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RESEARCH ARTICLE :

Mapping of crop growing soils in Kannur micro watershed Kollegal taluk, Chamarajnagar district, Karnataka

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SUMMARY : The selected micro watershed belongs to Kollegal taluk of Chamarajanagar district. The micro watershed lies 20km away from Kollegal taluk head quarter. The Micro-watershed is located between 120 6'34.5" and 120 7'49.6"N latitude, 77015'30.9" and 770 14'20.2"E longitude, with an average elevation of 775m above Mean Sea Level (MSL). It occupies apart of the four villages *viz.*, Kannuru, Anapura, Mangala, and Kamgare. Composite soil surface sample in strategic manner to cover all farming systems of the watershed. Upland soils was slightly acidic to neutral, low lands soil reaction was neutral to slightly alkaline. The electrical conductivity of all the fertility points was negligible, The organic carbon content vary between low to medium, The cation exchange capacity of the soil varied from low to medium. The available nitrogen, phosphorus and potassium were low, low to medium and medium respectively and fertility maps of all nutrients prepared.

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KEY WORDS :
Micro watershed, Remote sensing (RS) tools, Cation exchange capacity, GPS, Physiographic units

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BACKGROUND AND OBJECTIVES

The ability of the land to produce crops is limited and the limits to produce crops are set by soil, climate and land form conditions. However, the capacity of a soil to produce crops is limited and the limits to production are set by intrinsic characteristics, agro-ecological settings, use and management (FAO,1993a). Despite the significant growth in production, the sustainability of some cropping systems has been showing signs of fatigue. Therefore, comprehensive account of our land resource and as certainits potential and problems towards optimizing land use on sustainable basis is necessary. Keeping these considerations in view, an investigation was carried out for Kannur micro watershed in Kollegal taluk of Chamarajanagar.

RESOURCES AND METHODS

Remotely sensed data from IRSP6 was collected from Karnataka State Remote Sensing application Centre, Bangalore. Sensor used in this satellite is LISS IVMX. The imagery scale is 1:12,500 scales, the imaginary

collected Toposheets used in this study are 57B/4, 57C/4, 57F/4. The imaginary was interpreted in conjunction with the toposheet based on the tonal variations, texture and pattern. Permanent structures like roads, settlements, and lakes were marked on the trace sheet mounted onthe imagery. Soil samples (0-30cm) at random were collected during 21-25th July 2013. The exact sample location was recorded using GPS Collected and analyzed for physical and chemical properties. GPS reading were taken at respective sampling site. Standard analytical methods as described by Richards (1954) and Aguilera and Jackson (1953) were followed for measuring various soils attributes like pH, ECe, soluble cations and anions, CEC and exchangeable cations, organic carbon content. From the satellite imaginaries and cadastral map, fertility maps on surface soil reaction, organic carbon, available nitrogen, phosphorus, potassium and available micro nutrients were prepared to study the problems and potentials of study area (Fig.A).

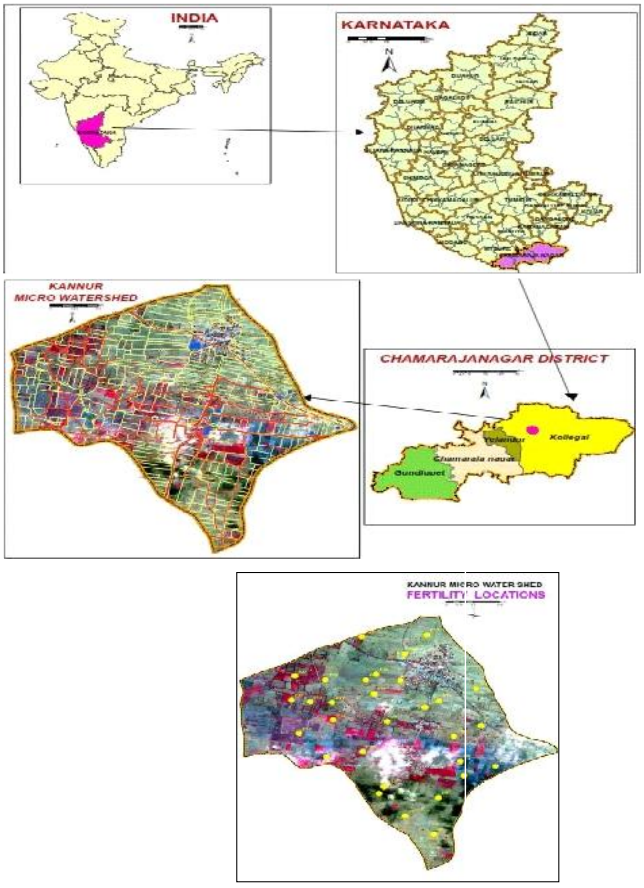

Fig. A: Location of study area

OBSERVATIONS AND ANALYSIS

The pH values in the study area ranged from 5.04 to 8.60 with mean and SD values of 7.08 and 1.16, respectively. Most of the study area was under neutral to moderately alkaline range. The acidic nature of red soils was due to acidic nature of parent material of the study area. The reaction was alkaline neutral to alkaline nature of black soils which was mainly due to high exchangeable bases (Bhadrapur and Rao, 1979). The EC values in watershed area ranged from 0.01 to 1.15 dSm^{-1}. The black soils which exhibited brown layers were relatively free from salts. The brown layer seems to be controlled salinity and exchangeable sodium (Dasog and Hadimani,1980 and Anonymous,1969). The organic carbon content in the study are aranged from 0.04 to 1.0 per cent of soil. Majorly soils of the study area fall under low to medium category. The low organic carbon content of the soils may be attributed to the prevalence of high temperature. The organic matter degradation and removal taken place at faster rate coupled with low vegetation cover, there by leaving less chances of accumulation of organic matter in the soil (Govindarajan and Datta (1968). The available nitrogen status in study are arranged from 56.5 to 240 kg per ha with mean. All the soils of micro watershed fall under low category. All the study area was low in available nitrogen. Major portion of the nitrogen pool is contributed by organic matter). Low organic matter content in this area due to low rainfall and low vegetation cover facilitated faster degradation and removal of organic matter leading to nitrogen deficiency The available phosphorus content in the study area ranged from 7.3 to 63.0 kg per ha. The lowlands were medium in status, where as uplands and midlands fall under low category. The red soils shown low values of available phosphorus which may be due to low CEC, clay content and soil reaction of <6.5 The available potassium content in the study are arranged from 62.9 to 264.8 kg per ha. Majority of the area falls under low category. The low land showed relatively high in available potassium than uplands and midlands. Black soils shown high values due to predominance of Krichmicaceous and feldspars minerals in parent material. The exchangeable Ca and Mg content in micro-watershed ranged from 30.3 to 197.6 ppm and 12.2 to 97.8ppm. The upland soils are relatively less base saturated than low lands and midlands Due to leaching of bases like Ca and Mg. The available sulphur content

of micro-watershed ranged from 0.6to18.0 ppm. The available sulphur content in lowlands was higher than that of uplands and midlands (Balanagoudar, 1989). The available copper content of micro-watershed ranged from 0.42 to 4.32 ppm. The available Iron content of micro-watershed ranged from 2.1 to 26.1 ppm.The available Manganese content of micro- watershed ranged from 2.1 to 26.1ppm. The available Manganese content in lowlands was higher than that of uplands and midlands, available Manganese was7.2 and 4.7 ppm, respectively. The available Zinc content of micro- watershed ranged from 2.1 to 26.1 ppm. Soil available micro nutrients showed sufficient presence in most of the soils studied (Anil Kumar *et al.*, 2010).

Soil reaction of upland soils was slightly acidic to neutral which is attributed to the presence of leaching of bases from the soil along with run off and drainage water due to moderately high rainfall existing in the area. In lowlands, the soil reaction was neutral to slightly alkaline (Fig. 1) due to deposition of bases from the upland physiographic units. The electrical conductivity of all the samples was negligible, which indicates non-saline nature of soil and good leaching. The organic carbon content in all the samples to vary between low to medium due to low vegetative/cropping cover. The soil erosion and warmer climate leading to low accumulation of organic carbon in the study area. The cation exchange capacity of the soil varied from low to medium. The upland physiographic units were low in cation exchange capacity than the midlands and low lands owing to their low clay content, low organic matter and the predominance of 1:1type of clay minerals, where as lowlands exhibited moderate CEC values due to higher clay content. The available nitrogen, phosphorus and potassium were low, low to medium and medium, respectively (Fig. 1). The low nitrogen content is attributed to the low organic

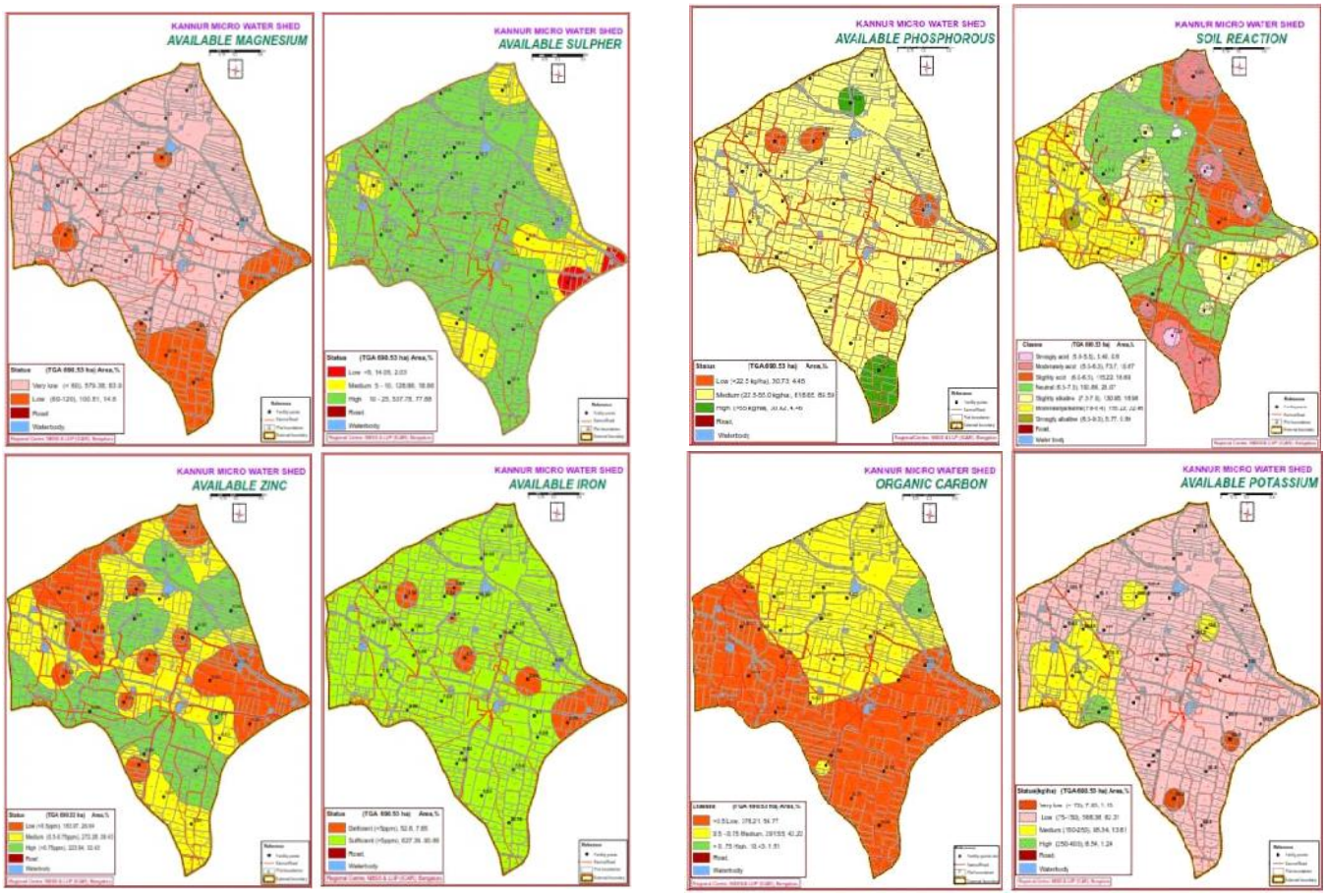

Fig. 1: Maps showing soil reaction, organic carbon, avalible potassium, avalible phosphorus, avalible secondary nutirients and micronutrients

carbon due to warmer climate and low vegetative cover coupled with little nitrogen fertilization. Soil available micronutrients showed sufficient presence in most of the soils studied except in case of available zinc confirming the study of Anil Kumar *et al.* (2010). Present study noticed that study area was adequateiniron, manganese, copper. Study area was low in available zinc status (Fig. 1) and mapping was done accordingly.

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