Evaluation of Coconut suitability in soils of Semi Arid Land, South Telangana Plateau, Andhra Pradesh, India

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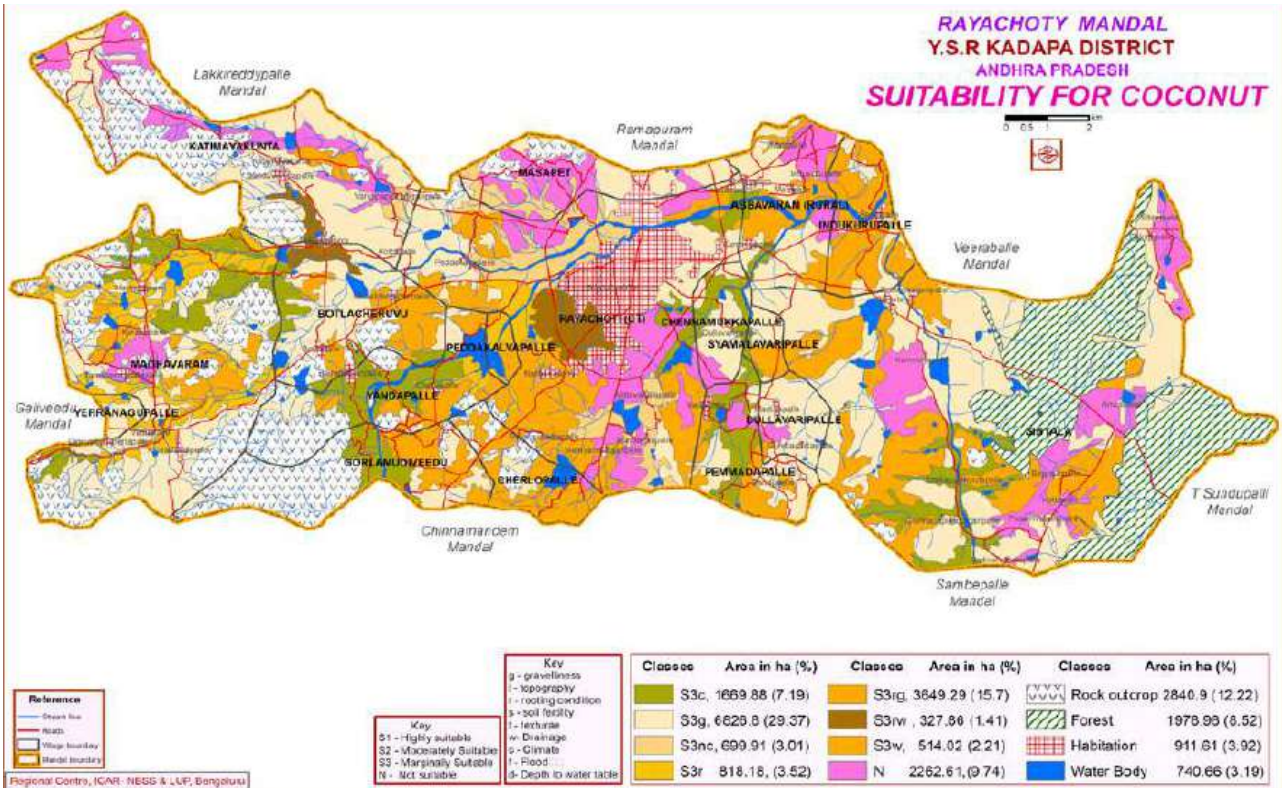

Map 1. Soil suitability for coconut in Rayachoty mandal, Andhra pradesh

India is the laregest producer of coconut in the world with a production of 20736 million nuts and productivity of 9430 nuts/ha. Kerala produces roughly 45% of India's coconuts, with some 92% of total production lying in the southern Indian states. Coconut plays an important role in the national economy of India. According to figures published by the Food and Agriculture Organization of the United Nations, India is one of the world's largest producers of coconut. Traditional areas of coconut cultivation are the Malabar and Coromandel coasts. The states of Kerala, Karnataka, and Tamil Nadu practise large-scale intensive farming of coconut.

Fig.1: Coconut production in irrigated land of Rayachoty Mandal, Andhra Pradesh

Soil site characteristics			Rating			
		Unit	Highly suitable S1	Moderately suitable S2	Marginally suitable S3	Not suitable
Climatic regime	Mean temperature in growing season	°C	26-29	23-25 30-32	20-22 33-34	
	Total rainfall	mm	1500-2500	1000-1500	500-1000	<500
	Dry months (Months with less than 50 mm rainfall)	Months	<3	4-5	6-7	

Land quality			Land characteristics			
		Unit	Highly suitable S1	Moderately suitable S2	Marginally suitable S3	Not suitable
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Imperfectly drained, excessively drained	Poorly
	Depth of water table	m	2-3	1-2	0.5-1.0	
Nutrient availability	Texture	Class	cl, scl, sc, sicl, sil	sl, c (non-swelling)	c (swelling), ls, s	
	pH	1:2.5	5.1-6.5	6.6-7.5 4.5-5.0	7.6-8.5 4.0-4.4	
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Presence of gravel in subsoil	%	<15	15-35	35-50	>50
	Presence of hard pan in subsoil	cm	>250	125-200	100-150	<100
Erosion hazard	Slope	%	<8	8-15	15.-30	-

Table 1. Soil-site suitability criteria for coconut

Fig. 2: Soil profiles in irrigated land cultivated with coconut in Rayachoty mandal, Andhra Pradesh

Soil survey data and the soil maps have been widely used for interpretative purposes by defining relative suitability or limitations of various soil types for different land use. Land suitability evaluation is the process of determining the potential of the land for alternative uses and forms a pre-requisite for land use planning. It integrates soil characteristics with climate and land use. Optimal requirement of a crop is always region specific, and soil site characteristics determine the degree of suitability for land use and help in planning expansion of area under a particular crop.

Land suitability evaluation done for coconut in Rayachoty mandal, YSR Kadapa district, Andhra Pradesh through detailed soil survey on 1:10000 scale (Chandrakala *et al.*, 2019). Soil-site suitability criteria for coconut presented in Table 1 represents the soil and climatic requirements of coconut for its sustainable production and productivity in a specific land unit. By using detailed soil survey data we have arrived with soil mapping units. Assigning soil site suitability criteria to particular mapping units, soil suitability map have been generated in the GIS environment.

In Andhra Pradesh, coconut is grown in an area of 1.05 lakh ha with a production of 16890.9 lakh tonne and a productivity of 15964 nuts/ha.

Mapping unit no.	Suitability classes	Description	Area ha	Area %
36,37,38,40, 51, 53	S3c	Marginally suitable land with slight limitation of climatic condition	1669.88	7.19
29,30,31,32, 33, 34,35,41, 42,43,44,45,46,47,48,49	S3g	Marginally suitable land with slight limitation of gravelliness	6826.8	29.37
52	S3nc	Marginally suitable land with slight limitation of soil fertility and climatic condition	699.91	3.01
27,28	S3r	Marginally suitable land with slight limitation of root restriction	818.18	3.52
9,10,11,12,13,14,15,16,17, 18,19,20,21,22,23,24	S3rg	Marginally suitable land with slight limitation of root restriction and gravelliness	3649.29	15.7
26	S3rw	Marginally suitable land with slight limitation of root restriction and drainage	327.86	1.41
39	S3w	Marginally suitable land with slight limitation of drainage	514.02	2.21
1,2,3,4,5,6,7,8,25,50	N	Currently not suitable	2262.61	9.74
		Soil total	16768.55	72.15
Rock outcrops			2840.9	12.22
Forest			1978.98	8.52
Habitation			911.61	3.92
Waterbody			740.66	3.19
Total geographical area			23240.7	100

Table 2 : Soil suitability for coconut in Rayachoty mandal, YSR Kadapa, Andhra Pradesh

Areas receiving good rains throughout the year (1500-2500 mm) and high relative humidity (>80 %) and preferably with a dry period of less than 3 months are favourable if temperature ranges from 26 to 29^{o}C. Coconut is grown at elevations of less than 600 m and on less than 8 per cent slopes on a wide variety of soil types, ranging from heavy clay to sandy soils, however deep to very deep; welldrained and medium textured soils are most suitable. Soil pH from 5.1 to 6.5 is ideal and the crop is sensitive to poor drainage and water logging, presence of free iron and aluminium, low pH in the sub soil, extreme gravelly and stony soils, sodicity and salinity.

Soil suitability for coconut in Rayachoty mandal is given in table 2 and map 1. Coconut is marginally suitable in 62.41 per cent of total geographical area with limitation of climatic condition, gravelliness, soil fertility, root restriction and drainage and 9.74 per cent of total area is unsuitable for coconut production in Rayachoty mandal (Chandrakala *et al.*, 2019a). Similar coconut suitability evaluation was done for Elamdasam Block, Idukki district, Kerala (Chandrakala et al., 2017 & 2019)

Conclusion

Coconut can be cultivated in Semi Arid Land of South Telangana Plateau, Andhra Pradesh provided with artificial irrigation through bore well/pump irrigation along with the application of mineral nutrients. Though climate is not highly suitable, coconut is marginally suitable in more than 60 percent of the Rayachoty mandal.

References

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