the energy plant (Environmental Impact Assessment). A large quantity of land is required for a coal-based thermal power plant. The inherent nature of the fly ash is changed and alkaline, due to its natural properties. The SPM is in a terrestrial soil (Suspended Particulate Material). SPM is diffused and deposited in soil that reduces soil layers and thus fertility and soil productivity [1 & 3]. A significant environmental quality is the environmental state for numerous components of the investigations. Preparation of EIA-linked environmental impact studies in 2006 and an EIA need to extract and understand the soil features of the region in order to properly manage soil resources for further development. The EIA will comprise evaluating key circumstances in the proposed location, assessing environmental implications for project development and operation and implementing precautionary measures to reduce impacts on the environment to an acceptable level [2].

The ultimate aim of the soil quality assessment does not consist, as defined by the Soil Quality Institute, in achieving high overall stability, biologic operations or other land characteristics. It is aimed in all organizations, including individuals, to protect and improve productivity, water quality and habitats on a long-term basis. For a range of management measures, a land managing director can evaluate the sustainability of the soil quality assessment.

1.1. QUALITY OF SOIL

Soil quality, as shown in the beginning of the 1990s, is 'workability of the soil. The Soil Quality Committee defines in particular the ability to retain plant and livestock productivity, maintain or enhance water and human health air quality and habitats within a natural or managed environment of a specified soil type, In addition, soil quality is regarded as the capacity of the soil to achieve its ecological duties characterized by integrated activity with different soil components. As far as agriculture is concerned, soil quality promotes crops without harming or weakening the environment. The fitness of the soil is soil quality.

Some researchers have argued [4] that soil quality is only linked to cultivation. Nevertheless, several of them have stressed that soil quality affects food and feed or how the quality of the soil affects a wide range of biota habitats. With respect to the dynamic and living nature of the soil, the concept of soil quality in the context of various uses of the soil, forests and farms, urban and industrial areas, among others. There will be many more problems. Due to the multitude of possible land use, the concept of soil quality should be considered relative rather than absolute. Consequently, every soil can play its part organically.

The notion is linked by the Institute for Soil Quality [7]. In some circumstances, however, most of the contaminated terrestrial regions are concentrated. These include the quality of soil, fertility, harm to soil and the quality of surroundings. Soil quality is part of the concept. The focus is on analyzing strategies for soil management and carrying out the required soil quality analysis [9].

2. AIM AND OBJECTIVES OF RESEARCH WORK

2.1. Aim of the research work

My research aims mainly to assess soil quality, collect information on the soil moisture production system, and give solutions to reduce agri-environmental pollution or pollutants based on numerous agri-environmental indicators [5 & 11].

1. Environmental soil effect assessment
2. Agricultural-environmental impact evaluation based on indicators at different geographic levels, e.g.
    - Experiment in soil laying.
    - Experimental lysimeter,
    - Experimental half-laboratory,
3. Recommend how the next budgetary period of the EU will enhance agri-environment subsidies.

2.1. Objectives of research work

The major objective of the EIA is to evaluate the possible environmental implications of the project, as described in section of the ESIA. ESIA's primary objective is to ensure the project's environmental and social management throughout its life cycle. Continued data collecting and an assessment of the underlying characteristics of the study site are presented in the current local environment conditions [21]. The baseline data allows identifying the main social environmental variables that may be associated with the projects. The relationship between social and environmental projects the basic circumstances of the project site are the focus of ESIA. The ESIA is designed to prevent the impacts in the receiving environment, either positive or harmful. Early recognition of the effects in the area reduces the chance of future bad events in the environment and offers mixing guidelines/measures to prevent, lessen and rectify significant unwanted impacts. It is also recommended that outcomes be achieved [23]. The ESIA also recognizes and expects the potential socio-economic effects of this initiative for persons and communities. The fundamental facts are used to select receptors that are physiologically, and humanely critical. An assessment approach includes the impact of the project on each of these 'Valued Components of the Co-System. Some of the major objectives are following below:

1. Soil sample collection from the region of investigation.
2. Physico-chemical soil sample analyzes for soil quality estimates
3. Environment and its resources are protected, conserved and preserved.

3. PROPOSED METHODOLOGY

All soil quality tests are based on a wide range of soil uses including agricultural, forestry, farming, and conservation of natural resources, recreation and urban development [21]. Agro ecosystems are the world's most widely recognized and applicable conception of the quality of the soil [25]. The evaluation or assessment of soil quality needs to be based on two primary questions:

- work on the soil; and
- Correct assessment methodologies.

The land characteristics, pedographic information and a more detailed understanding of dynamic processes inside the soil can calculate a variety of parameter values, indicators that demonstrate soil functions to its full potential [19]. The assessment of soil quality focuses on dynamic properties, but it needs to rely on soil variables in order to determine the sustainability of soil management practices [22].

3.1. Research methodology for project

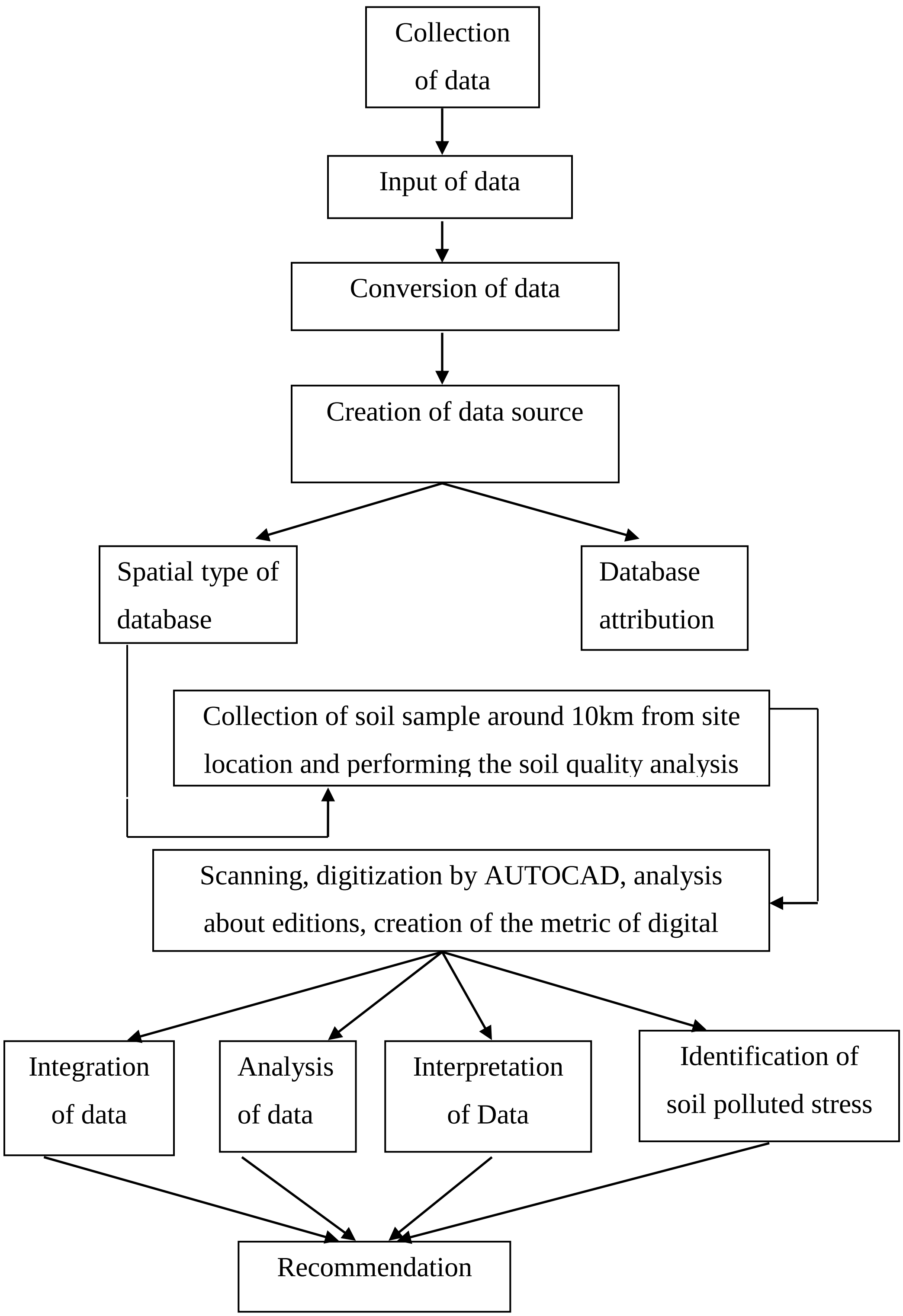

Figure.3.1. Research methodology for data analysis

3.2. Collection of data

For the study, several data products require the 65C/6.7.10,11 top-floors collected from Survey of India and the fused data of the satellite images from the surajpur kasna rod, institutional area, knowledge park I, greater Noida, utter Pradesh [42].

3.3. Data conversion and input

The survey field is then specified for use on latitude and longitude-based data, and for extra interpretation a hard copy output is provided [38 & 41].

3.4. Analysis of database and its creation

Many different types of geographical data, including top sheets, are available. In this effort, land is developed with high-level interpreting technology. The work entails generating environmental baseline data that have been tracked by one year of environmental baseline data in the 10 km radius of the study site. Details of the project's work on the monitoring of environmental baseline data with different activities, activity samples and monitoring metrics [45]. In addition, it can be argued that the difficulties of formalization, analysis and the use in nearly all fields of science are the responsibility of de facto professional and scientist communities. Land usage and management approaches have important effects on time and space direction and quantity of changes in soil quality. Viewed as one of the major challenges with present soil research, the understanding of soil quality and its markers [36]. This study provides a method of soil quality evaluation and mapping. Higher quality soils are destroyed faster because they usually require more nutrients than those with lower grades to retain their quality status. These analyzes demonstrate that the quality of soil in degraded areas has to be improved as well and maintained in high quality areas. Four radial distance soil samples accessible to the area of investigation were taken to evaluate soil quality. Sample one (S1) at the site of the project is gathered close to the temple. Surajpur sample 2 (S2) is taken 1.6 kilometers of the plant. Sample 3 taken by kasna road, which is 1.5 km (S3). The facility from the greater Noida collects sample 3(S3) around 1.7 km. On the four collected soil samples, the soil quality can be measured. The parameters of the soil sample such as porosity, samples structure, silt and clay content are analyzed. Conductivity, BIO(self), B(Boron), AL(aluminum), Cr(chromium), Cu(copper) and Fe(iri), and Pb (Selenium). Powder of organic matter bypasses (Lead).

Table.3.1. Samples of soil at various sites

Code of station	List of stations	Total site distance	Direction with respect to site
S_1	Near to temple at project site	--	--
S_2	Surajpur	1.7	NNE
S_3	kasna road	1.6	ENE
S_4	Greater Noida	1.8	SSW

4. RESULT AND DISCUSSION

4.1. Data of soil quality

As per the above Methodology, soil sampling has been analyzed .The detailed rate analysis has been prepared from the below table. The Texture of S1 is silty clay, S2 is clayey silt, S3 is sandy clay, and S4 is silty clay. For silty clay the sand is 18.0, clayey silt the sand is 21.2, sandy clay the sand is 62.5, silty clay the sand is 15.01 [45 & 48].

The silt content is high in S1 and low in S3. The clay is high in S2 and low in S3. Porosity is high in S4 and low in S2. pH is more acidic in S1, S3, S4 and basic in S2. Electrical conductivity is low in S2 and high in S1. The percentage of Organic matter is low in S3 i.e. (0.0821) and more in S1 (3.75). The percentage of organic carbon is low in S3 (0.0629) and more in S1 (1.70). Sodium content is low in S1 and more in S2 [51]. Calcium content is low in S2 and high in S4 .Magnesium content is low in S2 and high in S3. Manganese content is low in S3 and high in S4. Mercury, Arsenic, Selenium contents is <0.003 in all the four samples. Zinc content is low in S3 and high in S4. Cadmium content is <0.003 in all the four samples. Boron content is low in S1 and high in S4. Aluminum is low in S1 high in S4. Chromium content is low in S3 and very high in S4. Copper content is low in S2 and high in S1. Iron content is low in S3 and more in S4. Lead is low in S2 and more in S1.

Table.4.1. Analysis of soil

Parameter's	Description results			
	S_1	S_2	S_3	S_4
Texture	**Silty clay**	**Clayey silt**	**Sandy clay**	**Silty clay**
sand	18.0	21.2	62.5	15.01
silt	48.2	33.0	6.2	43.1
clay	35.10	48.09	31.01	44.0
porosity	41.3	18.8	33.7	42.9
P^H	7.09	9.53	7.93	6.21
Electrical conductivity	209	182	201	198
Organic matter %	3.75	0.432	0.0821	0.32
Organic carbon %	1.70	0.0639	0.069	0.26
Na (sodium)	0.23	0.84	0.34	0.743
Ca (Calcium)	0.320	0.291	0.372	0.375
Mg (magnesium)	0.012	0.018	0.09	0.081
Mn (manganese)	265	305	285	705
Hg (mercury)	<0.003	<0.003	<0.003	<0.003
As (arsenic)	<0.003	<0.003	<0.003	<0.003
Se (selenium)	<0.003	<0.003	<0.003	<0.003
Zn (zinc)	68.0	51.00	36.98	80.54
Cd (cadmium)	<0.003	<0.003	<0.003	<0.003
B(boron)	7.232	8.342	8.655	11.61
Al (aluminum)	5.01	5.73	5.97	7.83
Cr (chromium)	49.01	38.08	37.92	112.50
Cu (copper)	56.31	12.73	17.43	51.09
Fe (iron)	1.93	1.420	1.32	4.85
Pb (lead)	19.6	0.321	0.671	5.04

4.2. Analysis of Silty clay (S_1)

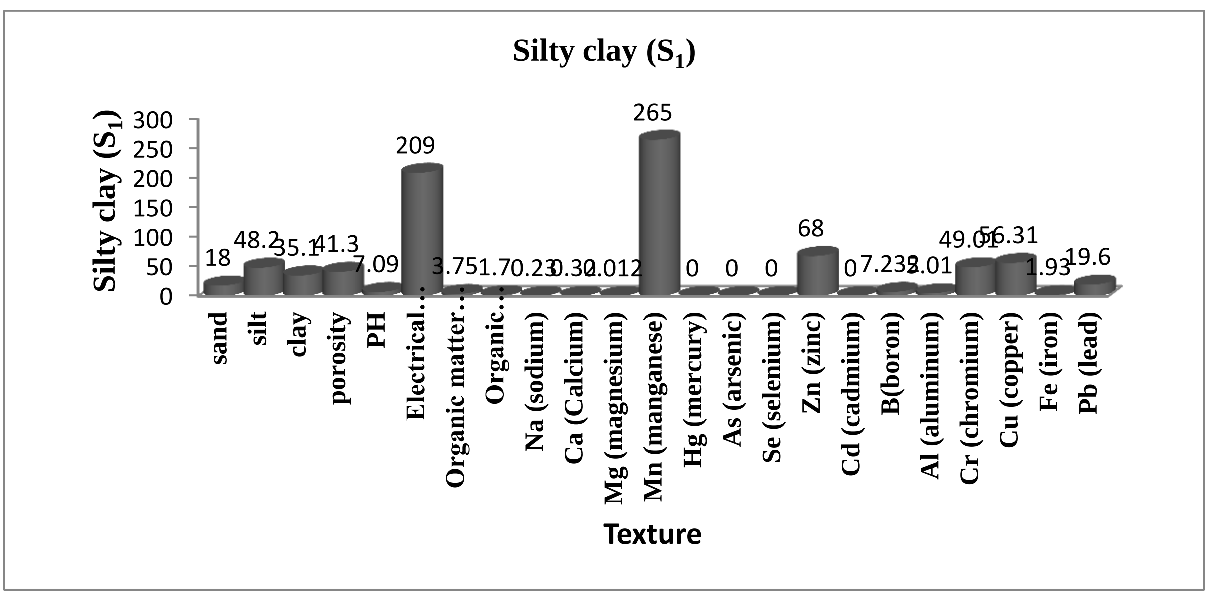

Figure.4.3. Analysis of Silty clay (S_1)

4.3. Analysis of Clayey silt (S_2)

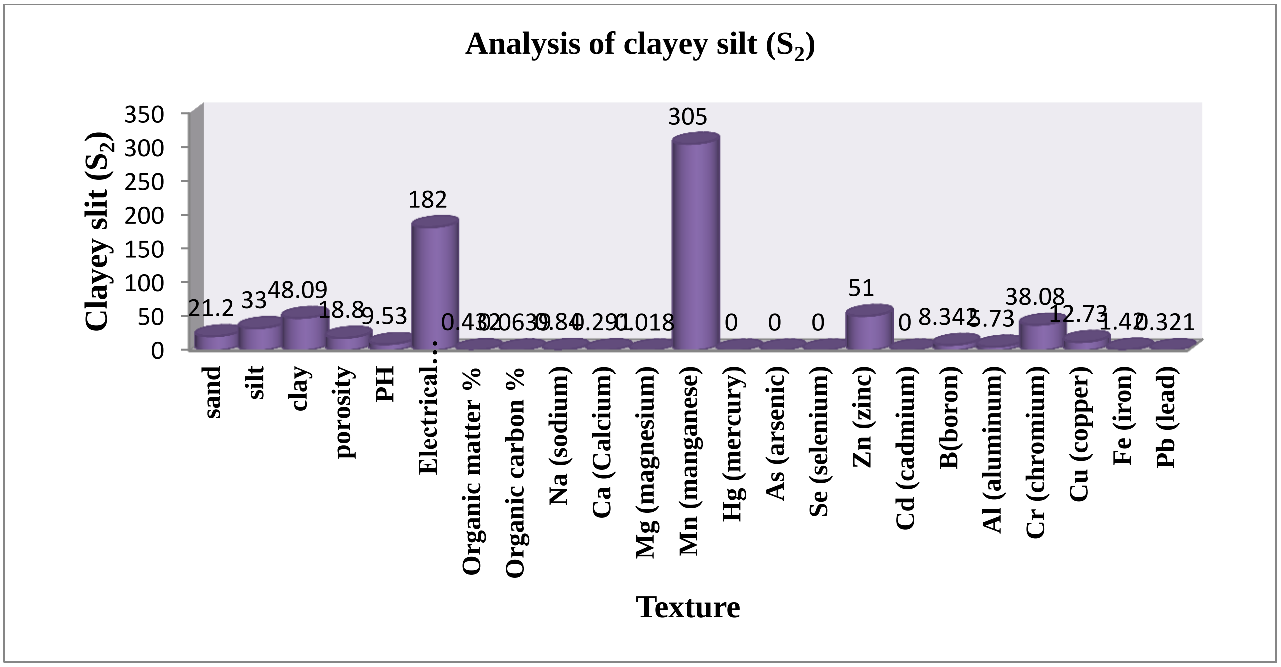

Figure.4.4. Analysis of Clayey silt (S_2)

4.4. Analysis of Sandy clay (S_3)

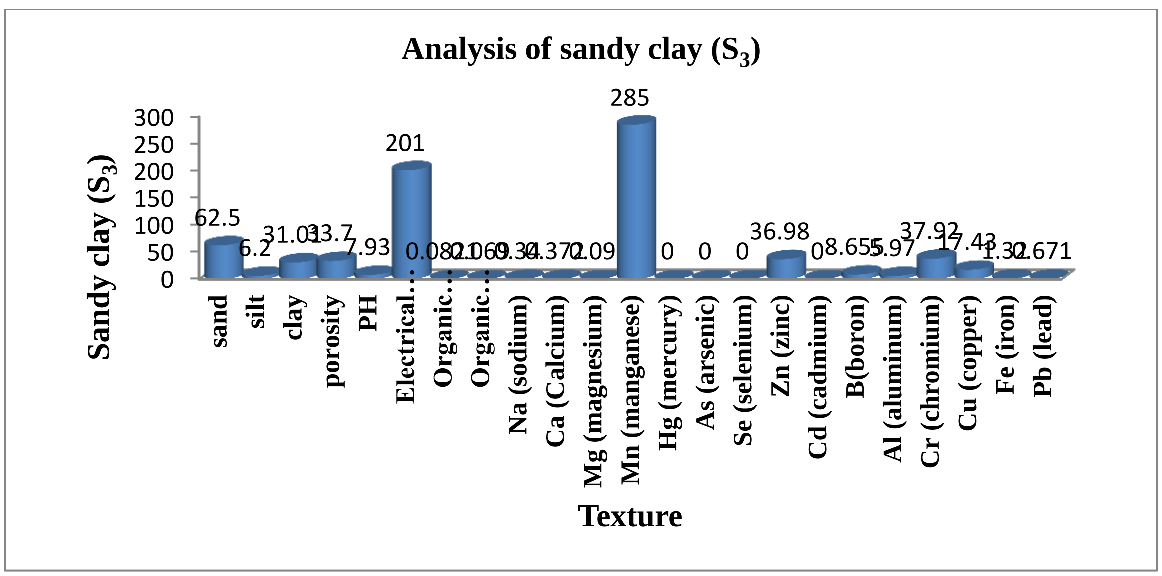

Figure.4.5. Analysis of Sandy clay (S_3)

4.5. Analysis of Silty clay (S_4)

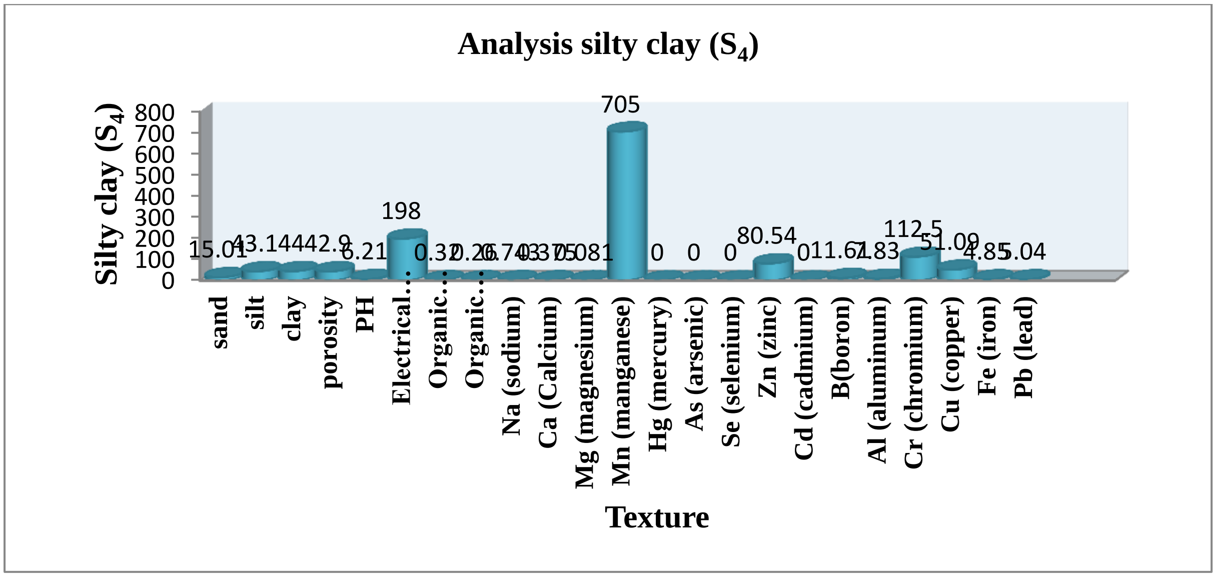

Figure.4.6. Analysis of Silty clay (S_4)

In order to correctly limit harmful environmental effects, this study aims to identify possible soil consequences from diverse project activities, impact assessment, risk assessment and environmental management methodologies [48]. The study evaluates the quality of soils including degradation of soil profiles, soil productivity changes, increased erosion, soil loss and land use change. The soil quality characteristics are observed. It may be inferred in general that, by implementing an EIA mitigation step and limiting the adverse consequences to acceptable levels, it would entitle the required requirements to be met by the impact of installing an Extra Unit. If environment permits are first to be achieved as a most important precondition to an operating permission, the environmental impact assessment for the thermal power station in greater Noida, Utter Pradesh should be ecologically practicable [49].

5. CONCLUSION AND FUTURE SCOPES

The maintenance and improvement of the quality of the soil is a necessity for sustainable environmental growth. The contemporary notion of land quality is, in spite of significant dispute, a strong and vital foundation for scientific soil understanding, sustainable land use and management. Soil evaluation is not a new process, and soil assessment has not made a major contribution to the complicated issue of soil quality assessment since the mid-20th century. Indicators of soil quality are crucial tools that are being increasingly used. After calculation of inherent soil indicators, however, dynamic soil indicators should be examined. The two phases of the ecological farming technique are a long-term, intrinsic evaluation and a quick, dynamic and primarily biological evaluation. The understanding and fruitfulness of physical and chemical constituents should not be reduced by biological approaches. The case study shows the inherent and dynamic soil quality component. Also studied and discussed can be made in modeling land evaluation and comparison of basic indicators. This DSPSC can be considered as a multicultural system suited to the particular conditions of Ramalo soil in Argentina but which has a considerable impact on the need for grains rotation, owing to its strong need on chemicals (mostly herbicides) or restricted plant change. Modern technology offers outstanding power and flexibility to integrate soil knowledge with innovation. The policy framework for agroecological soil evaluation, such as the Micro LEIS, emphasizes the multiple evolutions and potential of the soil quality evaluation. Using soil methods suitable for local terriers, land and climate and instruments for decision-making or planning, the quality of the land may be maintained and improved. This Chapter examines fewer than two key viewpoints, site specificity and time dimensions of the agro-ecological paradigm of modern farming. However, several global standards can be established across international boundaries under usual conditions. Positive soil quality affects focus on the principal principles of sustainable agriculture:

1. Increased organic matter,
2. Reduced erosion,
3. Improved water infiltration,

4. Greater capacity for water maintenance,
5. Reduced compaction of subsurface, and
6. Lower water release to groundwater for agrochemical products.

In future, postmodern farming is anticipated to expand not just with biotechnology and the use of pesticides, but also through agroecological advances to boost crop output and protection of the environment. The quality and procedures of soil assessment, knowledge growth and practical use, in which science remains relatively young, depend on. Farmers in a variety of locations could anticipate using IT to support a range of soil-specific operational aspects of agriculture such as systems that enable decision-making in the future in real time.

5.1. Future scopes

Our analysis shows how ground quality assessments have been altered through time, in the context of the objectives, tools, methodologies and an overall strategy. There are several methods for evaluating soil quality which in the many techniques established over the past three decades are considered at a somewhat distinct level. A clear explanation of the objectives provides a good start, i.e. whether the ground assessment is designed as the basis for management concepts, for a training instrument or for a monitoring plan. In order to improve adoption of the evolving evaluation process, target customers should also be identified and involved from the outset. Different knowledge tools are required for stakeholder assessments. For example, visible tools for soil evaluation are aimed at helping farmers to determine the status of the soil structure on the ground and at making further knowledge of productivity available for laboratory tests, such as Cornell Soil Health Assessment.

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