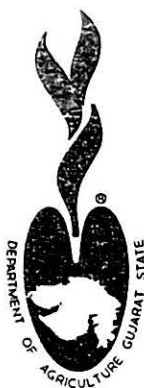


No. 13



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DEPARTMENT OF AGRICULTURE,
GUJARAT STATE, AHMEDABAD-6

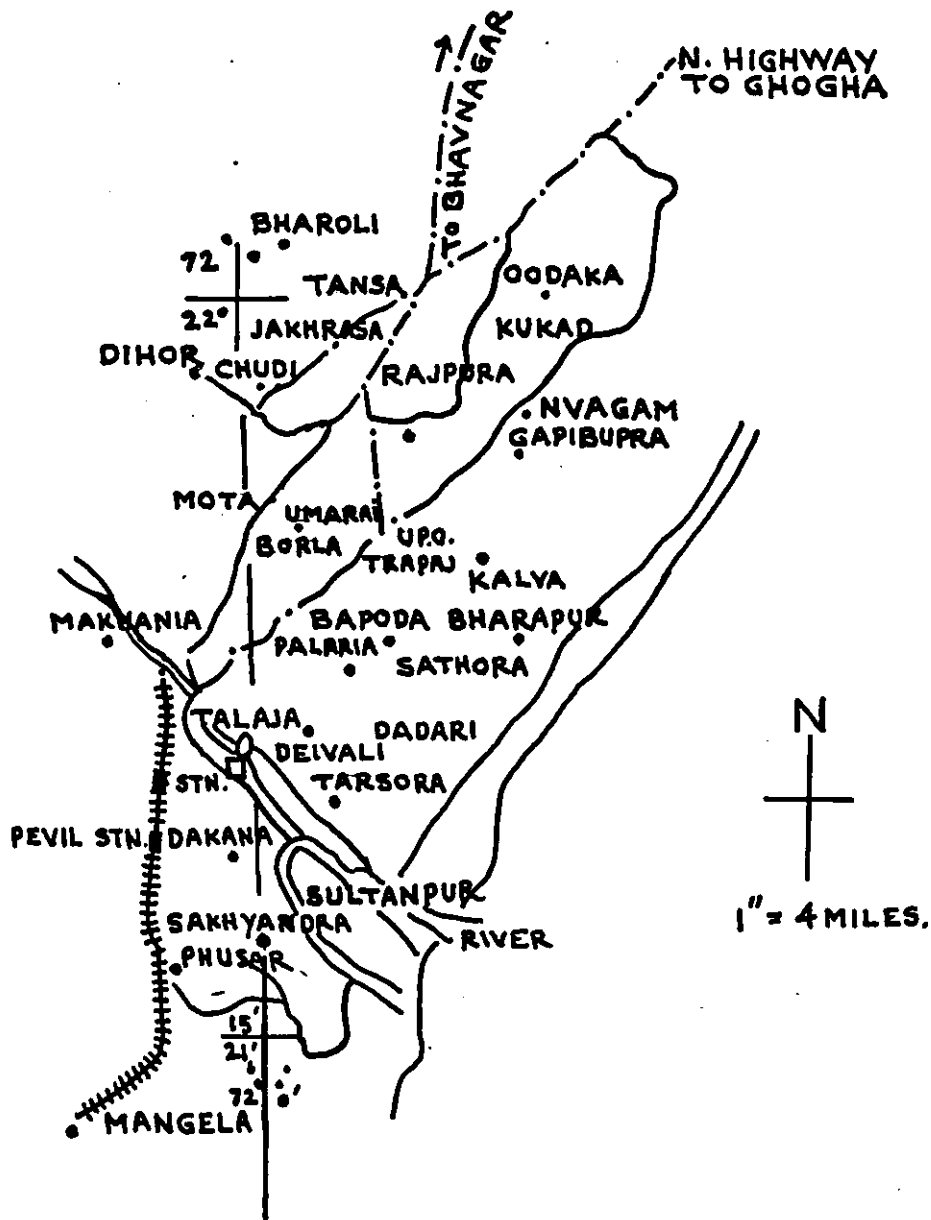
**Survey of
Trial-cum-Demonstration
Farm Talaja**

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INDEX MAP OF TALAJA



REFERENCE:-

RLY. LINE WITH RLY. STATION
 VILLAGES
 RIVER
 ROAD
 NATIONAL HIGHWAY
 FARM SITUATION



DETAILED SOIL AND LAND USE SURVEY REPORT OF TRIAL
CUM DEMONSTRATION FARM TALAJA, DISTRICT BHAVNAGAR,
GUJARAT STATE.

Introduction :

Detailed Soil and land use survey of Talaja farm was undertaken at the instance of Director of Agriculture, Gujarat State, Ahmedabad with a view to assess the drainage conditions and potentiality of the farm land for scientific land use as per land capability classification for intensive irrigated farming.

The survey work was carried out by the soil survey officials Navsari of Gujarat State in the month of October '69 covering the total area of 60.00 Hectares.

I. General description of the area:

1.1. Location:

The area is located approximately on 21°-22' N latitudes and 72°-4' E longitudes. The farm is about one Km away in NW from Talaja village. Bhavnagar Mahuva State highway and narrow railway line passes nearby the farm in east between the farm and Talaja village as well as Talaja-Palitana road passes through touching the farm in the South-West. The Northern side are surrounded by the cultivators' fields.

1.2 Physiography, relief and drainage:

Physiographically the farm area falls under the flood plain of ~~SHETRUNJ~~ Shetrunj river which drains the area. The flood plain is grouped under Alluvial clay underlaid by recent alluvium on gentle slope, soils near the river bed. The area has an elevation of 116.30 metres above M.S.L. The general topography of the farm is levelled except plot No-C part of C2; d1;d2. The drainage of farm lands is slow to moderately slow.

1.3 Geology :

The entire farm soils comprise of sedimentary deposits of Deccan trap composed of basalt and lime stone etc. Soils are moderate to deep (45 cm-72 cm.) Various sized basalt gravels are present through out the profile depth and below basalt gravels mixed with yellow soils as parent material was observed.

1.4 Climate:

The climate of the area is tropical semiarid steppe type with an average annual precipitation of 5" mm. (Appendix enclosed). The terrain experiences mild winter with

72°-48' F and hot summer with 108°-38' F. Bulk of the
22° C 220°-38°

annual precipitation is received in wet season of days followed by dry period (Appendix enclosed).

1.5 Natural Vegetation:
.....

Natural vegetation comprises of Xerophytes mostly which run as below:-

Trees

- Azadirragta indica (Neem)
- Acacia arabica (Babul)
- Mangifera indica (Mango)
- Ficus bangalensis (Bunion)
- Prosopis juliflora (Simal)

Grasses

- Cynodon dactylon (Dharo)
 - Dicanthium annuatum (Zizvo)
 - Sohemanervosm (Aniyar)
 - Cenchrus ciliarus (Mosi)
- Shrubes
- Acacia auriculata (Aval)
 - Zizpus zizuba (Ber)

II. General Agriculture and irrigation facility:

With the introduction of canal irrigation in the Dist. (Shetrunji Project) Government of Gujarat has established this trial-cum-Demonstration farm with a view to study the water requirements of different crops grown in the area and to study the suitability of raising multiple crops under intensive irrigated farming.

The crops grown in the area are Bajri, Jowar, Cotton, Groundnut and in Rabi season Wheat (under irrigation) etc.

Water Supply.

Seasonal irrigation is catered by Shetrunji irrigation canal system. There are five wells and the water table has rose very high due to canal water.

III. Soils of the area:

3.1. Technique of Soil Survey:

The standard detailed soil survey of the Trial-cum-Demonstration Farm Talaja was carried out according to the instructions contained in the All India Soil Survey Manual Farm map (supplied by the farm authority) having a scale of 24"-1 mile was used as a base map. For traversing depending upon the terrain and phusiography of the farm area representative profile pits of 6" depth or upto parent material were given and they were examined for the study of morphological characteristics of the soil to arrive at the tentative soil series of the farm area. In all;three profiles were studied and sampled for detailed analysis.

During traverse surface texture was examined at a close interval to delineate soil type indicating a range in morphological characteristics by the help of Augur baring. Eresion slope etc. were recorded for each soil unit. Finally the boundries of various Soil Units were mapped on the map Each

such soil units have been expressed in the soil map by a symbol such as Tlj (TCD) C-d4 indicating Talaja T.C.D. Farm series.

^{A-el}
'c' indicates clay soil type 'd4' indicates Soil depth upto 36". 'A' indicates 0 to 1% slope and 'e' indicates the slight or no erosion hazard other information such as building area, wells etc. were shown by the appropriate symbols.

3.2. Description of Soils:

According to the broad classification of Gujarat soils, this area belongs to the medium black soils of Saurashtra region. The colour of the soils varies from very dark grey to brown on a plain area.

The climate and vegetation of the area which are more or less uniform donot seem to have affected the variation in soil but topography has played an important role. The parent material of the area is sedimentary alluvium of yellowish basaltic murrum of ~~Daccan~~ Daccan Traps.

3.3. Soil Series:

The farm soils are tentatively correlated and fixed in one series only.

Talaja (T.C.D.) Soil series (Tlj(T.C.D) series)

Talaja (T.C.D.) Soil series occuring on a flat area with low relief position of the sedementary deposits of Daccan Trap. The soil colour is very dark grey on the top and throughout the profile depth. Clay content increases in sub-soils horizons indicating zone of eluviation and again decreases in the last horizon. Sliken side ped faces with moderate compactness in the sub-soil are common. Calcinated gravels and basalt gravels increase in sub-soil. The T.S.S. also increases alongwith the depth indicating open curve restricted drainage.

Talaja (T.C.D.) Soil Series:

A representative profiles of the soil series was dug in plot No. C₃ is decribed below.

	<u>Depth in cm.</u>	<u>Description</u>
Ap	0-15	Very dark gray (10 YR 3/1 D & M); clay; columnar structure brecking into coarse subangular blocky; dry hard; wet sticky and plastic; moist friable; few basalt and calcinated gravels present; clear and smooth boundry; few fine roots; permeability slow xxxxxx pH 8.2
A ₁	15-55	Very dark grey (10YR 3/1M); clay; course presmatic structure breakes into medium sub angular blocky; wet very sticky, very plastic moist firm; few basalt gravels and few calcinated gravels present; permeability very slow;

- ~~fe~~ few ~~xxxxxx~~ fine roots; boundry gradual and smoth; pH 8.2
- A₂ 55-72.5 Very dark grey (10YR 3/1M); clay; medium pres-matic structure breaks into medium to fine sub angular blocky; wet sticky and plastic; moist friable; few basalt gravels and abundant calcinated gravels present; violent effervescence with dil. HCl; permeability slow; few very fine roots; boundry diffuse wavy; pH 8.1
- C 75.5 Basalt gravels mixed with calcinated yellowish materials.

Range in characteristics:

Soil depth varies from medium to deep i.e. 25 cm. Clay % slightly increases between 15 to 55 cms. depth. Water table is at 5' depth Sliken sides and ped faces are common in subsoil horizons. pH varies from 7.5 to 8.2 on top soils, while in sus-soil the pH ranges from 8.1 to 8.3.

Relief.

Flat area having normal slopw 0 to 1%

Present land use :

Cultivated Kharif and Rabi crops.

Distribution:-

soil series.	Soil Units.	area in hectares.	% of the total area.
Talaja T.C.D.F. I (Tlj T.C.D.F.)	C-d4 A-el	13.25	22 %
	II C-d3 A-el	28.90	48 %
	III C-d3 A-el	3.35	5.50 %
	IV C-d2 A-el	3.65	6 %
	V C-d1 A-el	0.90	1.50 %
	VI C-d2 A-el	2.40	4 %

IV. Land capability classes and recommendations:

Land capability grouping in a system of interpretation to

to show the relative suitability of soils for intelligent planned land use viz. crops cultivation, grazing, forestry and wild life. The land capability classes is identified by roman numbers. There are eight classes-I to IV falls under the arable land use while V to VIII classes fall under non-arable land use. All the soils in particular class have limitations and management problem of about the same degree but of different kinds as shown by sub classes "s" for shallowness of rooting zone, "e" for erosion susceptibility and past erosion degree and "w" for poor soil drainage, wetness and overflow

Class II W Soils.

Land covers about 40.80 hectares 67 % of total area surveyed. The area under the class is nearly levelled with about 0-1 % slope. The soils are moderately deep to deep with heavy clayey soils with high water table about 5 feet (In the month of October). The land is suitable for varieties of crops viz. Jowar, Groundnut, Sugarcane etc.

Poor internal drainage resulting into high water table is the main problem of these soils. A suitable drainage is advocated 2½ to 4 feet deep and 70 to 80 feet apart to drain the surplus water thus lowering the water table below the roots zone. Organic manures viz. F.Y.M. compost and green manuring are advised to make the soil friable and fertile and improved the physical characteristics of the soils.

Class III es.

Land comprises about 12.40 Hectares 20% of the total area surveyed. Soils under the class is gently sloping with 1 to 2% slope with slight erosion. The soils are very shallow to shallow. Contour bunding followed by levelling or strip cropping with Bajari and Groundnut or Soyabean is advocated. Application of Organic manures and fertilizers are required. The land suitable for Jowar, Bajari and Pulses.

Discussion on Analytical data:

From the analytical data it is concluded that the soils of the farm is very heavy clayey soils. The water retentive capacity is rather high as evinced by the hygroscopic moisture and water holding capacity. Permeability of the soils are moderately slow to slow along the soil depth. Soil reaction (pH) is rather high. Total soluble salts are normal but increases along the depth. Soils are non-calcareous in nature.

From the fertility point of view soils are poor in Nitrogen (Organic matter) available Phosphate and Potash. The soil can be enriched by the application of suitable compound manures and fertilizers (appendix 3a and 3b enclosed)

Judicious irrigation with lesser duty and in three crops rotation in a year one crop must be a green manuring crop. Depumping of Farm wells in the off season is also advocated to lower the water table as a supplementary measure over and above the drains.

A P P E N D I X : 1 :

Rainfall data recorded at T. G. D. Farm, Talaja, Dist. Bhavnagar in mms.

Year.	January.	February	March	April.	May	June	July	August.	September	October	Novr.	Decr.	Total.
1963	-	-	-	-	-	-	200	271	86	212	-	-	769
1964	-	-	-	-	-	144	351	201	137	-	-	-	833
1965	-	-	-	-	-	-	253	182	61	-	-	-	496
1966	-	-	-	-	-	154	160	38	106	-	-	-	458
1967	-	-	55	-	-	209	161	108	104	-	-	29	666
1968	-	-	-	-	-	11	236.50	167	44	-	-	-	458.50
1969	-	-	-	-	-	-	72.50	71.50	86.00	284	-	-	514

Total Rainfall 4194.50 mms.

Average Rainfall... 590.21 "

WC/12/11.

APPENDIX 2:

Monthly Temperature data (1967-1969) recorded at T.C.D.Farm, Toluca in °F

Year	<u>January</u>		<u>February</u>		<u>March</u>		<u>April</u>		<u>May</u>		<u>June</u>		<u>July</u>		<u>August</u>		<u>September</u>		<u>October</u>		<u>November</u>		<u>December</u>		<u>Average</u>		<u>Average of last 3 Years.</u>	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1967	94.50	84.50	94.87	84.39	97.19	87.77	103.95	94.61	109.38	96.67	105.24	95.48	96.73	82.85	95.58	85.13	94.50	85.14	99.06	90.64	99.20	88.06	96.43	84.93	90.65	89.24	93.53	83.39
1968	96.10	84.44	95.39	84.07	96.89	84.55	101.86	92.40	94.00	87.20	93.00	88.20	88.45	82.51	84.87	80.54	89.93	94.33	92.77	84.87	89.20	78.83	84.32	74.45	92.31	83.96		
1969	82.25	72.16	84.21	75.03	91.58	82.19	98.17	86.17	96.29	89.29	93.42	87.62	88.12	83.83	85.39	81.96	87.63	82.46	93.61	80.67	90.23	78.73	84.58	72.48	89.53	81.08		

APPENDIX NO:31C4)

Analytical Statement Taleja Farm, District Bhavnagar.

Plot No.	Profile No.	Type of Soil	Clay %	Silt %	Coarse sand %	Fine sand %	Moisture %	pH	H.C mmhos/cm.	P ₂ O ₅ %	K ₂ O %	N ₂ %	Org. carbon %	Org. matter %	Line residue %	Permeability in/hrs.	W.H. cap. %	Pore space %	Sp.gr.	Yel. exp. %	App. density	Em.Ca me/100gm. of soil.	Ex.Mg. me/100gm. of soil.	C.S.C me./100gm. of soil	T.S.S. %	R e marks	
1.	C/3	1	C	68.12	24.45	1.79	7.27	12.3	8.2	0.215	0.00047	0.00625	0.0392	0.228	0.393	1.45	0.45	76.92	54.96	1.34	23.21	0.861	49.00	15.6	71.0	0.03	
			C	85.77	9.57	1.32	8.30	11.0	8.2	0.148	0.0	0.0085	0.0168	0.377	0.478	1.66	0.35	77.59	59.17	1.32	31.11	1.054	49.4	16.2	72.5	0.03	
			C	63.93	22.07	2.94	12.06	12.8	8.1	0.203	0.00342	0.00300	0.0308	0.228	0.393	4.66	0.59	90.0	55.46	1.47	34.19	1.01	50.0	19.0	-	0.08	
2.	D/6	x	C	76.66	24.31	1.75	5.18	14.3	8.0	0.172	0.00076	0.00410	0.0476	0.416	0.717	0.86	0.65	68.20	65.83	2.04	30.68	0.898	58.0	10.8	69.5	0.02	
			C	87.14	16.50	1.81	5.27	13.9	8.1	0.254	0.0	0.00300	0.028	0.147	0.353	1.66	0.54	92.06	88.77	2.06	34.37	1.061	54.0	15.6	81.0	0.03	
			C	78.55	25.78	1.44	4.43	11.5	8.3	0.296	0.00095	0.00300	0.0252	0.391	0.674	4.46	0.09	96.79	84.96	1.98	35.73	1.07	53.6	17.0	-	0.15	
3.	E/6	3	C	72.41	19.27	3.54	9.58	22.0	8.0	0.127	0.00712	0.00451	0.0336	0.352	0.606	2.28	0.05	84.96	52.99	1.406	24.16	0.920	44.0	19.5	-	0.01	
			C	66.09	11.27	3.07	13.79	11.9	7.5	0.115	0.0	0.0028	0.0252	0.391	0.674	2.66	0.05	84.80	50.01	1.213	35.61	0.961	42.0	18.0	-	0.02	
			C	65.36	14.90	7.23	5.0	11.4	8.1	0.163	0.00095	0.0028	0.0168	0.065	0.112	1.26	0.19	70.04	56.04	1.71	25.74	0.994	40.4	20.2	-	0.07	

APPENDIX NO. (b).

Analytical data of Surface samples, T. C. D. Farm, Talaja, District Bhavnagar.

Sr. No.	Plot No.	Type of Soil.	Moisture %	PH	E.C. mmhos/cm.	P ₂ O ₅ %	K ₂ O %	N ₂ %	Org. carbon %	Org. matter %	Lime reserve %	
1.	A/1	C	13.5	8.3	0.193	0	0.0026	0.0420	0.352	0.606	0.86	
2.	A/1	C	9.4	8.2	0.166	0.00095	0.0030	0.0056	0.078	0.134	3.66	
3.	C/1	C	9.8	8.3	0.296	0.00047	0.0053	0.0308	0.352	0.606	1.46	
4.	C/1	C	5.8	8.5	0.133	0.00475	0.0013	0.032	0.352	0.606	18.46	isolated.
5.	C/2	C	10.2	7.7	0.187	0.00475	0.0039	0.0420	0.309	0.533	3.06	
6.	D/1	C	9.57	7.6	0.121	0.00047	0.0028	0.0308	0.456	0.786	1.86	
7.	D/2	C	12.8	7.3	0.136	0.00104	0.0053	0.0112	0.16	0.275	1.66	
8.	E/1	C	10.8	8.4	0.103	0	0.0053	0.0014	0.391	0.674	1.86	
9.	D/3	C	12.7	7.6	0.33	0	0.0035	0.0252	0.423	0.729	2.46	
10.	E/2	C	10.7	7.5	0.163	0.00051	0.0026	0.0308	0.309	0.533	2.66	
11.	E/2	C	12.8	8.1	0.127	0.00076	0.0026	0.0084	0.309	0.533	3.26	
12.	E/3	C	13.8	7.9	0.203	0.00779	0.0026	0.0420	0.473	0.805	3.66	
13.	D/5	C	13.5	7.9	0.121	0	0.0026	0.0280	0.423	0.729	1.66	
14.	D/4	C	12.8	7.8	0.242	0.00047	0.0030	0.0336	0.521	0.898	3.06	
15.	D/7	C	12.3	7.8	0.136	0	0.0035	0.0504	0.473	0.805	3.06	
16.	D/8	C	13.6	7.9	0.148	0	0.0038	0.0224	0.473	0.805	0.86	
17.	A/8	C	12.3	7.8	0.112	0.00332	0.0033	0.014	0.147	0.253	0.46	
18.	A/3	C	14.2	7.8	0.154	0.0	0.0030	0.0252	0.192	0.330	1.66	
19.	A/4	C	10.8	7.7	0.187	0.0054	0.0030	0.0280	0.260	0.448	0.66	
20.	B/3	C	10.9	7.7	0.160	0.00323	0.0030	0.0252	0.391	0.674	0.86	
21.	B/4	C	12.1	7.7	0.151	0	0.0033	0.0224	0.391	0.674	0.06	
22.	B/5	C	11.0	7.5	0.145	0	0.0026	0.0196	0.512	0.882	0.66	
23.	A/6	C	10.45	7.7	0	0.00047	0.0038	0.0196	0.128	0.220	1.26	
24.	B/7	C	12.4	7.7	0.003	0	0.0038	0.0336	0.032	0.065	1.46	
25.	B/8	C	13.5	8.1	0	0.0005	0.0113	0.070	0.448	0.762	1.46	
26.	B/1	C	12.4	7.6	0.003	0.00333	0.0053	0.0448	0.224	0.386	0.86	
27.	B/2	C	13.5	8.1	0.003	0	0.0030	0.0168	0.352	0.606	2.06	
28.	C/4	C	12.7	7.9	0.03	0	0.0026	0.0252	0.448	0.762	2.06	
29.	C/5	C	14.0	7.7	0.03	0	0.0030	0.0084	0.448	0.762	1.46	
30.	C/6	C	11.1	7.7	0.03	0.0067	0.0033	0.0308	0.464	0.799	1.26	
31.	C/7	C	12.5	7.5	0.03	0	0.0035	0.0168	0.368	0.634	0.86	
32.	C/8	C	11.8	8.1	0.03	0	0.0048	0.0532	0.466	0.855	5.66	
33.	C/9	C	13.6	7.4	0.03	0	0.0038	0.440448	0.448	0.962	0.82	

A P P E N D I X 4:

Sr. No.	Name of Soil series.	Capability classes & sub classes.	Misc. land.	Total Area in hectare.	Remarks.
1	2	3	4	5	6
1.	Talaja(Tj1)	II III as	5.60	58.00	Misc. land
		40 12.40		+ 2.00	Roads includ- etc.
				<u>60.00</u>	office, School, Hostel, Garden thresh- ing yard area.

SOIL & LAND USE SURVEY OF TRIAL-CUM-DEMONSTRATION FARM AT TALAJA (DIST. BHAVNAGAR)

