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Assessment of Soil Available in Macro – Micro Nutrients And Suggesting Methods to Increase the Soil Fertility, Sustainablity in Industrial Area, Ariyalur District, Tamil Nadu.

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Abstract: ***In India, Tamil Nadu, Ariyalur district, there are many industries functioning. Industrialation and urbanization is reducing the cultivable land at a faster rate, at once side there is a growing demand of crops and vegetables for growing population, which require more land available for the cultivation, on the other side, the same population requires land for making homes, schools and industries to fulfill their other requirements[1]. Man has already realized the adverse use of fertilizers to get more and more crops from the same land. In India after so much cry about the industrial pollution, industries were pushed back to rural areas to avoid the pollution problems to the congested urban population [2]. Industries shifted in the rural areas emitting all types of pollution form air and water of soil. In this paper an attempt has been made to identify the impact of industries on surrounding environment mainly on the soil fertility [3].***

Keywords: Macro-Micro nutrients, Soil contamination, Ariyalur district, Physico – Chemical parameters, Soil fertility, sustainablity.

1. Introduction

One of the first often subconscious acquaintances a person has with nature is with soil. The definition is often limited to the idea of the surface of the earth, the object of farming. The soil is a natural formation resulting from the transformation of surface rock by the combination of the climate, plant and animal's life and ageing[4].

Contamination of soil is the major problem in the developing countries like India due to scarcity\ of land. Contamination of soil is mainly due to disposal of waste on land surface without treatment. The waste may be solid or liquid. The liquid waste and lenchates generated from the solid waste percolate into the ground and causing problems like ground water contamination, degradation of vegetation, modification of soil properties etc,. Here it is essential to know the contamination characteristics of soil to have safe proposed structure and prevention of failure of existing structure.

Assessment of soil fertility status involves an estimation of its available nutrient status. This is commonly known as soil testing and is used world around to arrive at a optimum fertilizer application [5]. The need for estimation of available nutrient arises because only a small portion (fraction) of what soil contains is in the plant available.

From mid 50's a great deal of attention was paid to assess the soil fertility through rapid means of chemical tests better known as soil tests. Several decades have been spent on research and development for calibration of soil test methods [6]. For soil available nitrogen, two methods were selected, i) One rapid estimation of organic carbon of the soil employing (walkley and Black) methodology.

ii) The other using Subbiah and Asija procedure of liberating ammonia from proteins and organic matter present in the soil.

For this, as in vitro study was conducted using the soil sample collected from Ariyalur District. The soils were scrutinized for their available nitrogen status inters alia, the other Physico - chemical parameters. The soil fertility status with reference to soil nitrogen which was assessed have been categorized and suitable strategies have been suggested for improving the fertility in a sustainable manner[7].

Nutrient elements gained from soil that the plants mostly face the deficiency. Of the 14 Nutrient elements gained from soil, six are utilized in large amounts and hence are called as Macronutrients. From these, Nitrogen, phosphorus and potassium are the primary elements, which are supplied to soil by the addition of commercial fertilizers or manure[8]. They are the critical macronutrient s, which are known as the most commonly deficient fertilizer elements retarding plant growth because of their low or slow availability or lack because of their imbalance with the other Nutrients[9]. On account of this, they will be examined thoroughly in the further sections. In the same way, calcium, magnesium, and sulfur are the secondary elements. Calcium and magnesium are added to acid soils in limestone, hence are called as lime elements, not fertilizer elements. And sulfur is applied to soil as an ingredient of fertilizers (e.g.: superphosphate, ammonium sulfate, or farm manure)[10]. The other Nutrient elements (iron, manganese, copper, zinc, boron, molybdenum, chlorine, cobalt) obtained from soil are utilized in very small amounts by higher plants, hence are called as micronutrients, they are mostly present in most soils with low availability; however, the deficiency problems concerning micronutrient s are not widespread as that of macronutrients [11].

2. Aim and Scope of the Present Study

Ariyalur consists of poor, small scale farmers who are trying to eke out a living on impoverished soils. With the aim to achieve higher food production in these impoverished soils and for maintaining soil fertility at a higher level. This study was conducted in this literate's belt wherein the soil parameters such as nitrogen. Phosphorous, potassium, iron, magnesium, zomc and organic matter status were studied. These soils generally have poor organic matter contents, sandy to sandy-clay in texture, poor nutrient and water holding capacities [12].

In general paddy is the main staple crop in this area with low yields. The major thrust area for this project is soil fertility by evaluating it with reference to the major nutrients such as , nitrogen, potassium and phosphorous etc,.. It is impossible to have a buildup of nitrogen in this tropical condition. Therefore the following objectives have been postulated [13].

The Main Objectives Involves the following

To study the macro nutrients, micro nutrients and organic matter content of the soil.

1) To study the soil available nitrogen status and evaluating the soil fertility.
2) Suggesting ways and means for a buildup in soil fertility.
3) To suggest technologies to improve soil fertility for a sustainable production.

3. Materials and Methods

Study area

The location of study area in India; in Tamil nadu; in Ariyalur district where many industries are located. The study areas are covered by 10 sq/km. The mixed patterns of household and cultivated lands are the existing land uses within the Ariyalur district. Samples Locations in Ariyalur district:

Sample No	Sample Station
SAMPLE A	Asthinapuram
SAMPLE B	Kaikati
SAMPLE C	Keelapaluvur
SAMPLE D	Chettinadu-Vetri Nagar
SAMPLE E	Nagalur
SAMPLE F	Poiyur

Soil Sample Collection

The analyze the soil quality of the study area six samples were collected from six different locations in the Ariyalur industrial areas. A field was treated as a single sampling unit when it was appreciably uniform in all respects. Variations in slope, texture, colour, crops grown and management levels followed had been taken into account. Recently fertilized plots, bunds, channels, marshy, tracts and spots neem trees, wells, compost pits were avoided during sampling. The soils were collected in zig - zag pattern. Since paddy was the crop in these fields previously and is being a shallow rooted crop. Soil samples were drawn up to 15cm depth soils samples were collected from a field at Ariyalur District.

Figure 1: Soil Sample form location

Figure 2: Soil Sample form location

4. Preparation of Sample for Analysis

The sample brought to the laboratory was spread out on a thick brown paper coarse concretions, stones and pieces of roots, leaves and other decomposed organic residues were removed. Large lump of moist soil were broken by hand. The soils were dried at 20 – 25^{o}C and were mixed during drying, then the soils were crushed in pestle and mortar and sieved. The pestle and mortar used were wood porcelain and porcelain in the present case and sieve was used of nylon.

5. Results and Discussion

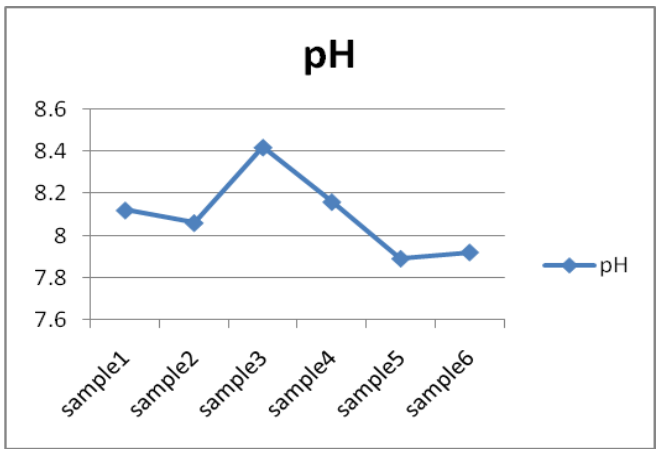
Six soil samples collected from the study areas were analyzed 11 parameters. The location wise soil quality results are mentioned in table.1 from the result obtained, following observation can be made.

Table 1: Soil quality in the study areas

Parameters	*Sample 1*		*Sample 2*		*Sample 3*		*Sample 4*		*Sample 5*		*Sample 6*	
Soil Physico – Chemical Properties	Results	Status	Results	Status	Results	Status	Results	Status	Results	Status	Results	Status
pH	8.12	Normal of calcareous or Saline Soil	8.06	Normal of calcareous or Saline Soil	8.42	Normal of calcareous or Saline Soil	8.16	Normal of calcareous or Saline Soil	7.89	Normal of calcareous or Saline Soil	7.92	Normal of calcareous or Saline Soil
EC (mill mohs/cm)	1.52	Good	0.89	Good	0.56	Good	0.49	Good	0.43	Good	0.64	Good
Organic Carbon (%)	0.29	Good	0.24	Good	0.32	Good	0.30	Good	0.35	Good	0.38	Good
Organi Matter (%)	0.48	Good	0.48	Good	0.64	Good	0.60	Good	0.70	Good	0.76	Good
Avail.N (Kg/ha)	96.3	Low	112.6	Low	108.9	Low	113.2	High	114.6	Low	112.8	Low
Avail.P (Kg/ha)	2.75	High	4.75	High	5.50	High	4.50	High	4.50	High	4.23	High
Avail.K (Kg/ha)	96	Medium	115	Medium	125	Medium	105	Medium	116	Medium	120	Medium
Avail.Zn (Kg/ha)	0.29	Low	0.65	Low	0.72	Low	0.59	Low	0.89	Low	0.87	Low
Avail.Cu (Kg/ha)	0.45	Low	0.65	Low	0.85	Low	0.49	Low	0.49	Low	0.63	Low
Avail.Fe (ppm)	4.23	Low	5.63	Low	5.48	Low	5.21	Low	5.96	Low	4.29	Low
Avail.Mg (ppm)	1.87	Low	1.56	Low	2.72	Low	2.16	Low	2.18	Low	2.09	Low

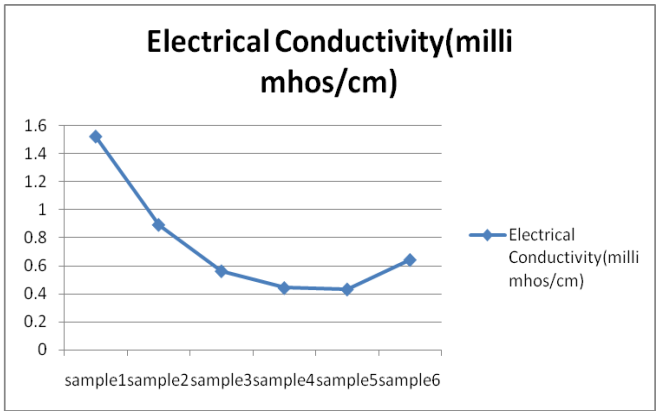
pH

pH of the soil varied from a maximum of 8.42 to a minimum of 7.92, which indicates that the soil is alkaline in nature (Table.1). These samples location somewhat fit for cultivating purposes.



Electrical Conductivity

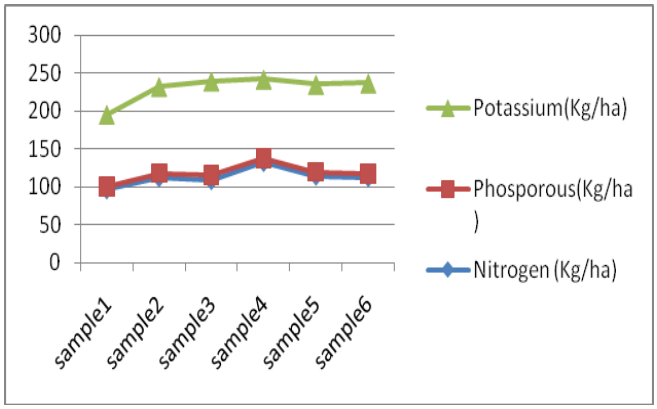
Conductivity showed that the concentration of electrolyte in the soil. It was found varying from a maximum of 1.52 milli mhos/cm to a minimum of 0.43 mill mohs/cm.



Macronutrients

Nutrients elements gained from soil that the plants mostly face the deficiency. Of the 14 Nutrient elements gained from soil, six are utilized in large amounts and hence are called as Macronutrients. From these, Nitrogen, Phosphorus and potassium are the primary elements which are supplied to soil by the addition of commercial fertilizers or manure [14].

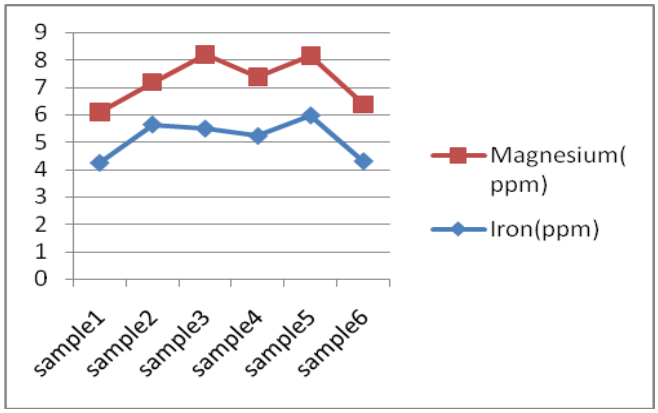
Nitrogen, Phosphorous, Potassium are very essential for the growth of human, animals and plants. From the analysis report Phosphorus and Potassium were present in significant quality in all six locations where as, Nitrogen was in low quantity except at the location of sample: 4(Table: 1).



Micronutrients

The nutrients which are obtained from soil and utilized in small amount by higher plants are called micro nutrients. Zinc, Iron, Copper, and Magnesium were present in low quantity but these are somewhat significant quantity for cultivating land. And also organic substance present in significant quantity in all sample locations. Zinc, Iron, Copper, are belonging to a group of trace metals which are essential for the growth of human, animals and plants are potentially dangerous for the biosphere when present in high concentrations. The main sources of pollution are industries and the use of liquid manure, composed materials and

agrochemicals such as fertilizers and pesticides in agriculture.



Soil samples showed that soil of the areas lacked manure, thus it was not a much fertile soil for the crops. Keeping in view the above observations, it can be clearly stated that the soil had been moderate in nature.

6. Conclusion

The result of the present study and its comparison of the quality of the six samples from different industrial locations at Ariyalur district are indication of a good environmental management system adopted by the industrial locations. Results are more or less similar to fertility level and conclude that industries are the requirement for the development and progress of the country, use of best available control technologies gives options to control the harmful pollutants at their minimum level.

An in vitro study was made to find out the fertility status of a regular paddy growing field soil. This soil was studied for its Physico - chemical properties. The soil was neutral in reaction without acidity or alkalinity or calcareousness. The soil was without salinity since the EC was well within the limit. Amount the major nutrient, soil available nitrogen was low since this is a laterite soil having very poor organic matter content. Soil available phosphorus status was high whereas the soil available potassium level was medium.

A build up in soil fertility can be achieved by practicing INM. It is suggested to include green manure crops in crop sequence and incorporation is situ. Planting of green manure and green leaf manure crops and use of the plant that will increase the soil fertility can be adopted.

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