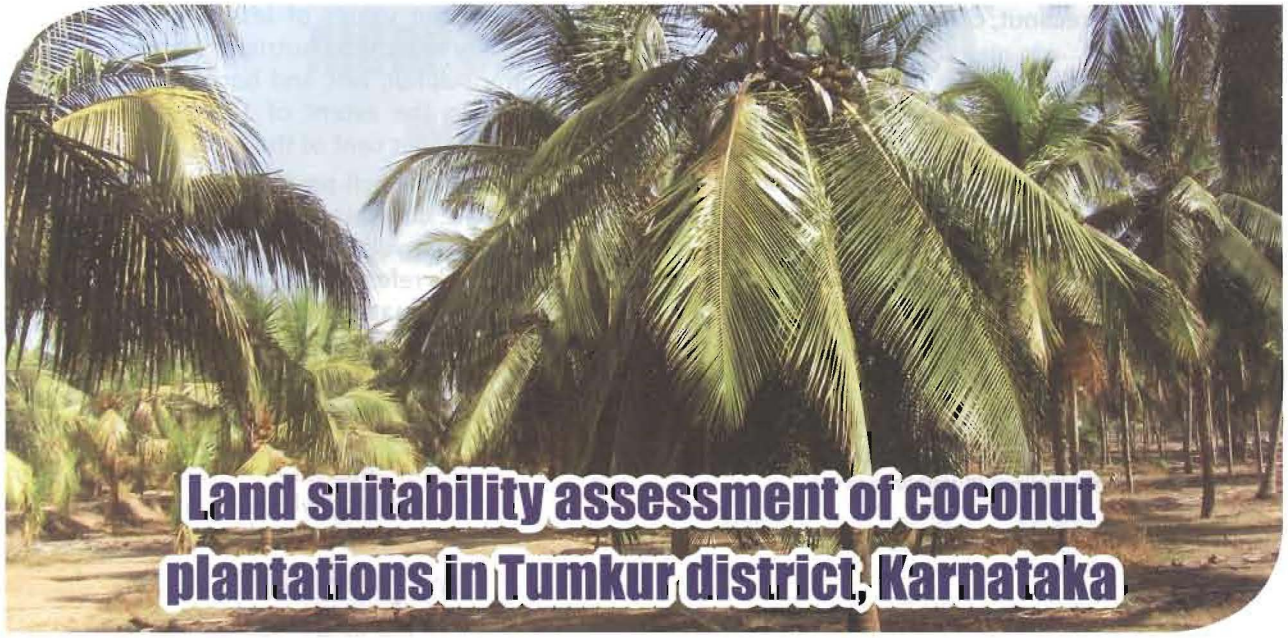

Land suitability assessment of coconut plantations in Tumkur district, Karnataka

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Introduction

Coconut (*Cocos nucifera L.*) is the most valuable natural gift to mankind and is commonly known as Kalpavruksha, which fulfils all his vital needs. It is unique among horticultural crops as a source of food, drink, shelter, fiber, medicine and a variety of raw materials for industrial use. It is cultivated in more than 93 countries including Philippines which has the largest area followed by Indonesia, India and Sri Lanka. These four countries altogether accounted for 80 per cent and 79 per cent of the world's coconut area (11.96 M ha) and production (67,128 million nuts), respectively (ICC, 2017). India became the world's largest coconut producer with the production of around 23,798 million nuts from 2.09 M ha. with the productivity of 11,350 nuts/ha. In India, Kerala, Karnataka, Andhra Pradesh and Tamil Nadu accounts for 89 per cent of area and contribute 93 per cent of the production with unique consumption pattern as tender coconut (20 %), matured coconuts (50 %) and copra (30 %).

Karnataka is bestowed with varied climate and soil type which suits well for a wide range of horticultural crops. In Karnataka, Tumkur, Hassan, Chikmagaluru, Chitradurga, Mandya, Ramanagara and Mysuru are the major coconut growing districts with the production share of 84 per cent with the productivity of 7818 nuts/ha which is lesser than the national average (11,350 nuts/ha). Coconut is mainly cultivated by small and marginal farmers with less fertile, uncultivated and rainfed areas which stagnates production and productivity of the crop in the state. Hence, the study was undertaken to assess the land resource inventory and suitability for coconut in watershed areas of Karnataka.

Location of the study area

The study was conducted in Tumkur district under the assistance of Watershed Development Department, Karnataka during the academic year 2017-18. The brief description of the study area is presented as below:

Biligere micro-watershed (Siddappanapalya sub-watershed, Tumkur taluk, Tumkur district) is located at North latitude 130 14 39.794" and 130 16' 13.145" and East longitude 76058' 43.14" and 770 0' 11.714" covering an area of about 509 ha bounded by Agrahara Biligere, Chikkeguddadha A Mahalkavalu, Govindarajapura, Siddegowdanapalya and Ariyur villages. Sandy clay and sandy clay loam are the dominant soil textural classes with an average annual rainfall is 635 mm and the major crops grown in the

study area are arecanut, coconut, mango and ragi.

Methodology adopted

To assess the land resource inventory and land suitability for coconut cultivation in the study area, 50 surface soil samples were drawn at 250 m grid intervals to cover the entire watershed and the samples were analyzed in the laboratory for 14 various soil fertility indicators such as macro, secondary and micro nutrients. Further, 16 profiles (up to 2 metre depth) were opened to study the detail soil characteristics viz., soil depth and sub surface soil gravelliness parameters.

Table 1. Major constraints identified during the land resource inventory survey

Soil Parameters	Suitable Soil characteristics for coconut cultivation	Soil Site characteristics observed in the study area	Remarks
Depth	Very Deep (>150 cm)	Moderately Shallow(50-75 cm)	Not Suitable
Texture	Sandy clay loam to Sandy clay	Sandy clay	Suitable
Slope	Nearly level to Very gently slopping	Very gently slopping	Suitable
Soil pH	Slightly acidic to neutral (5.10-6.50)	Very strongly acidic (4.5-5.0)	Not Suitable
Available N, P & K	730: 180: 680 g/ plant/ year (> 10 years)	Low in N, Medium	Not Suitable in P & K
Exchangeable Ca & Mg	Recommended Dose of Fertilizer	Deficient	Not Suitable
Fe, Mn, Cu and Zn	Recommended Dose of Fertilizer	Deficient	Not Suitable

Results and discussion

The results of the fertility analysis data of surface soil samples indicated that, about 32.40 per cent of the area (165 ha) is slightly acidic to moderately acidic while, 283 ha (55.60 % of the area) is strongly acidic to extremely acidic (pH values of 3.50 -5.50) which is not suitable for coconut cultivation. Regarding the major nutrients status of soils, available phosphorous and potassium content was medium while, 89.30 per cent of the area (454 ha) is low in available nitrogen with the values of less than 280 kgs/ha. The secondary and micro nutrients namely calcium, magnesium, sulphur, zinc and boron were found to be deficient to the extent of 17.70, 43.50, 14.90, 89.30 and 89.00 per cent of the area, respectively.

The results of the soil profile study revealed that, majority of the cultivated land (36.40 %) is having sandy clay, non gravelly soils with very gently sloping lands. Soil depth refers to the depth of soil from the surface to parent material or bedrock or the layer of obstacles for roots. It was observed in the study area that, 64.40 per cent of the area (328 ha) has very deep soils while, 24.90 per cent of the area (126 ha) has moderately shallow soils (50-75 cm depth) which are not suitable for coconut cultivation, as the crop has deep rooted system which requires deep soils (>150 cm depth) for better crop growth and yield.

Conclusion and policy implications

The results of the land resource inventory study indicated that, survey numbers 158 to 163, 166, 168, 169, 176, 196 and 197 has moderately shallow soils (50-75 cm) in which coconut crop was grown. The average annual yield was found to be 17 nuts per palm for the above survey numbers. Though, the crop is not economical, as it was the only source of income for livelihood of the households. Hence, unique crop plan has to be prepared based on the existing soil site characteristics and replace the crop gradually. Further, intercropping coconut plantations with Ragi + Cowpea (4:2) and Ragi + Redgram (8:2), horticultural crops like Indian gooseberry, custard apple, guava and sapota, vegetable crops like drumstick and curry leaves, forestry trees like Glyricidia and Melia dubia has to be encouraged for doubling farm income.

In addition to the above, majority of the farmers usually follow and cultivate the same crops as what the neighbours do. This is unscientific and also not economically worthy since, the soil characteristics are highly dynamic in nature and vary from place to place. Hence, knowledge and importance of the land resource inventory and soil test based crop suitability has to reach all the farmers through adequate extension education and village level trainings. ■

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