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ORIGINAL ARTICLE

Soil-site suitability for the major crops of Mahanandi mandal in Kurnool District, Andhra Pradesh

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ABSTRACT
Ten representative pedons were evaluated for their suitability to paddy, groundnut, redgram, sugarcane and sorghum crops in the soils of Mahanandi mandal in Kurnool district, Andhra Pradesh. The soil belongs to Inceptisols and Entisols. The soil-site suitability evaluation revealed that Pedon 1 was highly suitable (S1) for rice, moderately suitable (S2) for groundnut, sorghum, redgram and marginally suitable (S3) for sugarcane. Pedon 2 was highly suitable (S1) for rice and marginally suitable (S3) for crops like groundnut, sugarcane, sorghum and redgram. Pedon 3 was highly suitable (S1) for groundnut and moderately suitable (S2) for sugarcane, sorghum and redgram and marginally suitable (S3) for rice. Pedon 4 was highly suitable for rice, moderately (S2) suitable for groundnut and sugarcane and marginally (S3) suitable for sorghum and redgram. Pedons 6, 9 and 10 were highly suitable (S1) for growing rice, groundnut, sorghum and redgram and marginally suitable (S3) for sugarcane. Pedons 5 and 7 were highly suitable (S1) for growing rice and moderately suitable (S2) for groundnut, sugarcane, sorghum and redgram. Pedon 8 is highly suitable (S1) for growing rice, sorghum and redgram and marginally suitable (S3) for growing groundnut. The soil- suitability classes for major crops can be improved if the corrective limitations (soil fertility characteristics) are altered through soil amelioration measures.
Key words: *Soil site suitability, paddy, groundnut, redgram, sugarcane and sorghum, limitations*

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INTRODUCTION

The soils of Mahanandi mandal were diverse in genesis, physiography, vegetation, depth, colour *etc.* An understanding of soil characteristics is helpful in the magnitude of changes that may have taken place during the development and in planning the proper management practices to its efficient use. Therefore, it is worthwhile to characterize the soils of Mahanandi mandal for better management.

Performance of any crop is largely influenced by soil site parameters as conditioned by climate and topography and management level [7]. Thus it is essential to interpret the soil-site suitability for major crops grown in the area. However, each plant species requires specific soil and climatic conditions for its optimum growth. Production oriented crop cultivation on appropriate soils (taxonomic unit) is more beneficial [1, 5,6, 7]. Information on soil site suitability for crops in Mahanandi mandal in Kurnool District of Andhra Pradesh in general is very much lacking. Hence, in this study an attempt has been made to evaluate the soil-site suitability for major crops like paddy, groundnut, redgram, sugarcane and sorghum on Inceptisols and Entisols in Mahanandi mandal of Kurnool District**,** Andhra Pradesh.

MATERIAL AND METHODS

Ten dominant soils in the Mahanandi mandal of Kurnool district in Andhra Pradesh were selected for evaluation (Fig.1). Physical and chemical properties were estimated using standard procedures and are presented in Table 2. Their suitability was assessed using limitation method regarding number and intensity of limitation FAO [2]. This evaluation procedure consists of three phases.

In phase I, the data was collected in terms of characteristics as in Table 2. The following landscape and soil characteristics were used to evaluate soil suitability: topography (% slope), wetness (flooding and drainage), physical soil characteristics (texture, structure, % coarse fragments by volume, soil depth in

cm, CaCO3), soil fertility characteristics [apparent CEC (cmol (p+) kg^{-1} clay), per cent base saturation, sum of basic cation (cmol (p+) kg^{-1} soil), pH (H_2O), per cent organic carbon, salinity (EC, dSm^{-1}) and alkalinity (ESP)]. The study location was almost flat to gently sloping and had never been flooded (F0). Drainage conditions (Table 2.) were compared with regard to texture: (a) fine and medium textured soils and (b) coarse textured soils as per the guideline given in FAO [2]. Soil characteristics were evaluated as per suggestions of FAO [2].

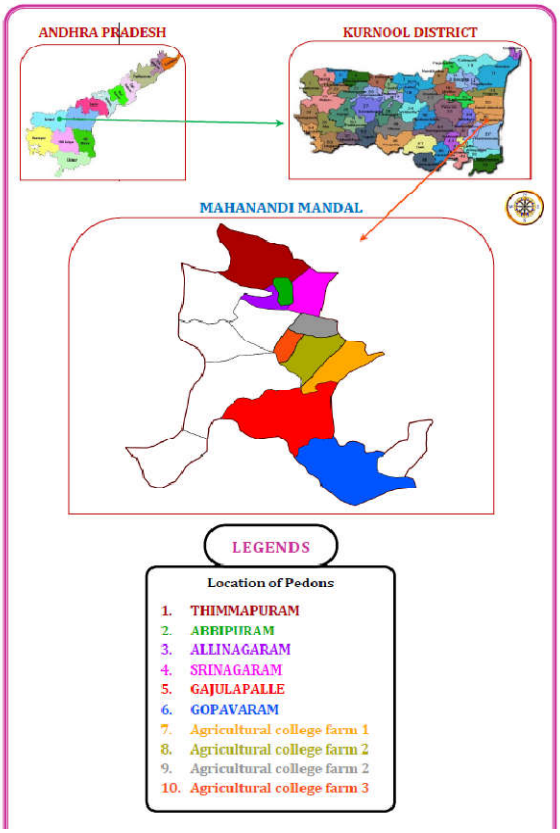
In phase II the landscape and soil requirements for these five crops were taken from tables given in FAO [2] and as described by Sehgal [8].

In phase III the land suitability under rainfed conditions was assessed by comparing the landscape and soil characteristics with crop requirements at different limitation levels: no (0), slight (1), moderate (2), severe (3) and very severe (4) (Table 3.). Limitations are deviations from the optimal conditions of a land characteristic, land quality, which adversely affect a kind of land use. If a land characteristic is optimal for plant growth, it has no limitation on the other hand, when the same characteristic is unfavourable for plant growth; it has severe limitation for particular land evaluation type. Thus, the evaluation was done by comparing the land characteristics with the limitation levels of the crop requirements tables of FAO (1976) as described by Sehgal [8]. The number and degrees of limitations suggested the suitability class of the soil for a particular crop given by FAO [2] are as follows:

Criteria for the determination of the land suitability classes

Land Classes	Criteria
S1 : Very suitable	Land units with no, or only 4 slight limitations.
S2 : Moderately suitable	Land units with more than 4 slight limitations, and / or no more than 3 moderate limitations.
S3 : Marginally suitable	Land units with more than 3 moderate limitations, and / or one or more severe limitations (s)
N1 : Actually unsuitable and potentially suitable	Land units with very severe limitations which can be corrected.
N2 : Unsuitable	Land units with very severe limitations which cannot be corrected.

Fig.1. Location map of Mahanandi mandal



RESULTS AND DISCUSSION

The depth wise soil characteristics used to arrive at soil-site characteristics for assessing crop suitability are presented in the Table1.

Pedon 7 was grouped under Vertic Haplustept and was highly suitable (S1) for rice and moderately (S2) suitable for groundnut, sugarcane, sorghum and redgram. Soil fertility characteristics *viz.,* pH and organic carbon and physical soil characteristics like texture were the limitations. Organic carbon was a limitation for all the crops except rice. However, texture and soil pH are found to be important soil related constraints in growing all these crops. So the organic carbon status in these soils can be improved by the application of farm yard manure, green manuring and inclusion of legumes in rotation. Texture can be improved by mixing with tank silt year after year. The pH can be controlled by applying organic manures and sulphur. Vertic Haplustepts were found to be moderately suitable (S2) for growing cotton, sorghum and redgram [3].

Pedons 1, 2, 4, 6, 8, 9 and 10 were grouped under Fluventic Haplustept. Pedon 1 was highly suitable (S1) for rice, moderately suitable (S2) for groundnut, sorghum, redgram and marginally suitable (S3) for sugarcane. Pedon 2 was highly suitable (S1) for rice and marginally suitable (S3) for crops like groundnut, sugarcane, sorghum and redgram. Pedon 4 was highly suitable for rice, moderately (S2) suitable for groundnut and sugarcane and marginally (S3) suitable for sorghum and redgram. Pedon 6 was highly suitable (S1) for rice, groundnut, sorghum and redgram and moderately suitable (S2) for sugarcane. Pedon 8 was highly suitable (S1) for rice, sugarcane, sorghum and redgram and moderately (S2) suitable for groundnut. Pedon 9 was highly suitable (S1) for rice, groundnut, sorghum and redgram and moderately suitable (S2) for sugarcane. Pedon 10 was highly suitable (S1) for rice, groundnut, sorghum and redgram and moderately (S2) suitable for sugarcane. Drainage is a limitation in pedons 1, 2 and 8, depth is a slight limitation in pedons1, 2 and 4 and texture, pH and organic carbon are major limitations in all pedons. Soil pH can be reduced through application of organic manures and amendments like sulphur. Moderate depth in these soils can be increased by deepening of soil by ridging or deep ploughing or breaking up of soil crust. Proper water management practices have to followed to reduce the drainage effect on soils. The organic carbon status in these soils can be enhanced by the application of farm yard manure, crop residues, green manuring and inclusion of legumes in rotation. Evaluation studies in southern Saurashtra region of Gujarat indicated that Fluventic Haplustepts were moderately suitable (S2) for cultivation of groundnut [6].

Table 1. Depth wise soil characteristics used in assessing crop suitability

Pedon No.	Location	Horizon	Depth (m)	Physical characteristics (s)			$CaCO_3$ (%)	Fertility characteristics (f)					Salinity and alkalinity (n)	
				Texture										
				Clay (<0.002)	Silt (0.05 -0.002)	Sand (2-0.05%)		CEC [cmol (p+)kg^{-1} soil]	BS (%)	Sum of basis cations [cmol (p+) kg^{-1} soil]	pH (1:2.5 H_2O)	OC (%)	EC(dSm^{-1})	ESP
				% of <2 mm soil										
1	Thimmapuram	Ap	0.00 – 0.25	26.00	8.00	66.00	2.00	28.23	78.00	21.39	8.30	0.70	0.83	2.23
		2Bw1	0.25 – 0.52	28.57	30.00	41.43	1.00	41.63	81.00	32.31	7.71	0.45	0.85	3.39

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		2Bw2	0.52 – 0.67	39.47	26.32	34.21	2.50	49.29	92.74	43.73	7.72	0.60	0.90	4.02
		2Bw3	0.67 – 1.00	31.08	36.49	32.43	1.50	45.12	89.49	38.56	7.71	0.56	1.00	4.03
		Cr	Weathered gneiss with lime nodules											
2	Abbipuram	Ap	0.00 – 0.22	74.58	10.17	15.25	1.50	17.92	70.20	11.66	7.60	0.72	0.80	5.13
		2Bw1	0.22 – 0.42	38.67	28.00	33.33	3.00	47.33	91.17	41.87	7.71	0.60	0.80	2.70
		2Bw2	0.42 – 0.80	33.77	31.17	35.06	4.00	50.16	94.74	46.53	8.00	0.56	0.52	1.97
		2Bw3	0.80 – 1.10	37.18	26.92	35.90	3.00	51.25	97.50	47.86	7.80	0.53	0.77	4.12
		Cr	Weathered gnesis mixed with gravel											
3	Allinagaram	Ap	0.00 – 0.20	83.33	9.26	7.41	9.50	8.21	68.57	5.47	8.00	0.71	0.30	1.95
		A1	0.20 – 0.44	81.13	13.21	5.66	10.50	6.79	66.13	4.34	7.80	0.47	0.27	2.21
		A2	0.44 – 0.69	77.19	10.53	12.28	12.50	11.89	70.73	8.22	7.90	0.36	0.50	1.60
		R	Limestone											
4	Srinagaram	Ap	0.00 – 0.17	34.33	40.30	25.37	5.50	24.36	77.67	18.73	7.80	0.62	0.54	0.78

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0.90	0.89	0.82	1.06	
0.47	0.46	0.50	0.53	
0.51	0.45	0.45	0.23	
7.81	7.81	7.81	7.52	
33.83	37.98	40.40	50.81	
81.43	88.04	92.57	98.56	
42.01	43.58	44.03	52.11	Limestone
5.50	8.00	11.00	10.00	
28.57	30.56	33.33	36.71	
32.86	36.11	32.00	34.18	
38.57	33.33	34.67	29.11	
0.17 – 0.50	0.50 – 0.79	7.90 – 1.04	1.04 – 1.25	
2Bw1	2Bw2	2Bw3	2Bw4	R

Table1. Contd…

Salinity and alkalinity (n)	ESP			0.74	1.93	0.51	2.55	1.01	
	EC (dSm^{-1})			0.66	0.75	0.59	0.45	0.46	
Fertility characteristics (f)	OC (%)			0.23	0.03	0.05	0.15	0.15	
	pH (1:2.5 H_2O)			7.42	7.44	7.55	7.74	7.70	
	Sum of basis cations [cmol (p+) kg^{-1} soil]			15.91	13.01	24.62	2.29	36.13	
	BS (%)			74.26	71.61	79.53	55.68	89.69	
	CEC [cmol (p+) kg^{-1} soil]			21.64	18.67	31.16	4.31	40.74	
$CaCO_3$ (%)				1.00	2.00	1.00	2.00	1.50	**Limestone**
Physical characteristics (s)	Texture	Clay (<0.002)	**% of <2 mm soil**	21.88	15.40	27.54	3.85	32.43	
		Silt (0.05 - 0.002)		64.06	13.87	62.32	1.92	60.81	
		Sand (2-0.05%)		14.06	70.73	10.14	94.23	6.76	
Depth (m)				0.00 – 0.24	0.24 – 0.58	0.58 – 1.02	1.02 – 1.32	1.32 – 1.55	
Horizon				Ap	A1	A2	A3	A4	R
Location				Gajulapalle					
Pedon No.				5					

6	Gopavaram	Ap	0.00 – 0.16	73.81	14.06	12.13	1.00	11.13	69.63	7.52	7.90	0.71	0.30	2.07
		2Bw1	0.16 – 0.41	41.79	32.84	25.37	2.00	25.93	76.36	18.87	8.11	0.20	0.29	3.59
		3Bw2	0.41 – 0.74	75.00	14.29	10.71	15.00	10.11	69.04	6.84	8.32	0.03	0.32	1.38
		4Bw3	0.74 – 1.14	20.00	51.43	28.57	5.00	32.09	80.59	25.47	8.27	0.02	0.32	1.22
		5Bw4	1.14 – 1.62	37.29	31.77	30.94	16.00	43.98	89.31	38.48	8.21	0.30	0.39	1.82
		6Bw5	1.62 – 2.00	45.31	32.81	21.88	7.00	20.51	74.16	15.02	8.23	0.03	0.43	0.93
		Cr	**Weathered gneiss**											
7	Agricultural college farm 1	Ap	0.00 – 0.22	74.14	12.07	13.79	1.50	13.93	71.36	9.72	7.71	0.45	0.19	1.58
		Bw1	0.22 – 0.62	18.67	48.00	33.33	1.00	41.21	90.66	36.99	7.80	0.27	0.22	0.90
		Bw2	0.62 – 0.98	42.25	28.17	29.58	1.00	42.83	83.89	35.59	7.70	0.26	0.21	0.79
		Bw3	0.98 – 1.28	41.90	27.93	30.17	9.50	43.26	87.89	37.57	7.75	0.18	0.24	1.04
		Bw4	1.28 – 1.70	27.56	38.06	34.38	16.50	49.88	93.93	46.26	8.14	0.12	0.27	1.18
		Bw5	1.70 – 2.00	39.03	28.26	32.71	19.00	46.21	90.02	41.33	8.27	0.03	0.28	0.58
		Cr	**Weathered gneiss with lime nodules**											

Table 1. Contd…

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Salinity and alkalinity (n)	ESP	1.33	1.51	1.02	2.42	4.03	0.41		0.83	0.59	0.60	1.05
	EC (dSm^{-1})	0.54	0.46	0.47	0.49	0.52	0.57		0.45	0.46	0.47	0.47
Fertility characteristics (f)	OC (%)	0.75	0.45	0.66	0.54	0.30	0.08		0.65	0.45	0.45	0.38
	pH (1:2.5 H_2O)	7.52	7.50	7.50	7.62	8.00	8.20		13.93	22.39	24.08	21.61
	Sum of basis cations [cmol (p+) kg^{-1} soil]	20.01	22.73	47.99	35.62	43.67	38.29		13.77	22.22	23.90	21.32
	BS (%)	75.00	79.30	95.51	85.14	93.31	88.52		72.29	78.12	79.95	77.96
	CEC [cmol (p+) kg^{-1} soil]	27.16	29.22	50.79	43.06	48.91	43.46		19.27	28.66	30.12	27.72
$CaCO_3$ (%)		4.00	3.00	3.00	3.50	3.00	5.00		1.50	2.00	1.00	9.00
Physical characteristics (s)	Texture											
	Clay (<0.002)	25.37	27.54	35.15	29.97	34.12	30.56		16.67	26.47	27.64	25.60
	Silt (0.05 - 0.002)	10.45	11.59	24.64	30.81	38.21	33.33		13.33	5.88	10.13	11.90
	Sand (2-0.05%)	64.18	60.87	40.21	39.22	27.67	36.11		70.00	67.65	62.23	62.50
		% of <2 mm soil										
Depth (m)		0.00 -0.16	0.16 - 0.45	0.45 -0.86	0.86 –1.29	1.29 – 1.59	1.59-2.00		0.00 – 0.20	0.20 - 0.50	0.50 – 0.79	0.79 – 1.09
Horizon		Ap	2A1	3Bw1	3Bw2	3Bw3	3Bw4	Cr	Ap	Bw1	Bw2	Bw3
Location		Agricultural college farm 2						Weathered gneiss with lime nodules	Agricultural college farm 3			
Pedon No.		8							9			

		Bw4	1.09 – 1.33	65.15	10.61	24.24	14.00	26.37	74.74	19.33	19.71	0.38	0.49	1.44
		Bw5	1.33 – 1.60	64.06	14.06	21.88	14.50	25.01	72.53	17.74	18.14	0.08	0.51	1.60
		Cr	Weathered gneiss with lime nodules											
10	Agricultural college farm 4	Ap	0.00 – 0.20	73.68	14.04	12.28	5.00	12.26	71.11	8.57	7.67	0.90	0.58	1.22
		A1	0.20 – 0.50	60.78	11.58	27.64	2.00	30.23	79.59	23.61	7.62	0.57	0.43	1.49
		Bw1	0.50 -0.80	35.90	30.59	33.51	2.50	47.90	92.21	43.59	7.68	0.42	0.49	1.21
		Bw2	0.80 – 1.12	34.35	31.70	33.95	11.00	48.68	92.63	44.48	7.70	0.30	0.44	1.25
		Bw3	1.12 – 1.41	33.66	36.47	29.87	10.00	42.99	84.48	35.83	7.82	0.38	0.43	1.14
		Bw4	1.41 – 2.00	31.90	37.45	30.65	12.00	43.71	88.93	38.44	7.87	0.33	0.50	0.98
		Cr	Weathered gneiss with lime nodules											

Table 2. Site and soil characteristics of studied profiles for crop suitability classification

Pedon No.	Soil	Land form	Parent material	Wetness (W) drainage	Physical soil characteristics (s)				Soil fertility characteristics (f)					Salinity and alkalinity (n)	
					Texture	Coarse fragments volume (%)	Soil depth zm)	$CaCO_3$ (%)	Apparent CEC [c mol (p+) kg^{-1} soil]	Sum of basic cations [c mol (p+) kg^{-1} soil]	BS	pH 1:2.5	OC	ECe (dSm^{-1})	ESP
1	Fluventic Haplustept	Plain	Weathered gneiss with lime nodules	Moderately well drained	scl	Nil	1.00	1.63	145.71	21.39	84.78	8.30	0.7	0.90	3.41

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3.24	1.91	0.86	1.05	2.00	1.01	1.41	0.74	1.30	
0.69	0.36	0.49	0.66	0.31	0.21	0.48	0.46	0.48	
0.71	0.66	0.16	0.22	0.53	0.43	0.64	0.61	0.71	
7.61	7.96	7.80	7.40	7.97	7.71	7.50	7.40	7.60	
89.18	68.50	85.05	75.57	73.97	83.92	86.08	77.45	84.29	
15.29	5.24	23.56	15.79	11.61	12.99	20.99	15.46	11.58	
143.07	96.82	142.60	121.23	94.40	123.64	144.50	108.97	142.94	
3.05	10.93	7.38	1.34	6.91	1.28	3.23	3.52	4.55	
1.10	0.69	1.25	1.55	2.00	2.00	2.00	1.60	2.00	
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
cl	ls	l	sil	sl	sl	scl	sl	sl	
Poorly drained	Well drained	Well drained	well drained	Well drained	Well drained	Moderately well drained	Well drained	Well drained	
Weathered gneiss mixed with gravel	Limestone	Limestone	Limestone	Weathered gneiss	Weathered gneiss with lime nodules	Weathered gneiss with lime nodules	Weathered gneiss with lime nodules	Weathered gneiss with lime nodules	
Upland	Upland	Plain	Upland	Plain	Upland	Upland	Plain	Plain	
Fluventic Haplustept	Typic Ustorthent	Fluventic Haplustept	Typic Ustorthent	Fluventic Haplustept	Vertic Haplustept	Fluventic Haplustept	Fluventic Haplustept	Fluventic Haplustept	
2	3	4	5	6	7	8.	9.	10.	

Table 3. Limitation levels of the land characteristics and land suitability classes

Potential land suitability sub-class	S1s	S1w	S1s	S1s	S1s	S1s	S1s	S1w	S1s	S1s	S1s
Actual land suitability sub-class	S1ws	S2wsf	S3wsf	S2wsf	S2wsf	S1wsf	S3wsf	S3wsf	S3wf	S3wsf	S3sf
Alkalinity (a)											
ESP	0	0	0	0	0	0	0	0	0	0	0
Soil fertility characteristics (f)											
OC (%)	0	1	1	1	1	0	1	1	1	1	0
pH 1:2.5	2	2	3	2	2	1	1	2	1	1	1
BS	0	0	0	0	0	0	0	0	0	0	1
$CaCO_3$ (%)	0	0	0	0	0	0	0	0	0	0	0
Physical soil characteristics (s)											
Soil depth (cm)	0	0	1	0	1	0	0	1	0	1	1
Coarse fragments (vol. %)	0	0	0	0	0	0	0	0	0	0	0
Texture	1	0	1	1	1	1	1	0	0	1	3
Wetness (w) drainage	1	2	1	1	1	1	3	3	3	3	0
Crop	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice
Soil	Fluventic Haplustept					Fluventic Haplustept					Typic Ustor

S1s	S2s	S2s	S2s														
S1sf	S2sf	S2sf	S2sf	S1s	S1	S1s	S1	S1s	S1s	S1sf	S1	S1	S1	S1	S1	S1	S1
Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	2	2	3	3	0	2	2	2	2	0	0	0	0	0
1	2	1	1	1	1	2	1	1	0	0	1	1	1	0	0	0	0	0
1	0	1	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0
1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
1	2	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	2	2	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Contd..

Potential land suitability sub-class	S1s	S1s	S2s	S1s	S1s	S1s	S1s	S1s	S1s	S1s	S1s	S1s	S1s
Actual land suitability sub-class	S1sf	S1sf	S2f	S1sf	S1sf	S2sf	S2sf	S2sf	S2sf	S2sf	S2sf	S2sf	S1wsf
Alkalinity (n)	ESP	0	0	0	0	0	0	0	0	0	0	0	0
Soil fertility characteristics (f)	OC (%)	0	1	1	1	1	0	2	1	2	2	2	0
	pH 1:2.5	1	1	2	1	1	1	1	2	1	1	1	0
	BS	1	1	0	1	1	0	0	0	0	0	0	0
CaCO3 (%)		0	1	0	1	0	0	0	0	0	0	0	0
Physical soil characteristics (s)	Soil depth (cm)	0	0	0	0	0	0	0	0	0	0	0	0
	Coarse fragments (vol. %)	0	0	0	0	0	0	0	0	0	0	0	0
	Texture	1	1	2	1	1	1	1	2	1	1	1	1
Wetness (w) drainage		0	0	0	0	0	0	0	0	0	0	0	1
Crop		Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Fluven tic
Soil		Fluventic Haplustept					Vertic Haplustept						

S1w	S1s	S1s	S1s	S1s	S1s	S2s	S1s	S1s	S1s	S1s	S2s	S1s	S1s
S2wf	S1wsf	S1wsf	S1wsf	S1sf	S1sf	S2sf	S1sf	S1sf	S1sf	S1sf	S2sf	S1sf	S1sf
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	1	1	1	1	0	1	1	1	1
0	1	0	0	0	0	1	0	0	1	1	2	1	1
0	0	0	0	1	1	0	1	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	1	1	1	1	2	1	1	1	1	2	1	1
2	1	1	1	0	0	0	0	0	0	0	0	0	0
Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram	Rice	Groundnut	Sugarcane	Sorghum	Redgram
				Fluventic Haplustept					Fluventic Haplustept				

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Pedons 3 and 5 were classified under Typic Ustorthent. Pedon 3 was highly suitable (S1) for groundnut and moderately suitable (S2) for sugarcane, sorghum and redgram and marginally suitable (S3) for rice. Pedon 5 was highly suitable (S1) for growing rice and moderately suitable (S2) for growing groundnut, sugarcane, sorghum and redgram. The major limiting factors for the growth of rice in pedon 3 were surface texture, soil depth and pH. The limitations for growing sugarcane, sorghum and redgram were texture, depth, pH and organic carbon. Pedon 5 has limitations of fertility characteristics like pH and organic carbon. Soil pH can be reduced through application of organic manures and amendments like sulphur. Moderate depth in these soils can be increased by deepening of soil by ridging or deep ploughing or breaking up of soil crust. The organic carbon status in these soils can be enhanced by the application of farm yard manure, crop residues, green manuring and inclusion of legumes in rotation. These results were in accordance with the results of Kumar and Naidu (2012) who reported that Typic Ustorthents were marginally suitable for growing rice crop in Vadamalapeta mandal of Chittoor district in Andhra Pradesh.

CONCLUSION

The soil-site suitability evaluation study revealed major limitations of the area such as texture, drainage, soil depth, pH and organic carbon. The coarse soil can be improved by mixing the soil with tank silt whereas the fine soil can be improved by addition of organic matter and also soil conservation practices. The soil fertility properties such as pH and organic carbon can be improved by addition of organic matter through farm yard manure or compost or green manuring. Hence, judicious use of organic manures in combination with inorganic fertilizers in these soils not only pave the way to achieve sustainable yields of crops like paddy, groundnut, sugarcane and vegetables but also to sustains the soil fertility without deterioration for future generations.

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