

PROFILE CHARACTERISTICS AND IRRIGABILITY CLASSIFICATION OF 'KOLE' LANDS OF TRICHUR DISTRICT.

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The kole lands of Trichur District extending over an area of 1100 ha. is an important rice growing tract of Kerala. Paddy cultivation in these lands is done under very adverse conditions often resulting in crop failures and occasionally in bumper yields. Physiographically the kole land is a flood plain lying below the sea level and remaining parallel to the coast with tongues extending eastward. The area is subject to frequent inundation which keep them under submerged conditions for nearly seven months in the year. The ground water table is high. Because of the peculiar lie of the land the area is handicapped by a poor drainage system. The climate of the area is tropical monsoonic with an average annual rainfall of 3019 mm and an average annual temperature varying from 23.4°C to 31.6°C. The monsoon is very severe during June-July. Geologically the 'kole' land represent piedmont type deposits silted up in flood plain with riverine alluvium and varying in thickness from 10-15 metres. Some portion of the 'kole' lands exhibit a lacustrine environment and contain black carbonaceous clay with plenty of vegetable matter. The Western portion shows the presence of very fine sand extending to 2 to 3 metres below ground level. In the present study the detailed soil survey of Manalur Village, a representative area of 'kole' lands was undertaken with a view to preparing an inventory of the soil resources of the area, to classify the area into various irrigability classes and to formulate recommendations for proper utilisation of each class of land.

Materials and Methods

The detailed soil survey of Manalur Village representing the 'kole' lands was carried out following techniques outlined in soil survey manual (Anon. 1970). Soil samples collected horizon wise from typifying pedons representing the soil series identified in the area were used for laboratory characterisation. The samples were analysed for physical properties and chemical constituents following methods of Piper (1950).

Results and Discussion

Studies carried out in the area have revealed the presence of three soil series viz. Konchira, Perumpuzha, and Anthikad. The morphological features of typifying pedons representing the three soil series are presented in Table 1. Konchira series include very deep dark brown fine textured soils deposited

Table 1 Morphological characteristics of typifying pedons of soil series identified in the 'kole' area

Soil series & Depth (cm)	layer/horizon	Colour description & Munsell Notation	Texture	Structure	Constituency moist & Wet	Boundary	Other characteristics
Konchira							
0—15	1	Dark brown (10YR 3/3) moist	Silty clay	Moderate medium sub angular blocky	firm, sticky & plastic	Clear smooth	abundant roots, poor permeability.
15-53	2	Very dark greyish brown (10 YR 3/2) moist.	Clay	Strong coarse sub angular blocky	firm, sticky & plastic	gradual wavy	poor permeability.
53—57	3	Black (10 YR 2/1) moist.	Clay	massive	friable, stricky & plastic	Clear wavy	Organic matter finely mixed with soil.
57—110	4						Decomposed organic debris, very loose layer.
Perumpuzha							
0—20	Ap	Dark gray (10 YR 4/1) moist	Clay	strong, coarse sub angular blocky	firm, sticky & plastic	Clear smooth	Abundant roots, poor permeability.
20—80	B2	Dark greyish brown (10 YR 4/2)	Clay	coarse sub angular blocky	very firm, sticky & plastic	diffuse	strong brown mottlings (10 YR 4/2) plenty, accumulation of clay, poor permeability.
80—110	B3	Dark greyish brown (10 YR 4/2) moist	Clay	massive	firm, sticky & plastic		Poor permeability.
Anthikad							
0—15	Ap	Dark greyish brown (10 YR 4/3) moist	Clay	strong, coarse sub angular blocky	firm, sticky & plastic	gradual smooth	abundant roots.
15—50	B2	Dark greyish brown (10 YR 4/2) moist	Clay	strong, coarse sub angular blocky	very firm sticky & plastic	diffuse smooth	few fine roots accumulation of clay.
50—110	B3	Dark brown (10 YR 4/3) moist	Clay	massive	firm, sticky & plastic		loose layer mixed with lime shells.

over organic debris. The depth of the organic layer varies and occasionally they are observed close to the plough layer resulting in acidic conditions. The pH of this layer is < 4 . The surface texture is mostly clay loam with, predominantly clayey subsoils. Soils are imperfectly drained with poor permeability. Perumpuzha series form the next group of soils identified and include very deep, dark grey, fine textured soils. The surface texture observed ranges from silty clay to clay, while subsoils are mostly clayey. The B_2 horizon shows accumulation of clay and is mottled. These soils are also imperfectly drained with poor permeability. Anthikad series are very deep, imperfectly drained, greyish brown, with clay surface texture. The subsoils are also clayey and the B_3 horizon shows the presence of lime shells. The physical and Chemical characteristics of the soils are presented in table 2 and 3. All the three soil series viz. Konchira, Perumpuzha and Anthikad have been developed from alluvium deposited by rivers and hence do not reveal much variations in Chemical and Physical properties. These soils are all imperfectly drained with slow permeability. The permeability rates range from 0.1 to 0.25 inches/hr. Drainage is the most important problem in these soils. The mechanical composition shows that all the 3 soils are clayey. The percentage of clay ranges from 52–86. Maximum clay is observed in perumpuzha series. The organic matter content is highest in Konchira series ranging from 1.24 to 1.63%. The total nitrogen of these soils shows correspondingly higher values ranging from 0.113 to 0.15%.

Table 2 Physical properties of soils identified in the 'kole' area

Name of soil series	Depth cm.	Gravel %	Mechanical composition %				Permeability inches/hr.	water holding capacity %
			coarse sand	fine sand	silt	clay		
Konchira	0—15	Nil	10.00	9.90	25.60	52.50	0.25	59.80
	15—53	„	6.00	12.10	20.00	60.00	0.20	61.10
	53—57	„	6.10	7.00	21.00	64.50	0.50	62.30
Perumpuzha	0—20	Nil	2.35	3.72	17.50	75.00	0.15	66.16
	20—80	„	0.35	0.75	10.50	86.00	0.10	69.10
	80—110	„	0.50	0.52	20.00	77.50	0.15	70.38
Anthikad	0—15	Nil	4.50	8.00	15.00	70.00	0.15	71.00
	15—50	„	0.30	0.50	25.00	72.00	0.15	69.34
	50—110	„	5.50	10.50	18.00	74.00	0.15	65.52

The other chemical constituents viz. total P_2O_5 , K_2O and GaO do not show any significant difference among the three series. The pH values also do not show much variation except for the organic layer of Konchira series which has a pH value of 4.00

The land irrigability classification of the 'kole' area shows that the area surveyed has been classified under one irrigability class viz. class 3, with subclasses d and sd. The distribution of the soils of the area and the irrigability classes have been indicated in the soil and land irrigability map. Class 3 d lands include very deep soils having clay loam surface texture grouped under Konchira series. These lands are only marginally suitable for irrigation owing to their limitations of drainage. The high water table due to the lie of the land below sea level restricts its adoptability to a wide range of crops. No natural outlets are available to drain out excess water and this necessitates the construction of permanent bunds and drainage channels. The development costs of these lands are comparatively high. Lands under class 3 sd include soils with silty clay to clay texture grouped under Perumpuzha and Anthikad series. Owing to deficiencies of both soil and drainage they are only marginally suitable for irrigation. The problems associated with inadequate drainage outlets have increased the reclamation costs of these lands.

Table 3 Chemical characteristics of soils identified in the 'kole' area

Name of soil series	Depth (em.)	PH	Total %	Total P_2O_5 %	Total K_2O %	Total CaO %	C.E.C. me/100g.	T.E.M.C. me/100g.	Electrical conductivity mmhos/cm	Organic carbon %
Konchira	0-15	6.0	0.151	0.197	0.172	0.152	5.70	2.30	Trace	1.630
	15-53	6.2	0.140	0.118	0.113	0.113	6.30	3.30	,,	1.530
	53-57	6.3	0.113	0.101	0.087	0.108	7.10	4.00	,,	1.240
Perumpuzha	0-20	6.1	0.052	0.124	0.118	0.112	10.23	5.00	frace	0.893
	20-80	6.3	0.043	0.104	0.082	0.096	8.29	4.20	,,	0.762
	80-110	6.7	6.042	0.081	0.073	0.042	9.11	5.10	,,	0.640
Anthikad	0-15	6.3	0.110	0.146	0.198	0.208	7.60	4.00	Trace	1.108
	15-50	6.4	0.107	0.118	0.117	0.084	6.70	3.70	,,	1.080
	50-110	6.7	0.073	0.073	0.091	0.063	6.30	3.10	,,	0.820

Summary

The detailed soil survey of Manalur Village representing the 'kole' area of Trichur district was carried out. Three soil series viz. Konchira, Perumpuzha and Anthikad were identified. The morphological features, chemical and physical characteristics and irrigability classification are discussed. A soil and land irrigability map of the village indicating the distribution of soils and the irrigability classes has been prepared.

സംഗ്രഹം

ചിമ്നി-മുപ്സി കോല പദ്ധതിയുടെ സഞ്ചയനമോലലയിൽ വിശദമായ മണ്ണു സർവ്വേ നടത്തി. ചിമ്നി-മുപ്സി പദ്ധതിയുടെ അയ്ക്കട്ട് പ്രദേശത്തിൽ ഉൾപ്പെട്ട കോല നിലങ്ങളും ഈ സർവ്വേയിൽ പെട്ടിരുന്നു. കൊഞ്ചിറ, പെരുമ്പുഴ, അന്തിക്കാട് എന്നിങ്ങനെ മൂന്നു മൺശേണികൾ കണ്ടെത്തി. ഇവയുടെ ബാഹ്യരൂപസ്വഭാവങ്ങൾ, രാസഭൗതിക ഗുണങ്ങൾ, സേചന വർഗ്ഗീകരണം എന്നിവ പഠനവിധേയമാക്കി.

REFERENCES

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CHIMONI MUPLI KOLE PROJECT SOILAND LAND IRRIGABILITY MAP

VILLAGE - MANALUR TALUK - TRICHUR

DISTRICT T RICHUR

AREA-1099.39 HECTARES



LEGEND.

- | | |
|-----------|-----------------------|
| Kch-cl-ds | Soil mapping |
| A-e1. | Unit |
| --- | Boundary |
| --- | with symbols |
| 3d - - - | Irrigated class |
| --- | sub-Class with |
| --- | Boundary |
| ⊙ | Auger boring |
| Kch - - - | Konchira |
| | Series |
| pmp - - - | Perumpuzha |
| | Series |
| AKD - - - | Anthikad Series |
| cl - - - | clay loam |
| sic - - - | silty clay |
| c - - - | clay |
| ds - - - | >36" (91.44 cm) |
| | very deep |
| A - - - | 0-1% Nearly level |
| e1 - - - | Slight or no erosion |
| - - - - - | Metalled road |
| □ | Kole Lands |
| ■ | Adjacent paddy lands. |