Current Status Of Agricultural Soil Fertility In Erode

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Abstract : Soilfertility is an important aspect in agriculture. Fertile soils only produce high nutritive value crops. Nowadays agricultural soils are contaminated due to many reasons. Farmers use synthetic fertilizers and synthetic pesticides for crop production. They play a major role in soil fertility. Physicochemical parameters of soil enable the current status of soil fertility. The soil samples were collected in Erode. All the agricultural soils were acidic in nature. Electrical conductivity of all the samples showed that the soils were good for seed germination. Total dissolved solids and salinity were in appropriate level in all the samples. Organic carbon level were in sufficient level. Macronutrients were in medium level. Calcium and magnesium were in sufficient level in all the soil samples.

Key words: Agriculture, fertility, Macro nutrients, Micro nutrients, Physicochemical parameters, Seed germination, Soil. Introduction

1 INTRODUTION

Soil qualities are related with agricultural activities. It includes physical, chemical and biological properties. These characters play a vital role in soil and make it suitable for agricultural activities [(Rakesh et al., 2012]. Soil is composed of many minerals, soil organic matter, water and air. It is very complex in nature [(Vishal et al., 2009; Flores-Magdaleno et al., 2011].Soil quality is related with environmental issues. Agricultural soils are contaminated due to synthetic fertilizers and synthetic pesticides. Industrial effluents are discharged in agricultural areas. Runoff from water streaming also play a major role in agricultural soil contamination. Soil quality is measured by soil nutrients. Soil physicochemical parameters are the good indicator of soil fertility. Soil quality and crop productivity are decreased due to continuous use of fertilizers. For sustainable agricultural production, fertility status of agricultural soils be evaluated. Its role is very specific in crop production and yield. Nutritional quality of crops depends on soil nutrients in soil profile [S. S. Dhanve et al., 2018]. In agriculture soil compaction is caused by mechanization and large machineries [Allman et al., 2015; Beylich et al., 2010]. The present study was conducted to understand the current status of agricultural soils. It is useful to farmers, they decide how to increase the crop yield in their areas. Soil management is a qualitative parameter. Soil organic carbon play a major role in crop production and it reduces the environmental issues on agriculture [Adhikari and Hartemink, 2016; Chabbi et al., 2017; Hatfield et al., 2017]. Soil quality is a significant factor. It determines the suitability of crops to grow. Good soil is an indicator of good environment. A good soil should be suitable for all kinds of plants to grow on it [M. Shanmuganathan, A. Rajendran, 2018].

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2 MATERIALS AND METHODS

Study area

Following agricultural samples were collected from Erode.
Sorghum bicolorL. - Seenapuram
Pennisetumpurpureum- Seenapuram
Arachis hypogaeaL. - Veeranampalayam
OryzasativaL. - Sunampuoodai
SaccharumofficinarumL. - Sunampuoodai

Soil collection

Soil samples were collected with the help of auger at the depth of 0-20 cm. They were collected in a clean polythene bags. They brought to the laboratory for further analysis. They air dried at room temperature. Then, they were passed through a 2 mm sievefor further analysis.Soil texture was identified for each samples. Moisture and temperature were measured. Physicochemical parameters like pH, EC, TDS, salinity, organic carbon, macronutrients like nitrogen, phosphorus, potassium and micronutrients like calcium and magnesium were estimated with standard methods.

3 Results and Discussion

***Table No: 1**. Physical parameters of agricultural soil samples*

S:No	SAMPLE	MOISTURE	TEMPERATURE ^0C
1.	Sorghum bicolor L.	8.3	7.60
2.	Pennisetumpurpureum	13.5	9.01
3.	Arachishypogaea L.	2.19	5.10
4.	Oryza sativa L.	30.5	7.90
5.	Saccharumofficinarum L.	20.1	8.01

***Table No: 2.** Chemical parameters of agricultural soil samples*

S: No	SAMPLE	pH	EC µS/cm	TDS ppm	SAL ppm	OC %
1.	Sorghum bicolor L.	06.35	092.2	060.0	068.6	1.5

2.	*Pennisetumpurpureum*	*07.08*	*127.8*	*088.9*	*102.0*	*1.9*
3.	*Arachishypogaea L.*	*06.75*	*097.0*	*068.1*	*079.8*	*1.6*
4.	*Oryza sativa L.*	*06.28*	*105.8*	*076.6*	*088.3*	*2.7*
5.	*Saccharumofficinarum L.*	*06.55*	*109.5*	*077.3*	*088.8*	*1.7*

Table: 3. *Macro and micro nutrients in agricultural soil samples (all in ppm)*

S:No	*SAMPLE*	*N*	*P*	*K*	*Na*	*Ca*
1.	*Sorghum bicolor L.*	*236*	*19*	*120*	*360*	*63*
2.	*Pennisetumpurpureum*	*280*	*28*	*243*	*366*	*67*
3.	*ArachishypogaeaL.*	*242*	*19*	*168*	*350*	*70*
4.	*Oryza sativa L.*	*310*	*20*	*270*	*368*	*76*
5.	*Saccharumofficinarum L.*	*265*	*22*	*216*	*353*	*83*

Soil moisture was high in paddy field (30.5) and low in Arachis hypogea L. soil (2.19). Soil temperature was high in Pennisetum purpureumsoil (9.01) and low in Arachis hypogaeaL.(5.10). Moisture content decreases the rate of heat dissipation ((Ochsner, 2001). In all the samples moisture content was higher than temperature. In Arachis hypogaeaL. soil moisture content was very low (2.19), so the temperature was high (5.10).Except Pennisetum purpureumall the samples were neutral pH in nature. Pennisetum purpureumwas slightly alkaline. Electrical conductivity was mainly based on soil salinity. EC strongly denoted soil salinization. Increased soil salinization or salinity of soil often related with agricultural practices only. Soil salinity definitely impacts the environment. It degrades the soil quality and crop productivity. It prevents the crops to take up water. Due to insufficient water the crop yield is very low (Zaldis et al., 2002; Dube and Chitiga, 2011). Electrical conductivity, TDS and salinity were slightly higher in Pennisetum purpureum (127.8 µS/cm), (088.9 ppm), (102.0 ppm) respectively. Low electrical conductivity, TDS, salinity were measured in Sorghum bicolorL. (092.2 µS/cm), (060.0 ppm), (068.6 ppm) respectively. Organic carbon level was medium in all the samples. High level of organic carbon was present in OryzasativaL..and low level was present in Sorghum bicolorL. Nitrogen level 200 – 5000 ppm is normal. All the samples had normal range of nitrogen. High level of nitrogen was present in OryzasativaL.(310 ppm) and low level was present in Sorghum bicolorL. (236 ppm).Phosphorus below 20 ppm is low, 20 – 40 ppm is medium, and 40 – 100 ppmis high. Above 100 ppm is excessive. Available phosphorus was between 19 ppm – 28 ppm. Phosphorus was medium in all the samples. Highest level of phosphorus was analysed in Pennisetumpurpureum(28 ppm). Lowest level was observed in Arachis hypogea L. andSorghum bicolorL. (19 ppm).Potassium level below 150 ppm is low. Potassium level 150 ppm – 250 ppm is medium, 250 ppm – 800 ppm is high. Above 800 ppm is excessive. High level of potassium was found in OryzasativaL.(270 ppm) and low potassium was found in SorghumbicolorL. (120 ppm). Sodium is not necessary for plant growth and it is not a plant nutrient. In acidic soil only, calcium deficiency occurs. Soluble salts below 640 ppm is best for plant growth. Sodium and calcium were present below 640 ppm in all the soil samples. High level of sodium was occur in OryzasativaL. (368 ppm) and low level was occur in SaccharumofficinarumL. (353 ppm). Calium was higher in SaccharumofficinarumL. (83 ppm) and low in Sorghum bicolorL. (63 ppm) [D.A. Horneck et al., 2011].

4 CONCLUSION

The study was conducted in Erode district to found out the fertility status of agricultural soils. Physicochemical parameters were studied for all the soil samples. The present study concluded that all the soil samples were good for cultivation of crops in agriculture based onpH, EC, TDS, salinity and organic carbon. Medium level of macro and micro nutrients were present in all agricultural soil samples. Sodium and calcium were present in appropriate level. All the agricultural soils were good in fertility.

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