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Available nutrient and fertility status of soils of Ratnagiri district

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Abstract
The agriculture and the other allied activities and in turn the prosperity and economic growth of a country depend on the soil resource. Soil is the basic source to produce food, fodder, fuel and fiber - the necessities of the human being. It is, therefore, important to understand the inherent potential and limitations of soil for managing it for sustained production in various seasons. Attempt has been made to examine the soil temporal variability of macronutrients in Ratnagiri District of Konkan region, Maharashtra. *viz*. Nitrogen, Phosphorus and potassium. Nitrogen was determined by alkaline permanganate method, phosphorus was calculated by Flame photometer and potassium was determined spectrophotometer. The available nitrogen content of the soil samples ranged from 107.32 to 602.11 kg ha^{-1} with mean value of 319 kg ha^{-1} 2.4 to 18.8 kg ha^{-1} surface soils was medium to very low in available phosphorus. The available potassium content ranged from 99.86 to 720.86 kg ha^{-1} with a mean value of 344 kg ha^{-1} at surface, majority of the soils in medium to high potassium. The nutrient index values of the surface soils under study were low to medium in available nitrogen with value 1.5 to 1.75, low in available, phosphorus and medium to high available potassium with values of 1.0 and 1.91 to 2.83 respectively.
The fertilizer input rate and continuous discharging of industrial waste water on soil surface are causing nutrient imbalance.

Keywords: Available nutrient, fertility status, Ratnagiri district

Introduction
India is gifted with heterogeneous landforms and variety of climatic conditions like high altitude forests, peninsular plateaus, the lofty mountains, the reverie deltas, variety of geological formations endowed with temperature varying from equatorial hot to arctic cold , and rainfall from per humid with world's maximum rainfall (1120 cm) of several hundred cms to extreme aridity with a few cms (<10cm). These varying environmental situations in the country have resulted in a greater variety of soils. Therefore, the systematic appraisal of agro-ecological regions has tremendous scope in grouping relatively homogenous regions in terms of soil, climate and physiographic and conductive moisture availability periods (length of growing season) in planning appropriate land use.
Soil is the most vital and precious natural resource that sustains life on the earth. A productive soil builds the foundation for any successful crop. The native ability of soils to supply sufficient nutrients has declined due to intensive and exhaustive crop production practices involving indiscriminate use of fertilizers, which not only increases the cost of production but also results in deleterious effects on soil fertility. Therefore, one of the great challenges today is to develop and implement soil, crop and nutrient management technologies that enhance the productivity and quality of soil, water and air.
The concept of balanced nutrition of crops guides the use of plant nutrients in a definite proportion as required by the crops which is possible only if one knows the available nutrient status of his soils. Soil nutrient status indicates the quantity of nutrients available in the soil for adjustment of fertilizer additions. Systematic and periodical identification of current nutrient status is a prerequisite for sustaining the productivity and fertility of soil. Soil characterization, evaluation of fertility status through problem identification and suggesting suitable management are important aspects in sustainable agricultural production.

Materials and Methods

The study area is located between 17' 45^0 latitude and 17' 26^0 longitude with elevation varying from 250 m above the mean sea level with an annual rainfall 4507.1 mm and average maximum and minimum temperatures of 31.4^0 c and 19.8^0 respectively. Soil samples were collected from 6 representative locations. The samples were processed and analyzed for Macronutrient status.

The soil p^H was determined in 1:2.5 (Jackson, 1973) [3] and 1:1 (Sanchez, 2003) soil water suspension using p^H meter. Electrical Conductivity were determined in1:2.5 soil water suspension using conductivity meter, OC content was estimated by Walkley and Black method (Jackson, 1973) [3] Available nitrogen was determined by alkaline permanganate method (Subbiah and Asija, 1956) [9], available phosphorus in the soil samples were extracted using Olsen's extractant (0.5 M $NaHCO_3$ of p^H 8.5) as described by Olsen *et al* . (1954) [6] and the phosphorus in the extract was determined by Murphy and Riley (1962) [5] method using ascorbic acid as the reducing agent using spectrometer, Available potassium was determined flame photometerically after extraction with neutral normal ammonium acetate (Muhur *et al* 1965) [4]. The soils were grouped into fertility capability units based on the classification given by Buol *et al.* (1975) and Sanchez *et al.* (1982) [7].

Results and Discussion

Macronutrients

The data related to the soils of Ratnagiri district presented in Table 1 revealed that the available nitrogen content at ranged from 107.32 to 602.11 kg ha^{-1}, with mean value of 319 kg ha^{-1}. Among the physiographic units, recorded low to medium available nitrogen at surface. The low nitrogen status in the soils might be due to low amount of organic carbon in the soil (Srinivasan and Poongothai, 2013) [8]. The variation in available N content in the soils could be attributed to the differences in their physiography as well as the differential cultivation and management of the soils.

The phosphorus content in surface soils varied from 2.4 to 18.8 kg ha^{-1} surface soils was medium to very low in available phosphorus. Low available P content to the soils might be attributed to their high fixing capacity which prevents phosphorus to come in to readily available form into the soil solution (Badrinath *et al*., 1986) [1].

The available potassium content ranged from 99.86 to720.86 kg ha^{-1} with a mean value of 344 kg ha^{-1} at surface, majority of the soils in medium to high potassium.

The overall means of nitrogen, phosphors was medium to low but potassium was all the samples studied higher. It might possibly by due to much accumulation of crop residues, debris and root exudates at surface than beneath, which on continuous mineralization release the nutrients.

Nutrient Index

Nutrient index values of macronutrients for the soils of Ratnagiri district are presented in Table 2. The nutrient index values of the surface soils under study were low to medium in available nitrogen with value 1.5 to 1.75, low in available, phosphorus and medium to high available potassium with values of 1.0 and 1.91 to 2.83 respectively.

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