



# Assessment of Secondary and Micronutrients of Soil in Coimbatore District, Tamil Nadu, India

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## Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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## ABSTRACT

An experiment was conducted in 2022-23 with prime objective to assess the Secondary and Micronutrients of Soil at different depths of various sites of Thondamuthur, Anaimalai and Karamadai blocks of Coimbatore District, Tamil Nadu. The soil samples were collected at 0 -15, 15-30 and 30-45cm depth following standard procedure. Calcium ( $6.2 \text{ cmol (p}^+) \text{ kg}^{-1}$  to  $9.0 \text{ cmol (p}^+) \text{ kg}^{-1}$ ) and Magnesium ( $2.3 \text{ cmol (p}^+) \text{ kg}^{-1}$  to  $5.7 \text{ cmol (p}^+) \text{ kg}^{-1}$ ) are very sufficient in this soil. Sulphur ( $0.78 \text{ mg kg}^{-1}$  to  $0.98 \text{ mg kg}^{-1}$ ) is optimum in all locations. Zinc ( $0.72 \text{ mg kg}^{-1}$  to  $0.87 \text{ Mg kg}^{-1}$ ) content is sufficient in this soil. The Iron content of the soil ranged from  $4.17 \text{ mg kg}^{-1}$  to  $5.97 \text{ mg kg}^{-1}$ . The Iron content is sufficient in all sites. The Boron content of the soil ranged from  $0.46 \text{ mg kg}^{-1}$  to  $0.85 \text{ mg kg}^{-1}$ . The Boron content is sufficient in all sites. The Copper content of the soil ranged from  $0.60 \text{ mg kg}^{-1}$  to  $0.80 \text{ mg kg}^{-1}$  The Copper content is excess in all sites. The Manganese content of the soil ranged from  $1.77 \text{ mg kg}^{-1}$  to  $3.03 \text{ mg kg}^{-1}$ . The Manganese content is sufficient in all sites. There is an including awareness of the need to pay greater attention in the role of organic matter enhancement for good soil health and proper nutrition of plant so as to attain optimum economic yield and soil is suitable for all major tropical and sub-tropical crops.

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## 1. INRODUCTION

“Soils provide food, fodder and fuel for meeting the basic needs of human and animal with the growth in human and animal population, demand for more food production is on the increase. however, the capacity of soil to produce is limited and limits to production are set by intrinsic characteristics, agro-ecological setting, use and management [1-4]. these demands systematic appraisal of our soil resources with respect to their extent, distribution, characteristics, behaviour and use potential’ which is very important for developing an effective land use system for argumenting agricultural production on sustainable basis” (FAO, 2018).

“Soil fertility is the ability of a soil to sustain plant growth by providing essential plant nutrients and favourable chemical, physical, and biological characteristics as a habitat for plant growth. Fertilizers are chemical or natural substance or material that is used to provide nutrients to plants, usually via application to the soil, but also to foliage or through water in rice systems, fertigation or hydroponics or aquaculture operations” [5-9]. “Nutrient sources include chemical and mineral fertilizers, organic fertilizers, such as livestock manures and composts, and sources of recycled nutrients” (FAO, 2021).

Coimbatore is situated in the extreme west of Tamil Nadu, near the state Kerala covering an area of 642.12 Sq. Km. sq.kms. Surrounded by mountains on the west, with reserve forests and the (Nilgiri Biosphere Reserve) on the northern side. The Noyyal River runs through Coimbatore and forms the southern boundary of the corporation. The city sits amidst Noyyal's basin area and has an extensive tank system fed by the river and rainwater. There are 12 blocks in Coimbatore district namely Anaimalai, Annur, Kinath ukidavu, Karamadai, Thondamuthur, Sular, Pollachi North, Pollachi South, Sarkarsamakulam, Sulthanpet, Periyanaichenpalayam and Madukarai [10-14]. In which the samples are taken from Thondamuthur, Anaimalai and Karamadai. The District Coimbatore R-GIS coordinates Latitude :11 01' 2.50" N 76 57'31.98" E. Coimbatore receives high rainfall from North East Monsoon of 444.3 mm. Rainfall distribution is also good. Temperature varies from 18.6 Celsius to 35.7 Celsius. Of the total geographical area 7.47 lakhs

ha and 3.14 lakhs ha are under net sown area and gross cropped area while 0.19 lakh ha is sown more than once. While the area under Food crops accounted for 54.17 per cent and that of non-food crops formed 45.83per cent only, Important crops grown in the district are Paddy, Cholam (Jowar), Cumbu (Bajra), Ragi, Maize, Small millets, Pulses, Sugarcane, Banana, Spices and Condiments, Fruits and Vegetables which constitute the Food crops. It is reported that fruits, vegetables, flowers, medicinal plants and horticulture crops are cultivated in the district covering an area of 52011 ha. The major plantation crops grown are Coconut (28.2 percent of the total area), Tea, Coffee, Areca nut (1577 ha) and Cardamom. Cashew and curry leaf are also grown in a few pockets. Fibres, Oilseeds, Drugs and Narcotics, Dyes, Fodder crops, Greenmanure crops, Flowers and Other Miscellaneous tree crops and Groves constitute Nonfood crops. Cocoa cultivation has also been started on a small scale as an intercrop in the coconut plantations with area coverage of 330 ha [15-18]. Mango, banana, guava, lime, papaya and grapes are some of the major fruit crops grown in about 9894 ha. Banana is also cultivated quite extensively and has covered 4983 ha with production of 1,45,880 MT. Mango cultivation is gaining impetus in Coimbatore. The district occupies second position in the State in area under grapes with 386 hectares and an estimated production of 9000 MT of fruit. The Spices like chillies, coriander, tamarind, cardamom, pepper, ginger, turmeric and cloves are also grown in about 8067 hectares.

## 2. METHODOLOGY

Analysis of the soil samples were under the methods, Estimation of exchangeable calcium + magnesium in soil was done by using neutral ammonium acetate solution which was given by Jackson, 1973. To get the magnesium content in soil sample calcium + magnesium in soil sample was subtracted with calcium content in soil sample. Sulphur is estimated in the soil by turbid metric method given by (Chesnin and Yien, 1950). Estimation of micronutrients such as zinc, copper, iron, boron and manganese in soil was done by DTPA Method was given by Lindsay and Norvell, 1978.

**Table 1. Secondary and micronutrients of different blocks of Coimbatore district**

Sampling Sites	Ca (c mol (p <sup>+</sup> ) kg <sup>-1</sup> )	Mg (c mol (p <sup>+</sup> ) kg <sup>-1</sup> )	S (mg kg <sup>-1</sup> )	Zn (mg kg <sup>-1</sup> )	Fe (mg kg <sup>-1</sup> )	Cu (mg kg <sup>-1</sup> )	B (mg kg <sup>-1</sup> )	Mn (mg kg <sup>-1</sup> )
L1	7.43	3.43	0.84	0.84	4.93	0.74	0.74	2.71
L2	6.26	2.26	0.87	0.72	5.36	0.60	0.49	2.63
L3	9.06	4.53	0.80	0.82	4.06	0.80	0.55	2.13
L4	8.43	3.26	0.86	0.74	4.16	0.62	0.47	1.77
L5	7.3	5.73	0.90	0.82	5.2	0.64	0.85	2.7
L6	8.4	4.6	0.85	0.77	5.46	0.63	0.84	3.03
L7	6.23	5.2	0.81	0.77	5.96	0.69	0.72	2.53
L8	8.66	3.63	0.94	0.72	5.33	0.75	0.74	1.93
L9	7.93	4.53	0.82	0.84	4.56	0.64	0.45	1.96

List of Villages: L1 – Alandurai (Thondamuthur), L2 – Nadhegoundenpudur (Thondamuthur), L3 – Puthupalayam (Thondamuthur), L4 – Somandurai (Anaimalai), L5 – Tatur (Anaimalai), L6 – Ambarampalayam (Anaimalai), L7 – Bettadapuram (Karamadai), L8 – Anna Nagar (Karamadai), L9 – Vadavalli (Karamadai)

### 3. RESULTS AND DISCUSSION

The soil samples were collected at 0 -15, 15-30 and 30-45cm depth following standard procedure. Calcium (6.2 cmol (p<sup>+</sup>) kg<sup>-1</sup> to 9.0 cmol (p<sup>+</sup>) kg<sup>-1</sup>) and Magnesium (2.3 cmol (p<sup>+</sup>) kg<sup>-1</sup> to 5.7 cmol (p<sup>+</sup>) kg<sup>-1</sup>) are very sufficient in this soil. Sulphur (0.78 mg kg<sup>-1</sup> to 0.98 mg kg<sup>-1</sup>) is optimum in all locations. Zinc (0.72 mg kg<sup>-1</sup> to 0.87 Mg kg<sup>-1</sup>) content is sufficient in this soil. The Iron content of the soil ranged from 4.17 mg kg<sup>-1</sup> to 5.97 mg kg<sup>-1</sup>. The Iron content is sufficient in all sites. The Boron content of the soil ranged from 0.46 mg kg<sup>-1</sup> to 0.85 mg kg<sup>-1</sup>. The Boron content is sufficient in all sites. The Copper content of the soil ranged from 0.60 mg kg<sup>-1</sup> to 0.80 mg kg<sup>-1</sup>. The Copper content is excess in all sites. The Manganese content of the soil ranged from 1.77 mg kg<sup>-1</sup> to 3.03 mg kg<sup>-1</sup>. The Manganese content is sufficient in all sites.

### 4. CONCLUSION

It was concluded that soil parameters studied during the course of investigation clearly indicated that soil has good secondary and micronutrients. Calcium and Magnesium are very sufficient in this soil. Sulphur and Zinc content is sufficient in this soil. The Copper, Iron and Manganese content is optimum in all sites. According to soil depths, the nutrients distribution is varying with different depths. Some nutrients are mostly present in upper depths and some of other nutrients is present in lowest depths. There is a need to pay greater attention in the role of organic matter in the soil for good soil health and proper nutrition of plant so as to attain optimum economic yield for all major tropical and sub-tropical crops.

### COMPETING INTERESTS

Author has declared that no competing interests exist.

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