Analysis Of Data

CHAPTER 6

ANALYSIS OF DATA

Primary meteorological data were collected from five observatories. Lysimetric data were also collected from premier agricultural research stations. This chapter covers the scrutiny of data, summary of data and statistical analysis of data for the problem under study.

6.1 WEEKLY AVERAGES

6.1.1 For the statistical analysis and computation of work, an year is sub divided into 52 weeks. Analysis of data in the smallest possible period will give accurate results. However week is selected as a base because of its application related with irrigation activities. Generally fortnightly water requirements are calculated and accordingly the present practice is to use fortnightly ETo values. Now based on recent change over to micro structure based rotational water delivery system, week as a base is required for irrigation

scheduling. Considering this aspect weekly average values are calculated. For uniformity, all the data is analysed in 52 standard weeks counting from the beginning of the calender year of Christian Era.

6.1.2 Maximum and minimum temperatures were recorded twice a day. From such daily observations weekly averages are worked out for 52 weeks. Weekly averages for maximum and minimum temperatures for five stations are given vide annexure 6.1 to 6.10.

6.1.3 Bright sun shine hours were observed daily for all five stations and weekly averages are worked out for 52 weeks. Such weekly averages for sunshine hours for all five stations are given vide annexures 6.11 to 6.15.

6.1.4 Wet bulb and Dry bulb temperatures were recorded twice a day for all stations. These data are used for calculating relative humidity using a chart which is shown at annexure 6.16. Weekly average values of maximum relative humidity are given for five stations vide annexures 6.17 to 6.21 and weekly average values of minimum relative humidity are given vide annexure 6.22 to 6.26. Values of wet bulb and dry bulb temperatures recorded in the morning are used to calculate the maximum relative humidity. Whereas values of wet bulb and dry bulb temperatures recorded in the afternoon are used to calulate the minimum relative humidity.

6.1.5 Wind velocity is observed twice a day with a anemometer placed at 3 meter height. These observed data is adjusted at 2 meter height using 1/7 power law as suggested by Dooren-

bos and pruitt. Weekly averages are then worked out for all stations for the respective periods. Weekly average values of wind velocity for all five stations are given wide annexures 6.27 to 6.31.

6.1.6 Evaporation data is observed twice a day using class A pan evaporimeter for five stations. From available daily data weekly averages were worked out for 52 weeks. Such weekly averages for all five stations are given vide annexures 6.32 to 6.36.

6.1.7 Daily observations of lysimeter are available from three stations for various crops and their periods shown in Table 5.3 From available daily values weekly averages of evapotranspiration were worked out for Bajra and kharif groundnut at Rajkot, cotton, tobacco, khrif groundnut and maize at Anand and for mug at Dantiwada. Crop coefficients (Kc) for above crops were also derived as per site conditions.

6.2 SUMMARY OF DATA

Annexures 6.1 to 6.36 shows yearwise weekly averages of all meteorological parameters for five stations. Averages of all the years for each week and for each parameter are worked out and are presented in annexures 6.1 to 6.36. This weekly average value is considered as normal value of a parameter for that week. Table 6.1 to 6.5 shows an abstract of all the meteorological parameters for Dantiwada, Anand, Vadodara, Rajkot and Junagadh respectively. Average values for each meteorological parameter of five stations are caried out. This value is considered as a representative value of the North,

Central and Saurashtra region of Gujarat. Table 6.6 represents the regional value of each parameter. For getting the clear idea regarding the variation of a meteorological parameter over a year, graphs are drawn for each parameter and for each station under study.

Fig. 6.1 to Fig.6.5 show the variation of maximum, minimum and mean temperature, in degree celsius, for Dantiwada, Anand, Vadodara, Rajkot and Junagadh stations respectively. The variation in bright sun shine hours for Dantiwada, Anand, Vadodara, Rajkot and Junagadh stations is shown in figure 6.6 to 6.10 respectively. Variation in maximum, minimum and mean relative humidity in percentage for five stations are shown in Fig 6.11 to 6.15. Weekly average values of wind velocity in Km/hr. for five stations are shown in Fig. 6.16 to Fig. 6.20. Fig 6.21 to Fig 6.25 shows weekly variation of evaporation in mm/day for five stations.

For comparision of various meteorological parameters between different stations graphs are prepared. The variation of mean temperature for all the stations under consideration is shown in figure 6.26. The variation of bright sun shine hours over the region under study is shown in figure 6.27 and the figure 6.28 shows the variation of mean relative humidity. Comparative variation in wind velocity and pan evaporation values are shown in figures 6.29 and 6.30 respectively for all the five stations.

TABLE 6.1

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR DANTIWADA

Weeks	Tmax °c	Tmin °c	Tmean °c	B S S Hours	Wind Km/Hr.	RHmax %	RHmin %	RHmean %	Epan mm/day
1	27.00	9.70	18.30	9.50	3.74	62.20	29.80	46.00	4.21
2	27.00	10.80	18.90	9.45	4.75	60.50	26.90	43.70	4.29
3	27.10	9.30	18.20	9.78	3.77	60.70	25.90	43.30	4.34
4	27.60	10.10	18.80	9.83	4.07	59.60	25.60	42.60	4.77
5	27.40	10.00	18.70	9.55	3.64	58.90	26.00	42.45	5.05
6	28.40	10.40	18.40	9.16	4.01	56.80	22.70	39.75	5.55
7	29.40	11.90	20.60	9.61	4.34	59.20	25.30	42.25	5.70
8	30.60	13.00	21.80	9.84	4.87	57.60	26.80	42.20	6.12
9	31.80	14.40	23.00	9.11	4.15	53.80	24.20	39.00	6.75
10	33.80	15.20	24.40	10.17	4.27	50.10	20.40	35.25	7.63
11	34.90	17.00	25.90	10.41	5.19	51.00	19.60	35.30	8.43
12	35.00	17.70	26.30	10.07	5.61	51.30	19.60	35.45	8.74
13	36.20	18.80	27.40	10.21	5.12	48.50	18.40	33.45	9.50
14	37.00	20.10	28.60	10.63	5.76	49.70	20.30	35.00	10.75
15	38.60	21.40	30.00	10.90	5.45	46.80	18.60	32.70	11.34
16	39.20	22.20	30.60	10.95	6.47	53.40	19.50	36.45	11.95
17	40.00	23.00	31.50	11.26	6.97	56.90	18.60	37.75	12.25
18	39.70	23.40	31.50	10.67	7.48	59.60	19.70	39.65	12.35
19	40.80	25.00	32.80	10.52	8.46	64.70	22.50	43.60	12.29
20	40.70	25.40	33.00	10.63	8.99	64.90	23.60	44.25	12.74
21	40.70	25.90	33.30	11.03	9.27	70.80	25.30	48.05	13.52
22	40.10	26.20	33.10	10.42	10.20	73.50	30.50	52.00	13.64
23	39.90	27.10	33.50	10.76	11.40	71.70	34.00	52.85	13.55
24	38.80	27.30	33.00	9.40	12.70	70.30	37.50	53.90	12.09
25	37.80	27.00	32.30	7.73	13.40	76.10	43.20	59.65	12.20
26	36.40	26.70	31.50	7.31	13.50	78.60	48.10	63.35	10.42
27	35.80	26.40	31.00	6.69	13.00	80.10	54.60	67.35	9.43
28	34.60	25.80	30.20	7.01	12.40	83.00	54.80	68.90	9.05
29	33.10	25.60	29.30	6.04	9.61	85.50	62.80	74.15	7.73
30	32.90	25.70	29.30	3.85	10.80	83.50	63.50	73.50	6.70
31	32.50	25.30	28.80	4.36	10.40	87.80	67.10	77.45	5.68
32	31.50	24.90	28.20	4.79	8.52	87.60	67.20	77.40	5.08
33	32.20	24.90	28.50	3.83	6.45	88.10	67.90	78.00	4.93
34	32.30	24.70	28.50	3.94	7.18	86.20	63.60	74.90	5.88
35	32.80	24.50	28.60	4.60	6.75	86.50	61.00	73.75	5.84
36	33.10	24.20	28.60	7.56	7.08	85.40	59.70	72.55	6.73
37	33.50	24.00	28.70	7.99	5.54	82.60	52.30	67.45	6.85
38	35.10	23.90	29.50	9.02	4.40	78.30	43.80	61.05	7.05
39	35.70	23.20	29.40	8.63	4.22	76.60	42.30	59.45	6.93
40	36.70	22.40	29.50	9.10	3.27	71.20	35.20	53.20	7.46
41	36.80	21.10	28.90	9.04	4.22	66.30	28.30	47.30	6.75
42	36.40	19.40	27.80	9.78	4.54	60.40	27.40	43.90	7.01
43	35.90	18.40	27.10	9.26	3.58	58.00	25.90	41.95	6.23
44	35.20	17.40	26.30	8.61	3.67	54.10	22.90	38.50	6.41
45	34.20	16.10	25.10	8.83	2.55	53.90	25.60	39.75	5.40
46	33.30	15.90	24.60	8.92	2.84	58.70	29.40	44.05	5.22
47	31.60	14.80	23.10	8.97	3.17	60.10	30.30	45.20	4.56
48	30.60	12.90	21.70	8.82	3.82	61.30	29.70	45.50	4.59
49	29.90	11.40	20.60	8.97	3.50	60.20	28.20	44.20	4.75
50	28.80	11.20	19.90	8.53	3.90	63.40	32.50	47.95	4.51
51	28.60	10.80	19.70	8.63	3.75	63.60	30.40	47.00	4.06
52	27.50	10.40	18.90	9.01	4.28	63.60	32.30	47.95	4.15

TABLE 6.2

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR ANAND

Weeks	Tmax °c	Tmin °c	Tmean °c	B S S Hours	Wind Km/Hr.	RHmax %	RHmin %	RHmean %	Epan mm/day
1	27.74	11.28	19.51	8.76	4.63	70.86	37.30	54.08	3.29
2	27.47	11.27	19.37	9.05	4.36	68.97	38.89	53.93	3.30
3	27.32	10.52	18.92	9.33	4.32	65.63	35.19	50.41	3.33
4	27.90	10.48	19.19	9.36	4.27	63.77	33.48	48.63	3.52
5	28.39	10.66	19.52	9.74	4.10	65.01	32.47	48.74	3.84
6	29.04	10.80	19.92	9.99	4.05	62.51	26.96	44.74	3.96
7	30.44	12.14	21.29	9.86	3.83	63.08	28.21	45.65	4.39
8	30.90	13.36	22.13	9.95	4.46	59.00	26.35	42.68	5.02
9	31.97	14.26	23.11	9.96	4.40	59.69	23.39	41.54	5.69
10	34.06	15.16	24.61	9.92	4.28	58.23	21.53	39.88	5.57
11	34.95	16.51	25.73	9.69	4.60	55.27	24.03	39.65	6.48
12	34.85	17.17	26.01	9.67	4.90	61.28	22.93	42.11	6.53
13	36.17	18.49	27.33	9.52	5.12	57.30	21.98	39.64	6.93
14	36.93	19.57	28.26	9.78	5.41	57.66	20.71	39.19	7.65
15	38.34	20.67	29.51	9.92	5.33	58.97	21.04	40.01	8.33
16	38.76	21.27	30.01	10.16	5.85	63.60	22.99	43.30	8.23
17	39.72	22.66	31.19	10.14	6.01	63.38	27.24	45.31	8.39
18	40.17	23.28	31.72	10.74	6.47	65.86	27.24	46.55	8.58
19	40.13	24.34	32.24	10.30	7.15	68.19	30.81	49.50	8.59
20	40.51	25.53	33.02	10.35	7.75	67.82	29.77	48.80	9.10
21	40.23	26.26	33.24	10.15	8.50	71.57	30.80	51.19	9.01
22	39.63	26.78	33.21	9.89	8.97	71.36	35.91	53.64	9.23
23	38.31	27.11	32.71	8.83	9.47	73.67	41.64	57.66	8.84
24	37.27	27.09	32.18	7.56	9.34	77.41	47.39	62.40	7.94
25	36.06	26.88	31.47	6.69	9.01	79.79	54.33	67.06	7.38
26	34.65	26.23	30.44	5.48	8.23	83.53	58.18	70.86	6.58
27	33.42	25.98	29.70	4.95	7.19	87.01	63.11	75.06	5.29
28	32.64	25.74	29.19	4.67	7.59	86.72	59.48	73.10	4.87
29	32.04	25.42	28.73	3.95	7.20	89.43	69.83	79.63	4.34
30	33.68	25.35	29.51	4.00	7.51	89.46	72.56	81.01	3.72
31	31.48	25.28	28.38	3.40	6.89	89.67	71.42	80.55	4.14
32	30.81	25.05	27.93	2.87	6.72	90.85	75.16	83.01	3.36
33	30.91	24.76	27.83	3.76	6.42	90.08	73.07	81.58	3.80
34	31.06	24.67	27.86	3.63	6.16	90.53	72.31	81.42	3.36
35	31.44	24.49	27.97	5.08	6.35	90.08	65.98	78.03	3.88
36	31.81	24.33	28.07	6.15	6.41	88.33	57.18	72.76	4.48
37	32.32	24.28	28.07	6.80	5.76	88.35	57.55	72.95	4.77
38	33.58	23.97	28.30	7.88	5.44	86.13	56.35	71.24	3.81
39	33.92	23.89	28.78	7.91	4.62	85.68	52.44	69.06	4.56
40	34.98	22.69	28.83	9.06	4.11	80.30	42.74	61.52	4.92
41	35.23	21.89	28.56	8.67	4.00	79.52	38.56	59.04	4.77
42	35.28	20.11	27.69	9.36	3.79	73.23	32.05	52.64	5.22
43	34.67	18.50	26.58	9.48	3.83	68.27	30.09	49.18	4.79
44	34.38	17.40	25.59	9.47	3.70	67.64	30.56	49.10	4.52
45	33.44	16.37	24.90	9.47	4.16	63.00	29.88	46.44	4.44
46	32.66	15.49	24.08	9.43	3.72	67.49	31.00	49.25	3.87
47	31.48	15.02	23.25	8.67	4.17	65.93	29.45	47.69	3.82
48	30.52	14.31	22.42	8.81	4.72	66.53	31.86	49.20	3.86
49	29.98	13.47	21.23	8.64	4.49	65.64	29.52	47.58	3.78
50	29.24	12.54	20.89	8.33	4.19	69.31	35.77	52.54	3.18
51	29.13	12.26	20.69	8.52	4.29	67.07	35.00	51.04	3.15
52	28.09	11.46	19.77	8.74	4.03	67.32	36.99	52.16	3.11

TABLE 6.3

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR VADODARA

Weeks	Tmax °C	Tmin °C	Tmean °C	B S S Hours	Wind Vel Km/Hr.	RHmax %	RHmin %	RHmean %	Epan mm/day
1	29.10	12.80	20.95	9.00	6.60	66.40	44.80	55.60	4.25
2	29.20	12.60	20.90	9.30	6.80	71.00	43.80	57.40	4.25
3	29.40	12.10	20.75	9.50	6.10	66.30	33.80	50.05	4.56
4	29.50	12.30	20.90	9.80	7.00	62.70	37.70	50.20	4.77
5	29.40	12.40	20.90	9.70	6.80	61.80	39.60	50.70	4.74
6	29.90	13.20	21.55	9.40	6.40	61.10	42.50	51.80	5.13
7	30.60	13.80	22.20	9.40	6.50	63.60	41.00	52.30	5.22
8	32.40	14.50	23.45	9.70	7.80	59.60	37.80	48.70	5.56
9	33.70	15.20	24.45	9.50	7.00	57.80	39.40	48.60	6.44
10	34.80	16.10	25.45	10.00	6.90	61.90	40.20	51.05	7.06
11	35.40	16.60	26.00	10.50	6.80	58.20	34.20	46.20	7.46
12	36.90	17.70	27.30	9.90	7.20	57.50	32.00	44.75	7.45
13	37.30	19.50	28.40	9.50	7.60	58.60	28.00	43.30	7.64
14	37.80	20.80	29.30	10.10	7.80	55.50	36.00	45.75	8.03
15	38.80	21.60	30.20	10.30	7.00	56.70	36.00	46.35	8.65
16	39.00	22.70	30.85	10.20	7.40	61.10	39.30	50.20	9.13
17	40.20	23.60	31.90	10.40	8.30	65.90	38.50	52.20	9.17
18	39.70	24.70	32.20	10.20	8.90	63.60	35.70	49.65	9.38
19	40.40	26.00	33.20	10.30	10.40	65.00	38.20	51.60	9.86
20	40.50	26.80	33.65	10.60	11.40	68.70	39.30	54.00	10.40
21	40.10	26.80	33.45	10.90	10.20	66.00	40.30	53.15	10.50
22	39.40	26.90	33.15	8.80	11.50	69.30	43.60	56.45	10.10
23	38.10	27.50	32.80	9.80	12.10	72.90	45.90	59.40	9.70
24	37.40	27.30	32.35	8.10	11.40	76.00	51.40	63.70	8.10
25	36.30	27.00	31.65	7.30	11.40	76.40	55.70	66.05	7.20
26	34.20	26.40	30.30	6.30	11.30	78.70	60.20	69.45	5.87
27	33.30	26.10	29.85	5.60	10.50	81.90	69.10	75.50	5.30
28	33.00	26.10	29.55	4.80	9.80	83.00	65.50	74.25	5.29
29	32.30	25.50	28.90	3.50	9.70	85.10	71.00	78.05	5.34
30	32.00	25.80	28.90	3.50	9.80	85.00	75.80	80.40	5.03
31	31.90	25.60	28.75	2.90	8.80	85.30	72.80	79.05	4.45
32	31.30	25.40	28.35	2.70	8.10	86.90	73.90	80.40	4.47
33	31.30	25.10	28.20	3.90	7.50	85.90	75.50	80.70	4.53
34	30.80	24.90	27.85	3.60	7.40	88.60	75.10	81.85	4.47
35	31.10	24.80	27.95	3.70	7.90	87.10	71.70	79.40	3.98
36	31.30	24.60	27.95	5.90	8.20	84.70	68.60	76.65	4.44
37	32.50	24.50	28.50	6.40	6.10	82.40	64.70	73.55	4.84
38	33.80	24.40	29.10	7.40	5.90	81.50	63.70	72.60	5.32
39	34.70	24.50	29.60	7.80	5.50	80.80	63.60	72.20	5.56
40	35.30	23.90	29.60	8.90	5.50	77.40	56.60	67.00	5.86
41	35.00	22.90	28.95	8.80	5.70	75.60	54.20	64.90	5.61
42	36.10	21.80	28.95	9.40	5.80	66.60	46.40	56.50	5.43
43	35.50	20.10	27.80	9.20	5.00	61.20	46.00	53.60	5.24
44	35.10	18.60	26.85	9.20	5.30	62.30	43.50	52.90	5.36
45	34.20	17.40	25.80	9.50	5.80	61.80	45.40	53.60	4.73
46	33.70	17.10	25.40	8.90	4.50	61.90	45.10	53.50	4.39
47	32.60	16.30	24.45	8.60	6.10	65.60	46.20	55.90	4.19
48	31.70	15.30	23.50	8.90	6.10	68.20	47.80	58.00	4.38
49	31.00	14.60	22.80	8.90	5.40	64.90	45.00	54.95	4.22
50	30.60	13.40	22.00	8.80	5.40	66.30	44.30	55.30	4.00
51	30.80	13.70	22.25	8.80	5.50	65.70	44.20	54.95	4.09
52	29.90	13.00	21.45	8.60	6.20	68.80	46.30	57.55	4.04

TABLE 6.4

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR RAJKOT

Weeks	Tmax °c	Tmin °c	Tmean °c	B S S Hours	Wind Vel Km/Hr.	RHmax %	RHmin %	RHmean %	Epan mm/day
1	28.19	10.36	19.27	9.66	8.76	70.58	54.08	62.33	5.70
2	27.64	10.19	18.91	9.83	9.46	71.25	56.17	63.71	5.88
3	28.75	10.34	19.55	9.90	8.06	73.25	55.08	64.17	5.88
4	29.19	10.38	19.78	10.00	8.35	68.25	50.75	59.50	6.18
5	29.30	11.41	20.35	9.84	8.57	66.92	49.42	58.17	6.62
6	29.66	11.84	20.75	9.90	8.83	68.58	50.67	59.63	7.17
7	30.31	12.30	21.31	9.61	8.89	74.42	54.00	64.21	7.46
8	31.23	12.86	22.05	10.22	9.50	71.08	51.25	61.17	8.23
9	32.88	13.97	23.43	9.98	9.55	69.92	45.50	57.71	8.94
10	34.13	15.97	25.05	9.63	10.07	71.67	46.64	59.16	9.70
11	35.38	17.44	26.41	9.34	10.12	72.08	46.18	59.13	9.68
12	34.94	17.13	26.03	9.92	10.75	76.33	48.00	62.17	10.22
13	36.40	17.68	27.04	9.60	10.15	74.00	47.92	60.96	10.57
14	37.44	19.74	28.59	9.54	11.06	77.25	45.58	61.42	11.61
15	38.82	20.99	29.90	9.88	11.88	79.67	39.58	59.63	12.86
16	39.72	21.73	30.73	10.26	12.32	76.15	36.00	56.08	13.72
17	40.26	22.72	31.49	9.82	14.31	77.46	35.08	56.27	14.52
18	40.11	23.48	31.80	10.23	15.19	78.38	39.58	58.98	14.38
19	40.90	23.90	32.40	10.74	17.64	75.00	40.42	57.71	14.81
20	41.28	24.48	32.88	11.00	17.35	76.54	37.17	56.86	15.37
21	40.85	25.08	32.97	10.73	18.65	81.31	38.83	60.07	14.97
22	40.00	25.42	32.73	10.26	17.67	82.92	42.00	62.46	14.31
23	39.97	26.42	33.19	9.56	17.10	84.08	42.58	63.33	13.06
24	38.49	26.33	32.41	7.81	17.22	83.77	51.08	67.43	11.30
25	36.48	25.96	31.22	6.18	19.69	83.31	53.00	68.16	9.84
26	35.39	25.99	30.69	5.98	19.05	86.85	62.83	74.84	10.12
27	34.50	25.36	29.93	5.16	19.02	87.15	64.58	75.87	8.18
28	33.78	25.02	29.40	4.62	18.77	90.00	70.83	80.42	7.60
29	32.79	24.74	28.76	4.21	16.92	89.23	69.83	79.53	6.48
30	32.00	24.67	28.33	3.63	17.55	89.77	74.92	82.35	5.87
31	32.06	24.75	28.41	3.31	16.18	91.08	72.33	81.71	5.69
32	30.86	24.11	27.49	3.92	15.08	91.75	76.50	84.13	4.67
33	30.70	24.04	27.37	3.28	13.37	92.69	75.92	84.31	4.58
34	31.47	24.12	27.80	3.67	12.10	90.69	74.75	82.72	5.03
35	31.95	23.53	27.74	5.79	11.61	90.15	68.08	79.12	5.55
36	32.83	23.43	28.13	6.54	10.86	89.46	64.58	77.02	6.26
37	33.63	23.22	28.42	7.49	8.66	89.54	62.33	75.94	6.32
38	34.45	23.33	28.89	7.29	8.99	87.31	58.75	73.03	6.57
39	34.45	23.44	28.94	7.30	9.16	89.69	57.25	73.47	6.25
40	35.63	22.91	29.27	8.75	8.46	87.38	51.08	69.23	7.27
41	35.76	21.62	28.69	9.00	8.02	85.38	52.50	68.94	7.64
42	36.09	20.71	28.40	9.42	6.98	78.08	45.42	61.75	8.04
43	35.58	19.31	27.44	9.55	6.58	70.85	43.75	57.30	7.58
44	34.97	18.44	26.71	9.37	7.69	70.92	46.25	58.59	7.37
45	33.72	16.77	25.25	9.69	7.98	68.69	44.92	56.81	7.09
46	33.08	16.05	24.57	10.05	7.27	69.85	46.83	58.34	6.96
47	31.95	15.47	23.71	9.80	7.04	69.69	47.67	58.68	6.18
48	30.68	14.46	22.57	9.61	8.14	68.69	46.50	57.60	6.22
49	30.51	12.98	21.74	9.76	8.39	65.77	45.42	55.60	6.65
50	29.98	12.80	21.39	9.47	8.47	66.62	48.92	57.77	6.03
51	30.01	12.64	21.33	9.77	7.65	70.92	53.27	62.10	5.83
52	28.07	10.68	19.38	9.92	8.47	73.58	58.27	65.93	5.93

TABLE 6.5

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR JUNAGADH

Weeks	Tmax °c	Tmin °c	Tmean °c	B S S Hours	RHmax %	RHmin %	RHmean %	Wind Km/Hr.	Epan mm/day
1	30.00	10.24	20.12	8.80	70.00	30.00	50.00	6.70	6.43
2	30.60	9.81	20.20	8.90	62.00	26.00	44.00	7.15	6.37
3	30.30	9.47	19.89	9.30	57.00	24.00	40.50	6.05	6.20
4	30.70	10.11	20.41	9.30	64.00	23.00	43.50	6.56	6.62
5	31.30	9.79	20.55	9.20	66.00	23.00	44.50	6.84	7.09
6	31.60	10.77	21.19	9.00	64.00	22.00	43.00	7.12	7.61
7	32.10	12.28	22.19	9.10	61.00	26.00	43.50	6.76	7.40
8	33.50	13.91	23.70	9.50	64.00	25.00	44.50	7.40	8.03
9	34.00	14.21	24.10	9.20	65.00	25.00	45.00	7.52	8.63
10	35.70	15.17	25.44	9.00	66.00	20.00	43.00	8.50	9.55
11	36.10	16.60	26.36	8.80	68.00	19.00	43.50	8.58	9.44
12	36.20	17.50	26.85	9.00	70.00	24.00	47.00	9.20	9.97
13	36.80	19.04	28.10	8.80	65.00	22.00	43.50	9.62	10.25
14	37.70	19.63	28.67	8.80	61.00	18.00	39.50	9.27	10.72
15	39.20	20.23	29.72	8.90	76.00	22.00	49.00	9.38	10.35
16	37.60	22.16	29.88	9.20	72.00	21.00	46.50	9.28	10.59
17	38.80	21.55	30.17	8.90	80.00	27.00	53.50	9.02	10.23
18	38.90	22.07	30.49	9.40	81.00	34.00	57.50	9.64	9.66
19	39.90	22.71	31.31	9.60	77.00	28.00	52.50	10.00	10.49
20	39.90	23.33	31.62	10.00	81.00	37.00	59.00	10.70	11.45
21	39.10	24.42	31.76	9.70	81.00	44.00	62.50	11.30	11.45
22	38.00	24.61	31.31	9.70	77.00	41.00	59.00	11.70	11.00
23	37.40	24.74	31.07	7.40	82.00	49.00	65.50	11.60	9.84
24	36.60	23.93	30.26	6.40	83.00	55.00	69.00	11.20	8.42
25	35.40	24.10	29.75	4.20	86.00	58.00	72.00	11.00	8.44
26	33.90	24.17	29.03	3.90	87.00	62.00	74.50	10.00	7.85
27	33.60	23.56	28.58	4.30	85.00	68.00	76.50	11.00	7.52
28	33.30	23.27	28.39	2.60	89.00	62.00	75.50	10.80	6.81
29	32.20	23.03	27.66	2.20	93.00	85.00	89.00	9.71	6.22
30	31.80	23.00	27.43	1.80	94.00	80.00	87.00	10.50	6.26
31	31.00	22.79	26.92	2.30	95.00	82.00	88.50	10.00	5.48
32	31.00	22.16	26.67	1.80	94.00	74.00	84.00	9.77	4.61
33	31.30	22.02	26.72	1.40	94.00	76.00	85.00	7.64	4.34
34	31.50	21.81	26.06	3.10	94.00	75.00	84.50	7.53	5.20
35	32.10	21.59	26.95	4.00	91.00	64.00	77.50	6.62	4.83
36	32.10	21.45	26.86	5.00	88.00	63.00	75.50	5.59	4.01
37	32.80	20.80	26.84	6.80	92.00	58.00	75.00	5.45	4.68
38	33.80	20.72	27.31	7.20	84.00	60.00	72.00	4.45	4.77
39	34.90	20.94	27.97	7.30	85.00	58.00	71.50	4.65	4.80
40	35.80	21.89	28.91	7.90	86.00	54.00	70.00	5.68	6.16
41	37.10	21.19	29.10	8.70	80.00	36.00	58.00	4.89	6.22
42	37.50	19.78	28.68	9.10	80.00	42.00	61.00	5.80	6.89
43	37.20	18.97	27.92	8.90	70.00	31.00	50.50	5.90	6.81
44	36.40	17.72	26.85	8.90	70.00	27.00	48.50	6.78	6.65
45	35.80	16.90	26.24	8.20	68.00	24.00	46.00	5.54	6.61
46	35.30	16.03	25.61	8.10	67.00	24.00	45.50	5.51	5.82
47	34.00	15.00	24.28	8.10	72.00	29.00	50.50	4.59	5.15
48	32.30	14.51	23.21	8.40	70.00	30.00	50.00	6.07	5.88
49	32.70	12.12	22.32	8.50	77.00	38.00	57.50	6.20	5.58
50	32.50	10.62	21.44	8.00	75.00	30.00	52.50	6.15	5.49
51	31.60	11.27	21.26	8.10	72.00	29.00	50.50	5.15	5.04
52	30.60	9.99	21.31	8.10	69.00	27.00	48.00	5.68	5.06

TABLE 6.6

WEEKLY AVERAGE METEOROLOGICAL PARAMETERS FOR GUJARAT

Weeks	Tmean	BSS	RHmean	WIND VE	EVP	AV.ETo
1	19.63	9.14	53.60	6.09	4.78	4.11
2	19.66	9.31	52.55	6.50	4.82	4.18
3	19.46	9.56	49.69	5.66	4.86	4.22
4	19.82	9.66	48.89	6.05	5.17	4.36
5	20.00	9.61	48.91	5.99	5.47	4.63
6	20.36	9.49	47.78	6.08	5.88	4.91
7	21.52	9.52	49.58	6.06	6.03	5.05
8	22.63	9.84	47.85	6.81	6.59	5.47
9	23.62	9.55	46.37	6.52	7.29	5.75
10	24.99	9.74	45.67	6.80	7.90	6.31
11	26.08	9.75	44.76	7.06	8.30	6.53
12	26.50	9.71	46.29	7.53	8.58	6.67
13	27.65	9.53	44.17	7.52	8.98	6.84
14	28.68	9.77	44.17	7.86	9.75	7.33
15	29.87	9.98	45.54	7.81	10.31	7.74
16	30.41	10.15	46.50	8.26	10.72	7.95
17	31.25	10.10	49.01	8.92	11.54	8.14
18	31.54	10.25	50.47	9.54	10.87	8.25
19	32.39	10.29	50.98	10.73	11.21	8.60
20	32.83	10.52	52.58	11.24	11.81	8.80
21	32.94	10.50	54.99	11.58	11.89	8.72
22	32.70	9.81	56.71	12.01	11.66	8.42
23	32.65	9.27	59.75	12.33	11.00	8.07
24	32.04	7.85	63.29	12.37	9.57	7.21
25	31.28	6.42	66.58	12.90	9.01	6.45
26	30.39	5.79	70.60	12.42	8.17	5.92
27	29.81	5.34	74.06	12.14	7.14	5.52
28	29.35	4.74	74.43	11.87	6.72	5.26
29	28.67	3.98	80.07	10.63	6.02	4.69
30	28.69	3.36	80.85	11.23	5.52	4.37
31	28.25	3.25	81.45	10.45	5.09	4.21
32	27.73	3.22	81.79	9.64	4.44	3.95
33	27.72	3.23	81.92	8.28	4.44	3.92
34	27.61	3.59	81.08	8.07	4.79	4.09
35	27.84	4.63	77.56	7.85	4.82	4.54
36	27.92	6.23	74.90	7.63	5.18	4.94
37	28.11	7.10	72.98	6.30	5.49	5.24
38	28.62	7.76	69.98	5.84	5.50	5.58
39	28.94	7.79	69.14	5.63	5.62	5.60
40	29.22	8.74	64.19	5.40	6.33	5.72
41	28.84	8.84	59.64	5.37	6.20	5.68
42	28.30	9.41	55.16	5.38	6.52	5.91
43	27.37	9.28	50.51	4.98	6.13	5.74
44	26.46	9.11	49.52	5.43	6.06	5.38
45	25.46	9.14	48.52	5.21	5.65	4.95
46	24.85	9.08	50.13	4.77	5.25	4.78
47	23.76	8.83	51.59	5.01	4.78	4.54
48	22.68	8.91	52.06	5.77	4.99	4.39
49	21.74	8.95	51.97	5.60	5.00	4.19
50	21.12	8.63	53.21	5.62	4.64	4.00
51	21.05	8.76	53.12	5.27	4.43	3.98
52	20.16	8.87	54.32	5.73	4.46	3.90

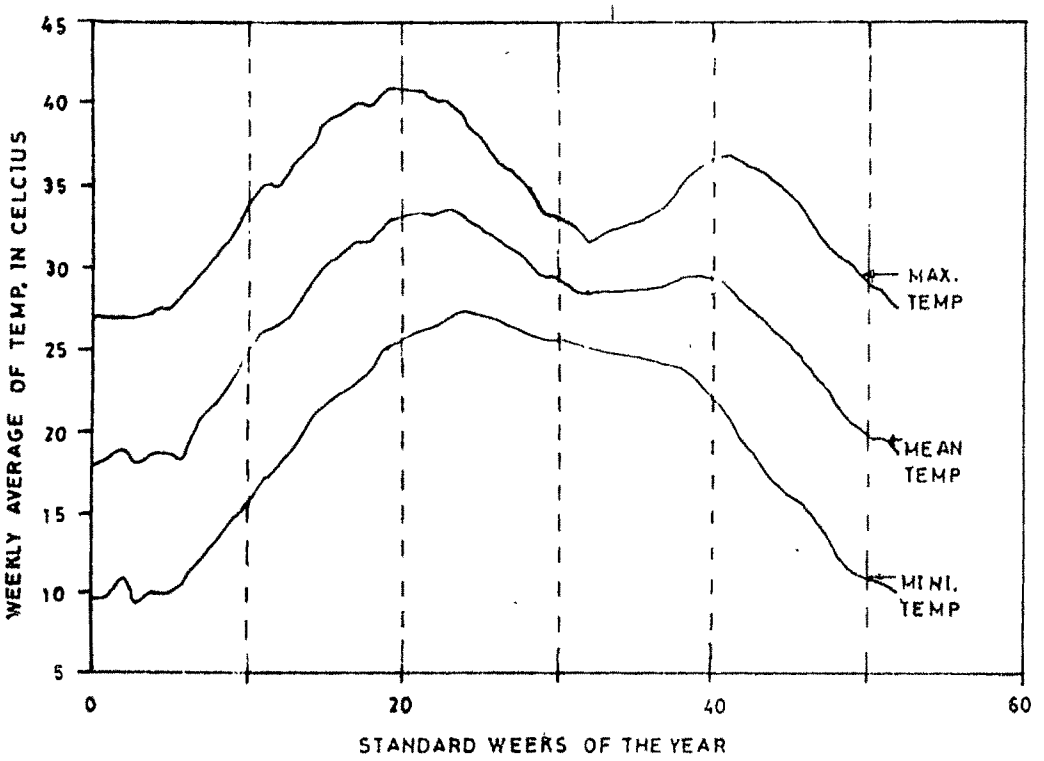

FIG: 6.1 - TEMPERATURE AT DANTIWADA

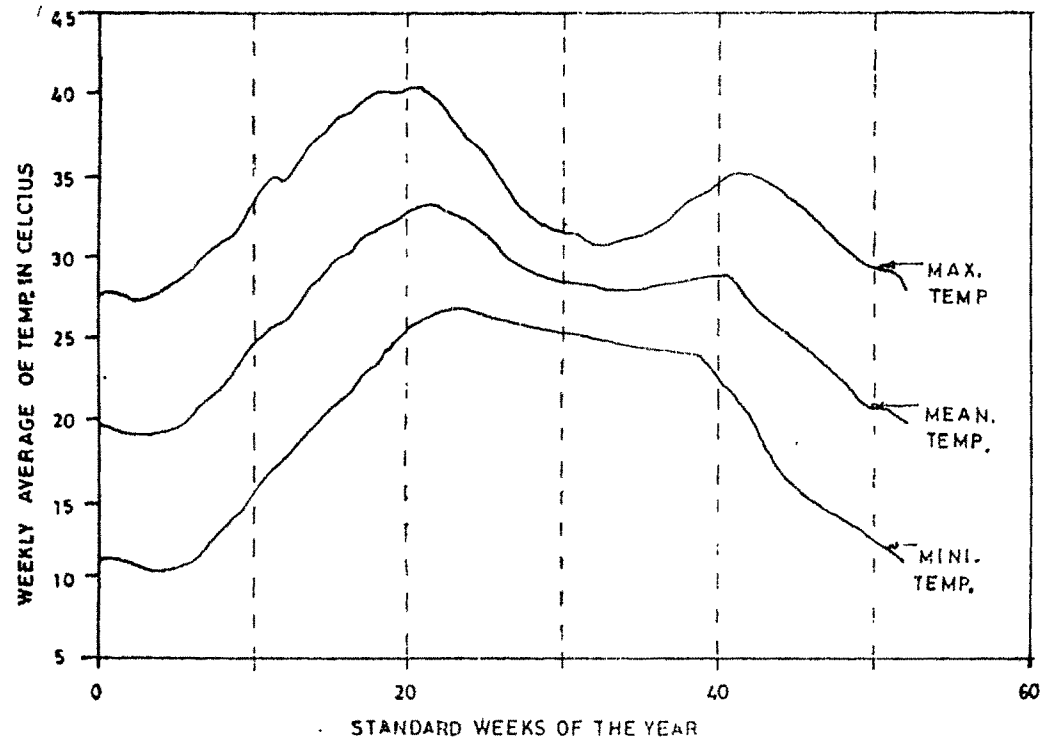

FIG: 6.2 - TEMPERATURE AT ANAND

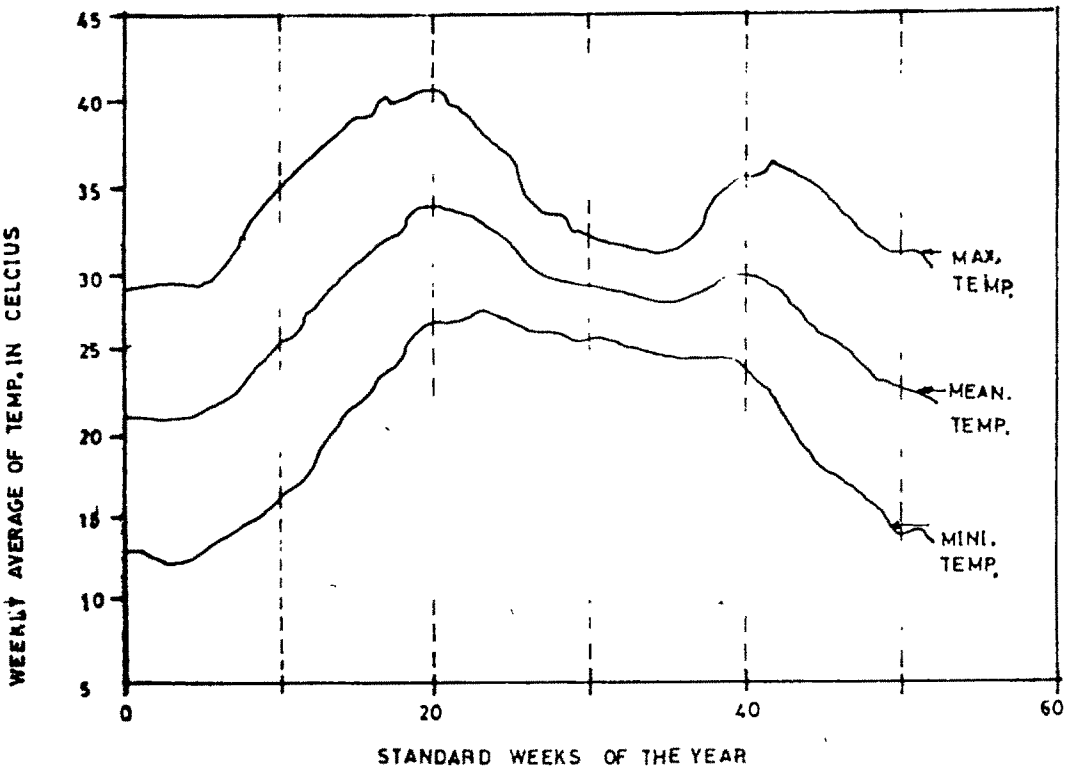

FIG: 6.3 - TEMPERATURE AT VADODARA

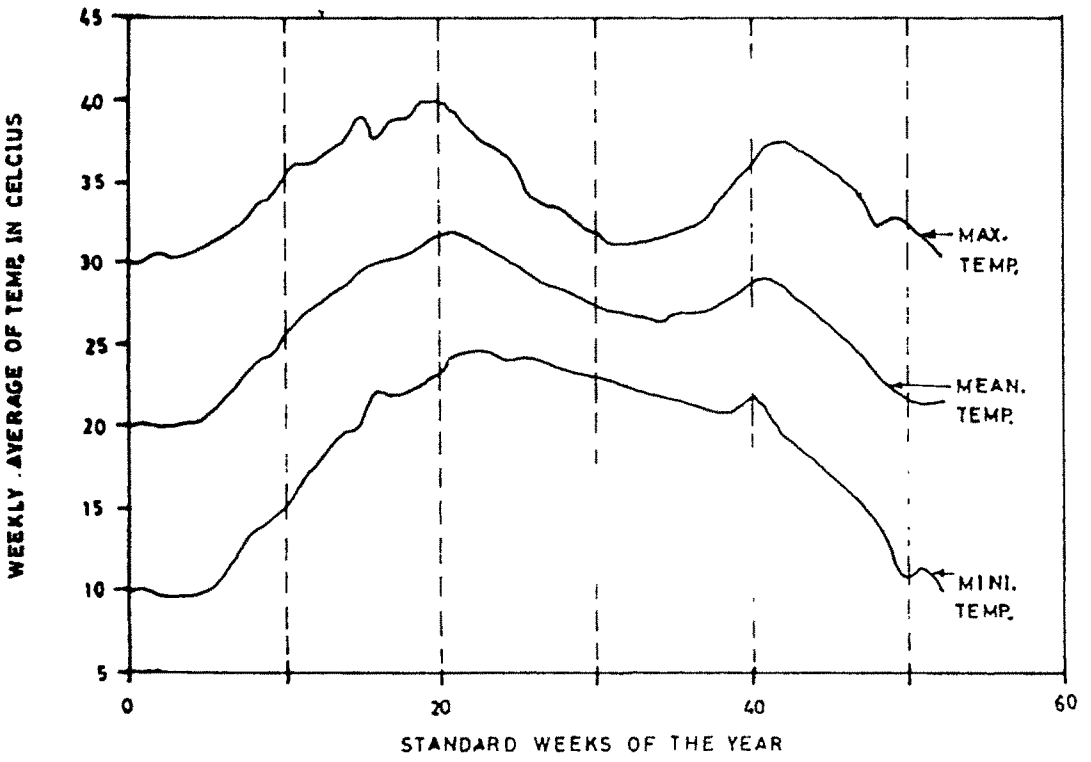

FIG: 6.4 _ TEMPERATURE AT JUNAGADH

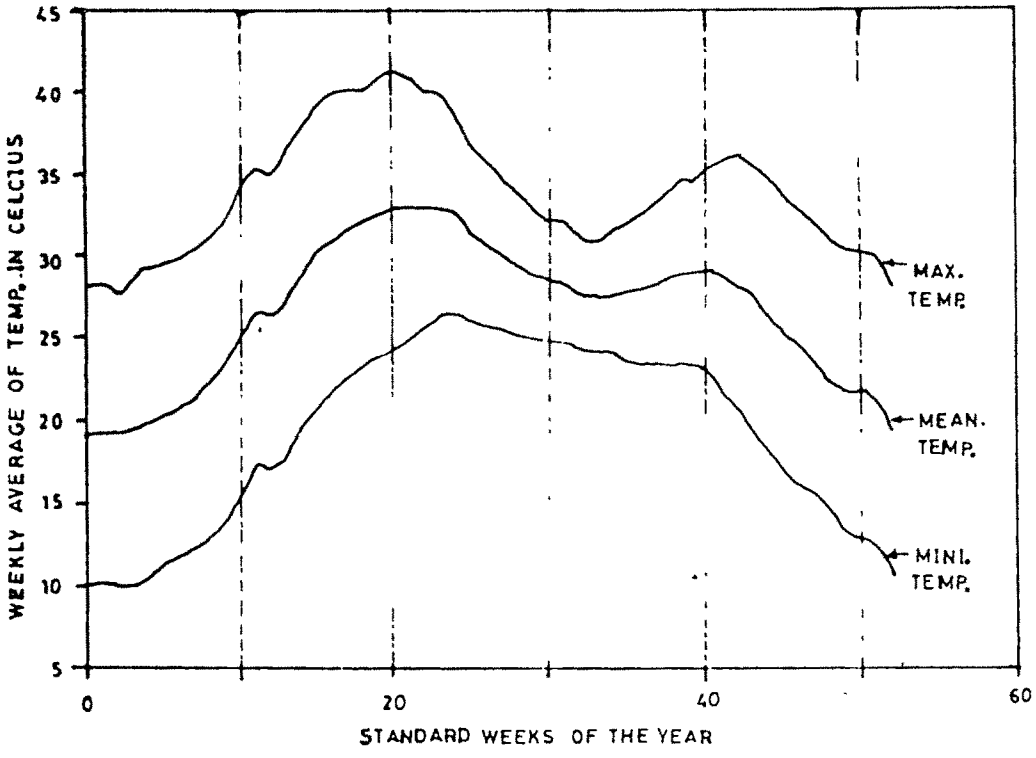

FIG:6.5-TEMPERATURE AT RAJKOT

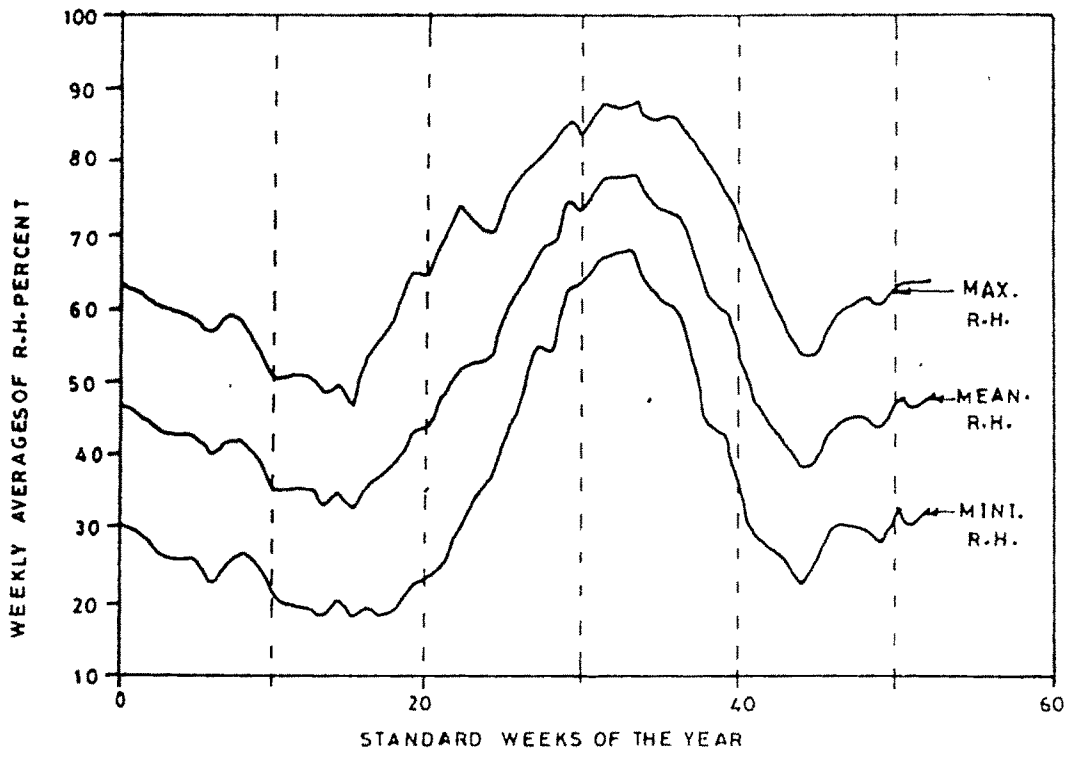

FIG:6.6-RELATIVE HUMIDITY AT DANTIWADA

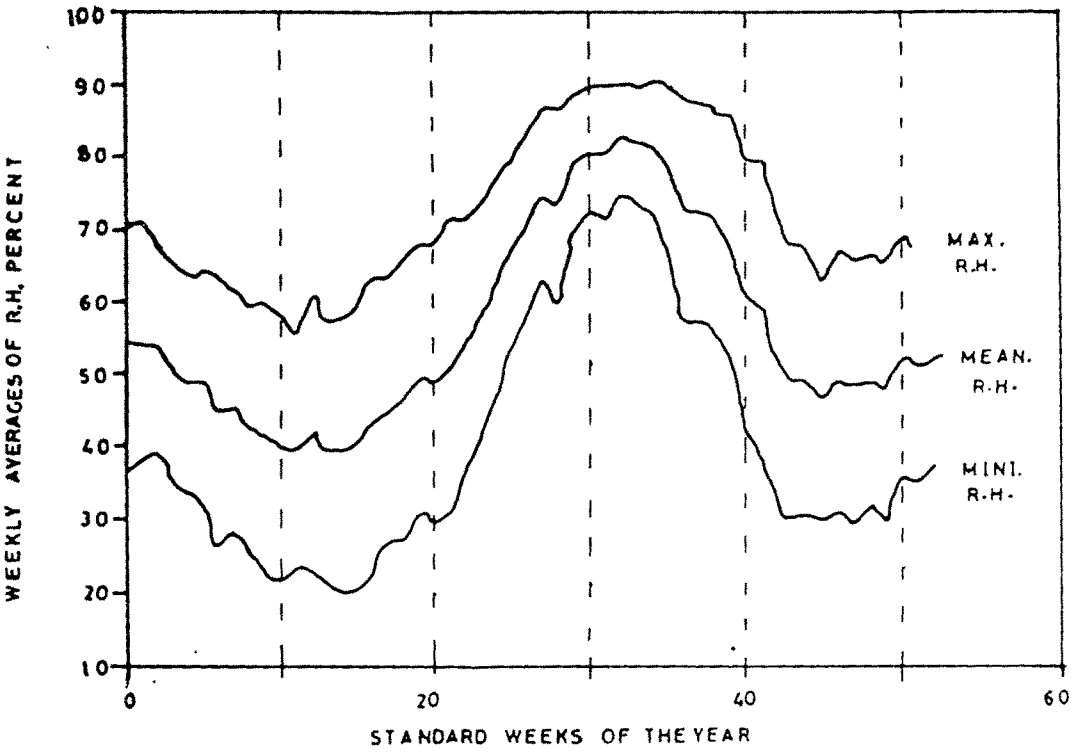

FIG:6.7-RELATIVE HUMIDITY AT ANAND

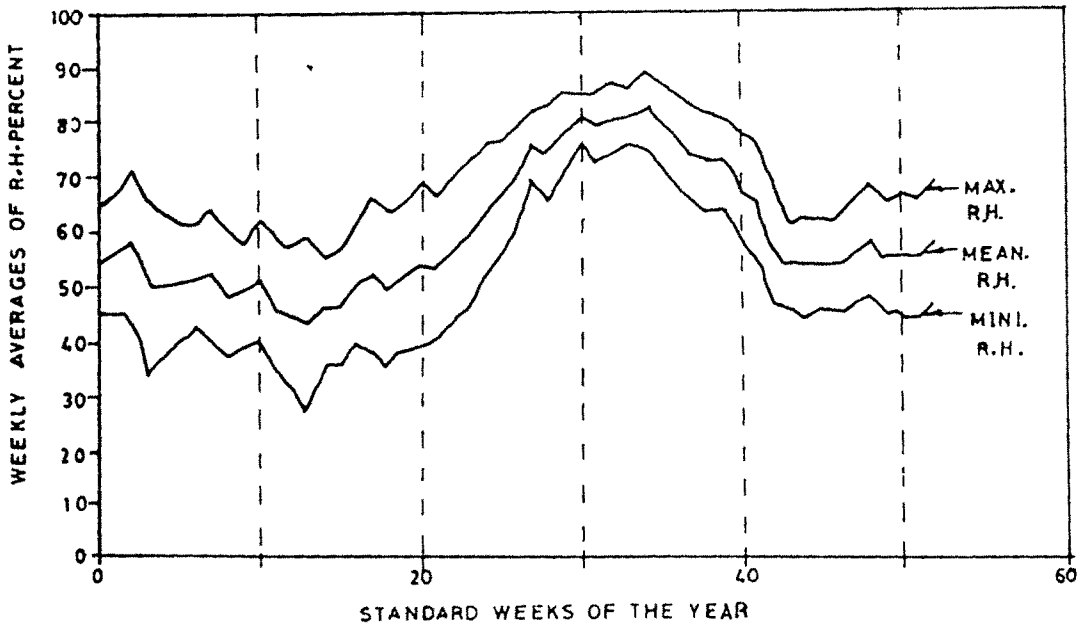

FIG:6.8-RELATIVE HUMIDITY AT VADODARA

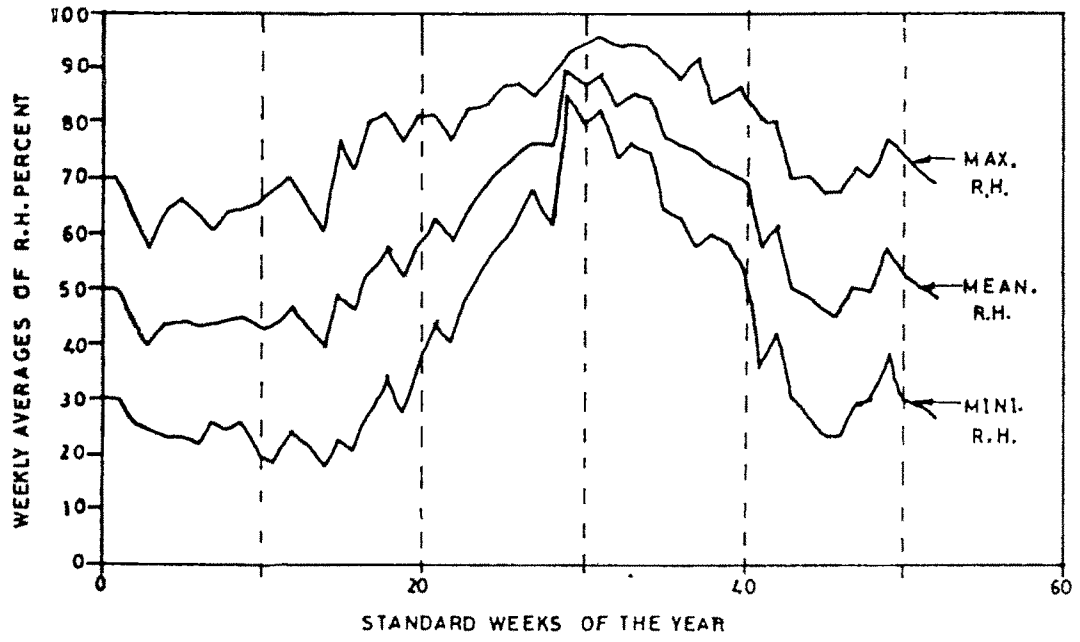

FIG:6.9 -RELATIVE HUMIDITY AT JUNAGADH

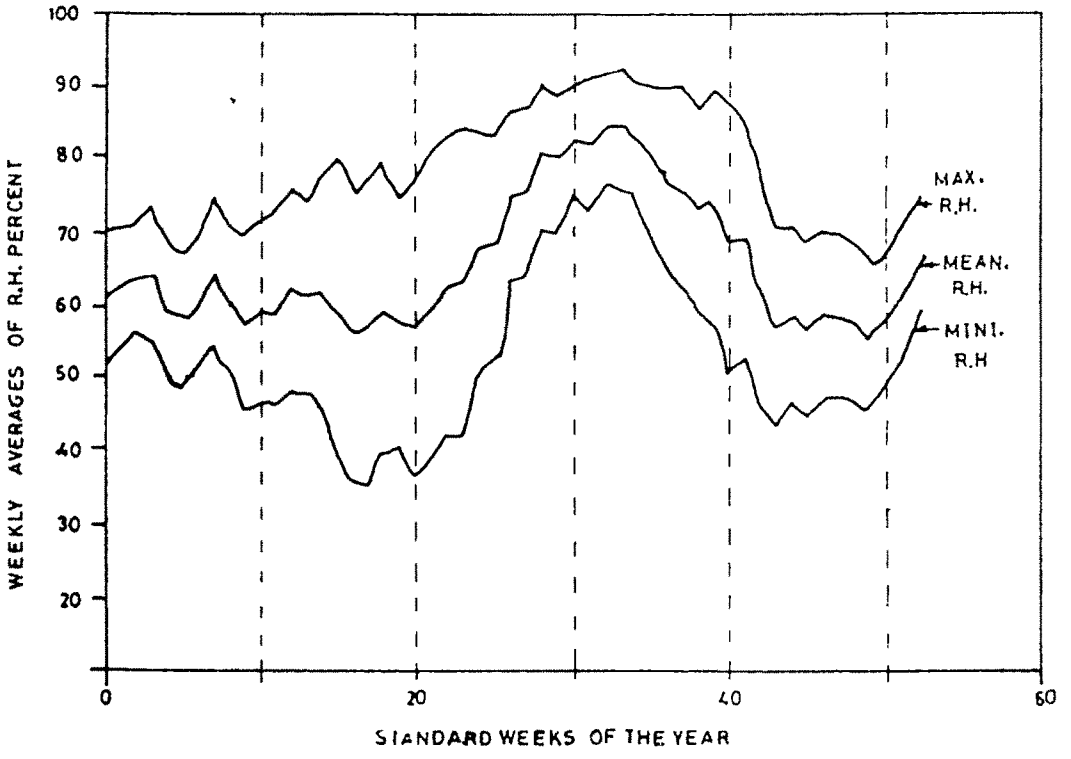

FIG: 6.10-RELATIVE HUMIDITY AT RAJKOT

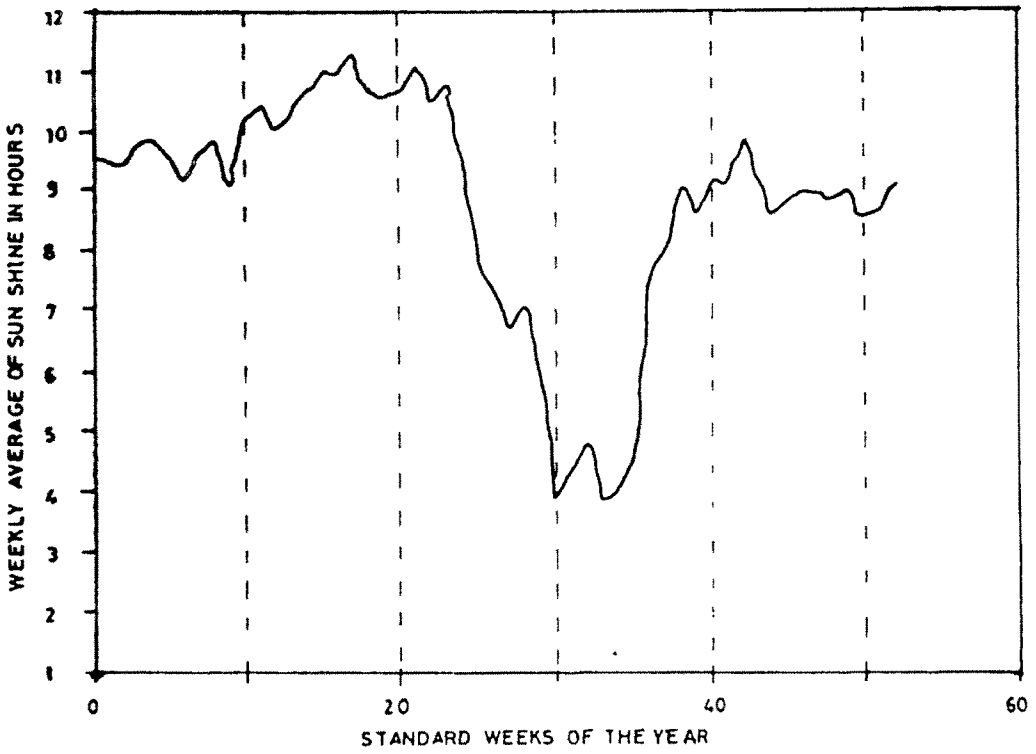

FIG: 6.11-SUN SHINE HOURS AT DANTIWADA

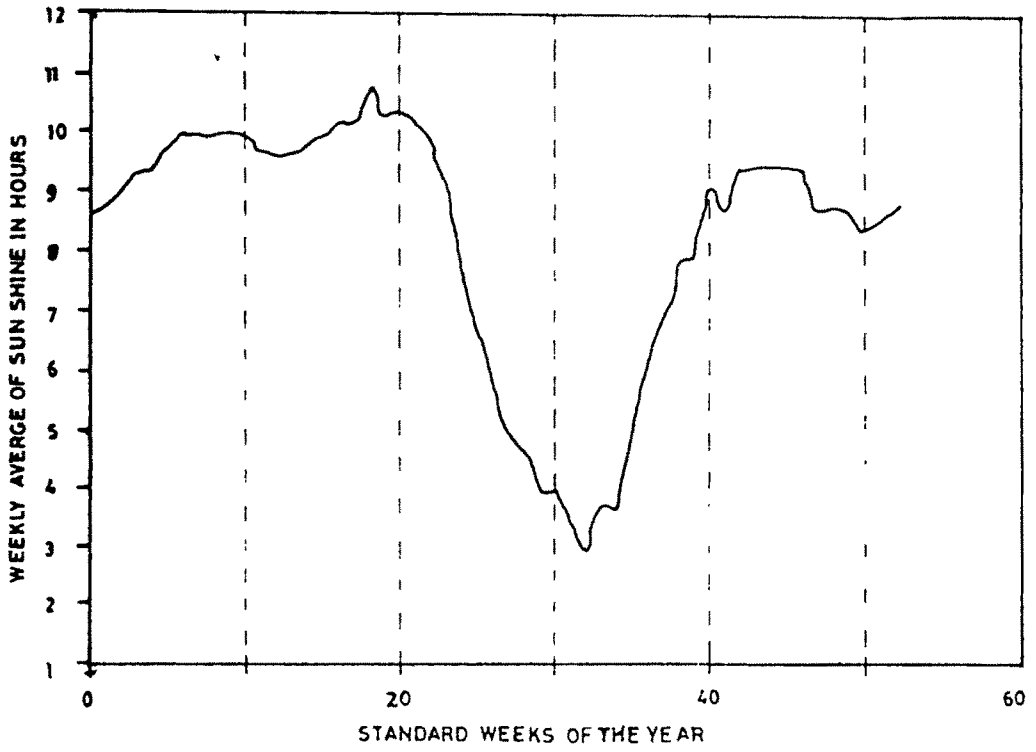

FIG: 6.12_SUN SHINE HOURS AT ANAND

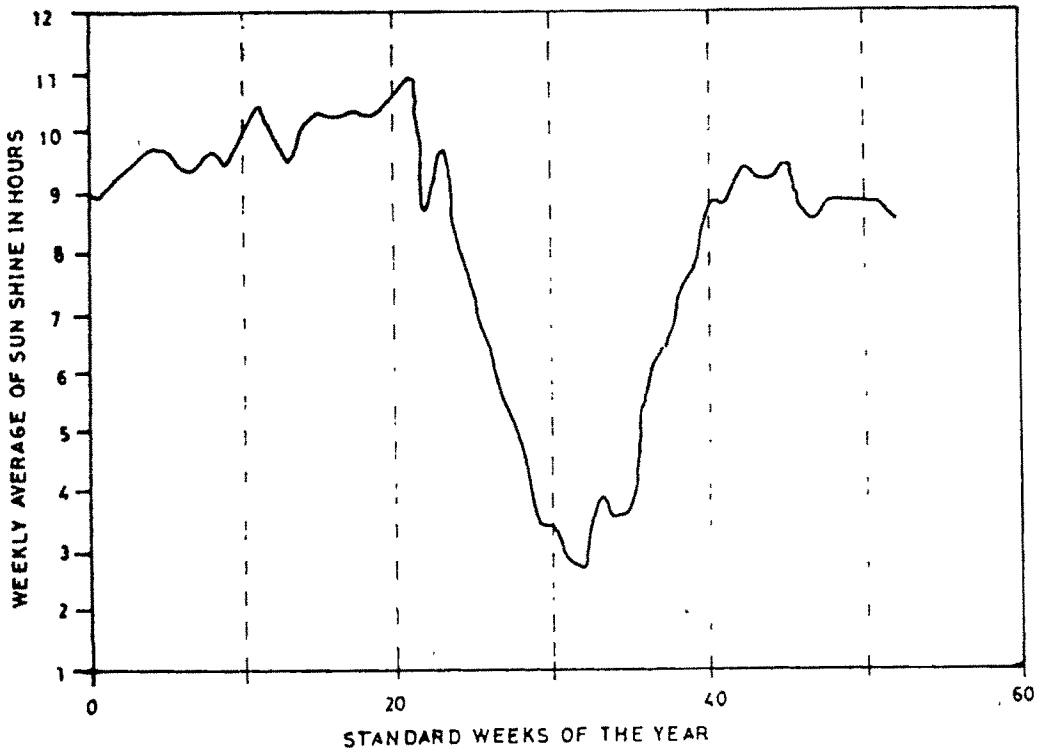

FIG: 6.13-SUN SHINE HOURS AT VADODARA

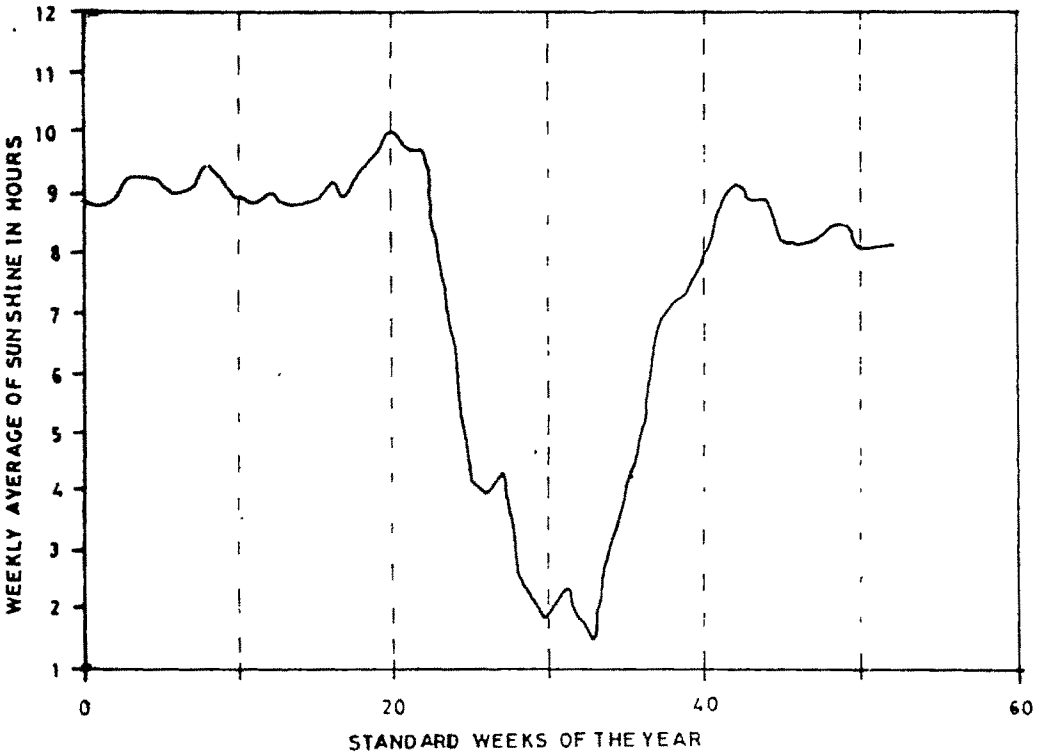

FIG: 6.14-SUN SHINE HOURS AT JUNAGADH

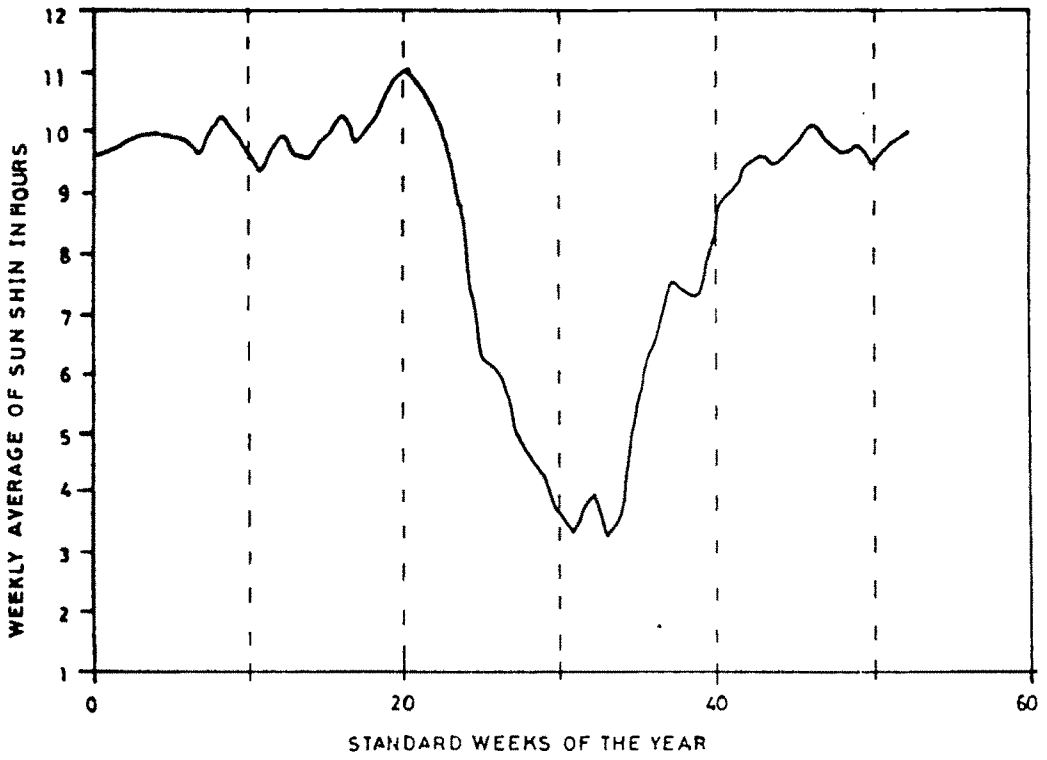

FIG: 6.15-SUN SHINE HOURS AT RAJKOT

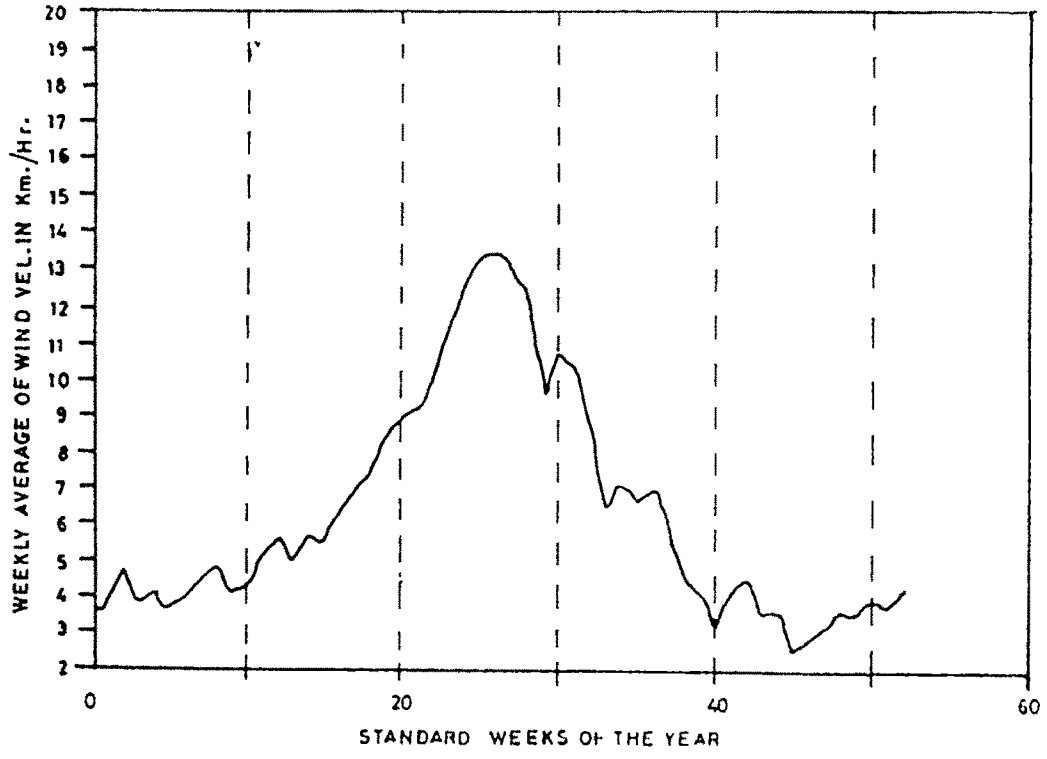

FIG: 6.16_WIND VELOCITY AT DANTIWADA

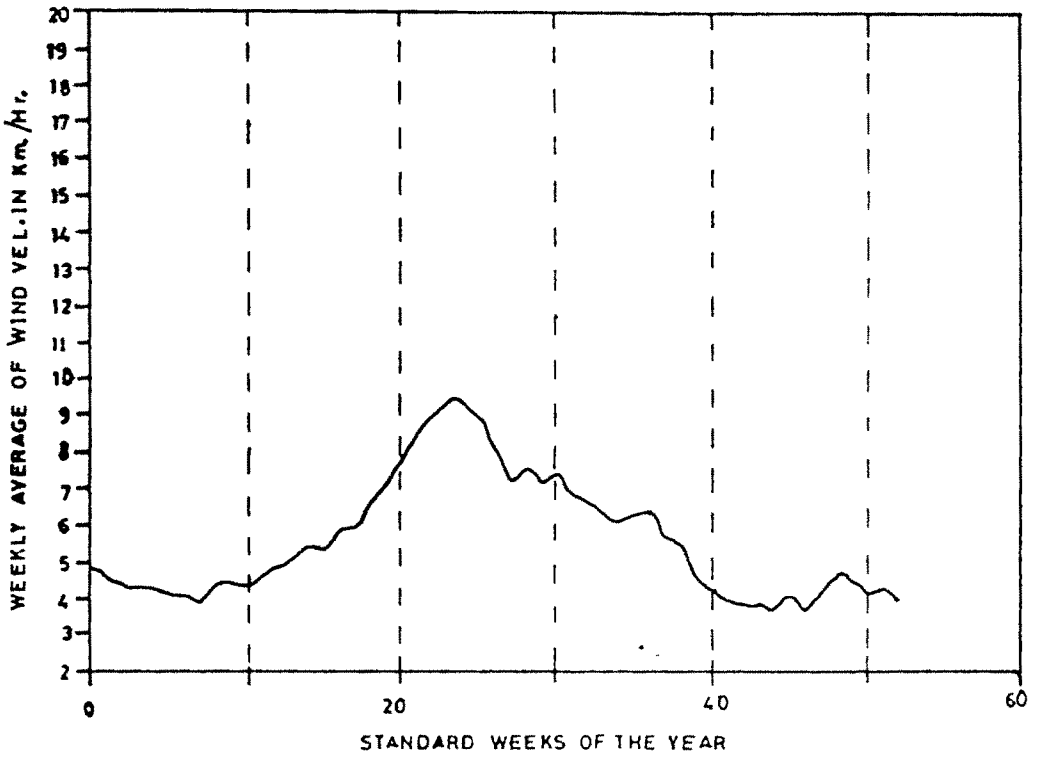

FIG: 6.17-WIND VELOCITY AT ANAND

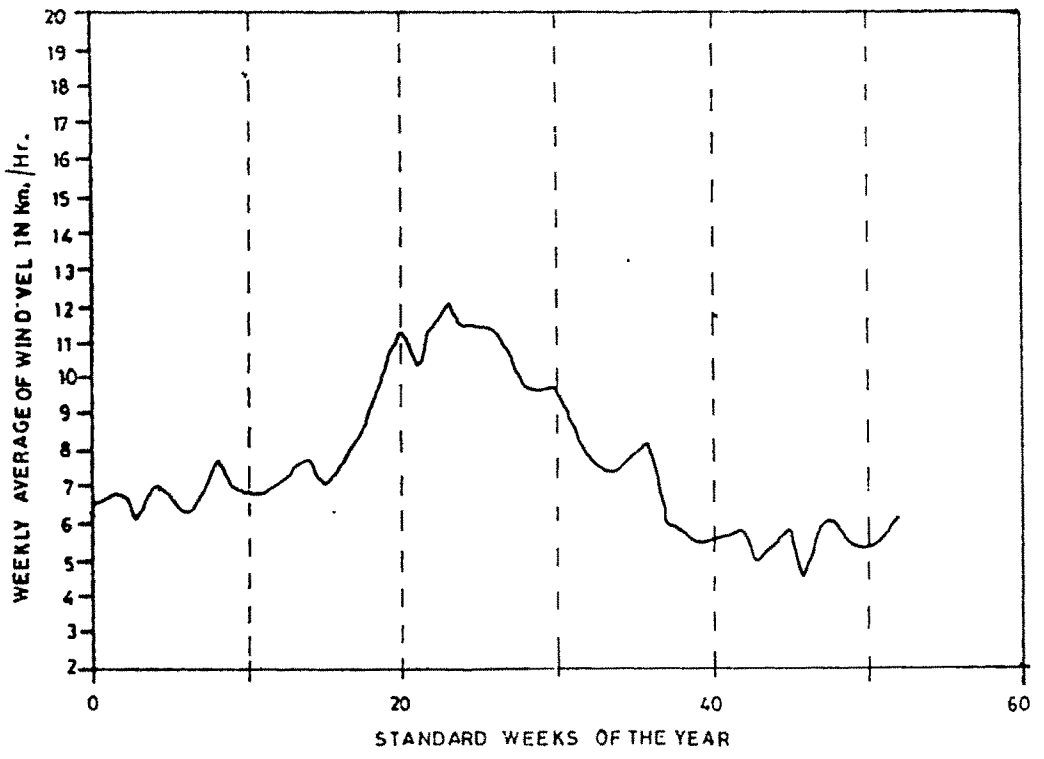

FIG: 6.18-WIND VELOCITY AT VADODARA

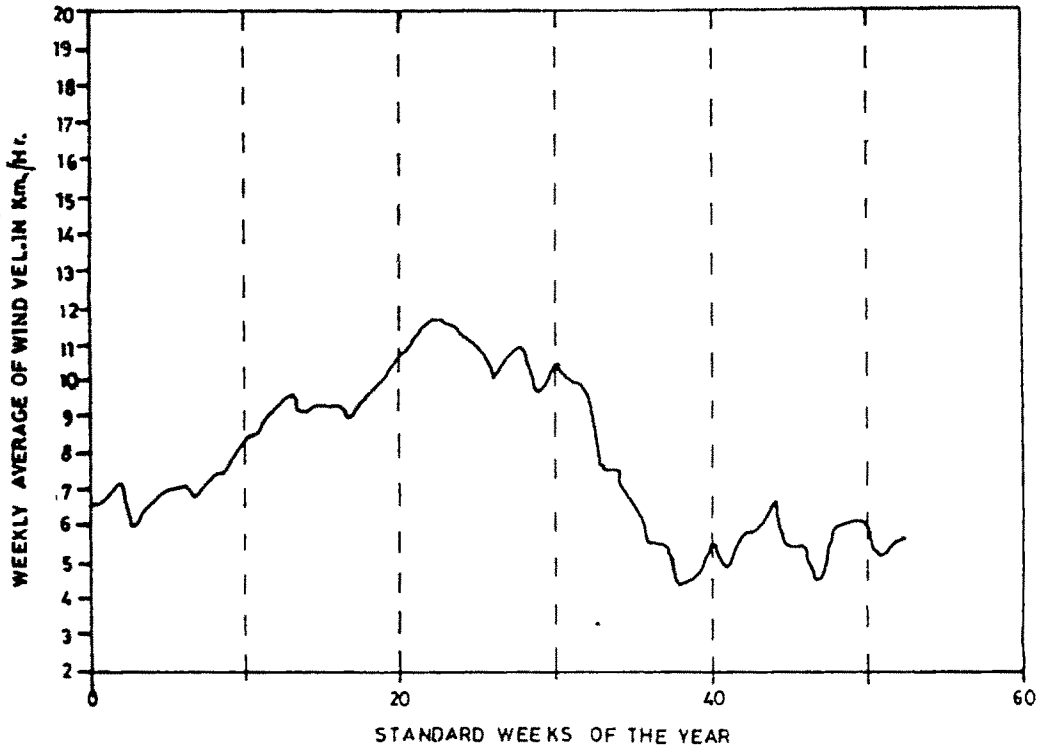

FIG: 6.19-WIND VELOCITY AT JUNAGADH

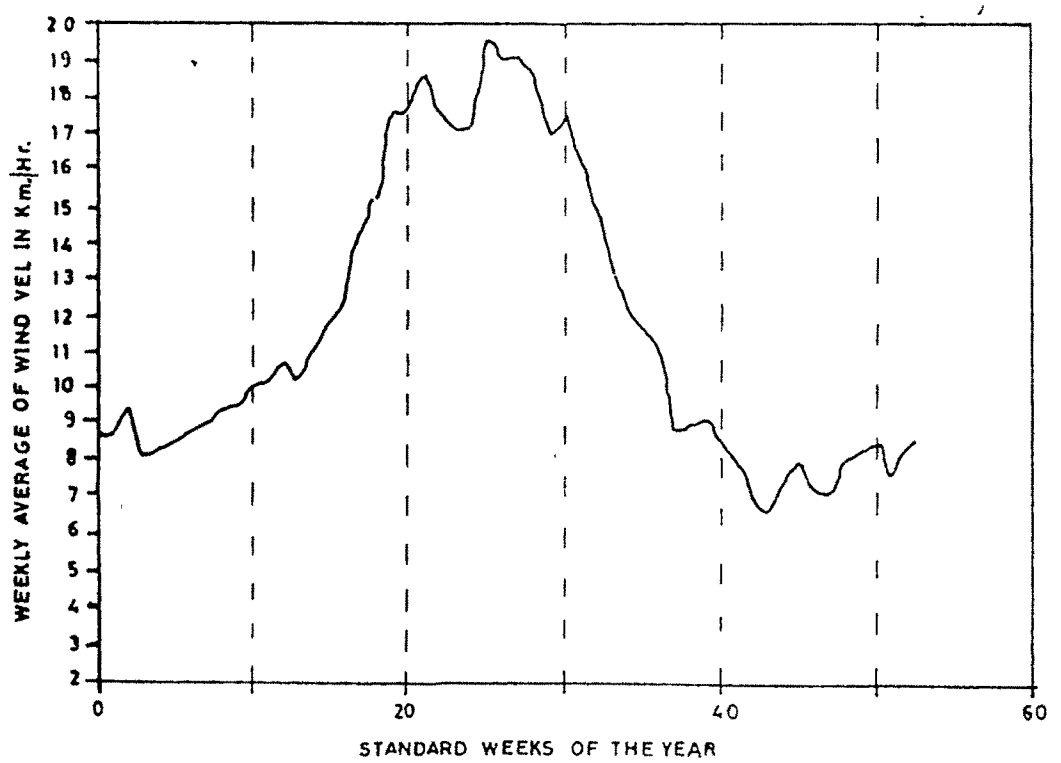

FIG: 6.20-WIND VELOCITY AT RAJKOT

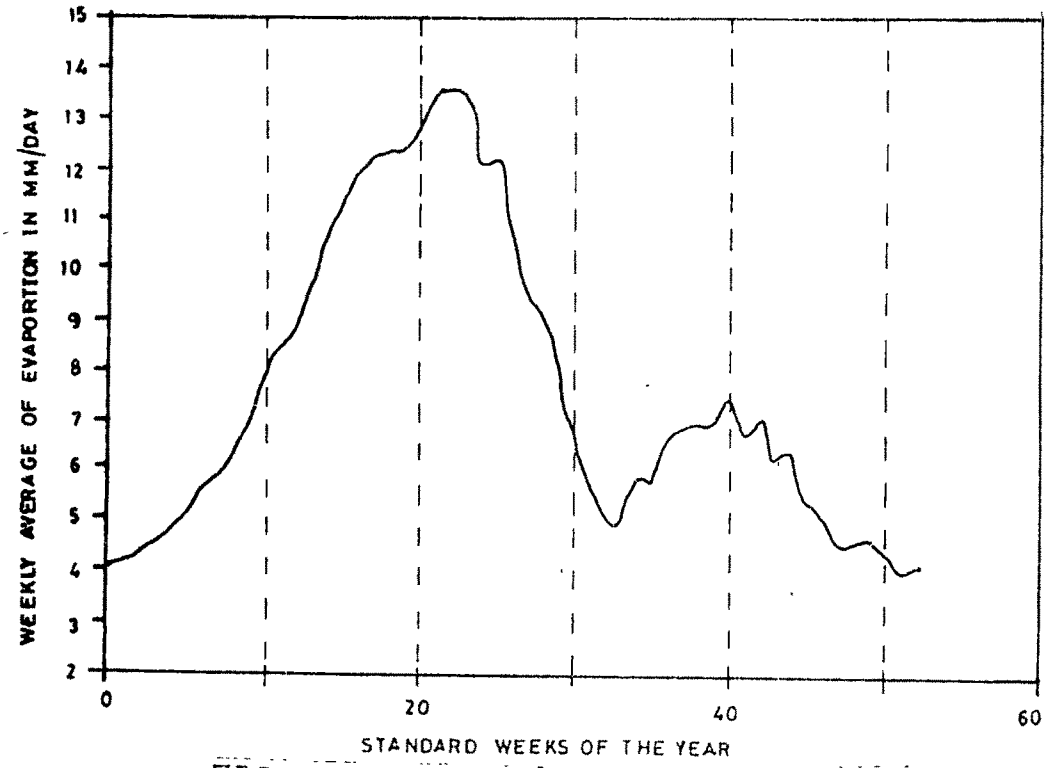

FIG: 6·21-EVAPORATION AT DANTIWADA

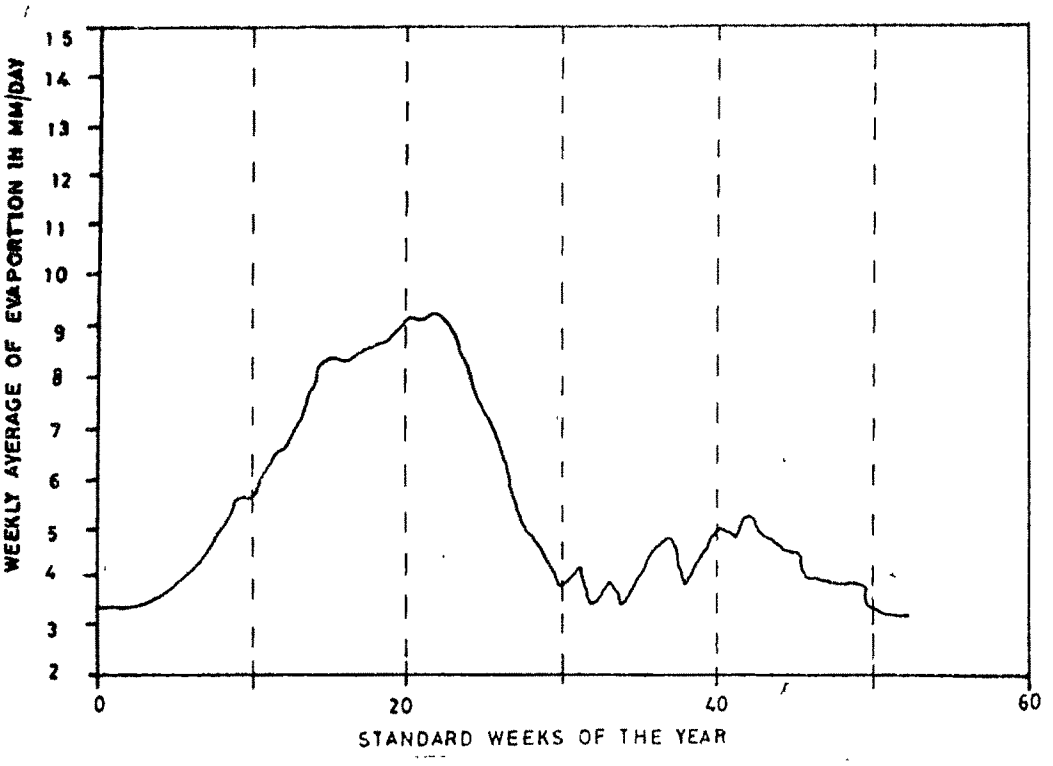

FIG: 6·22-EVAPORATION AT ANAND

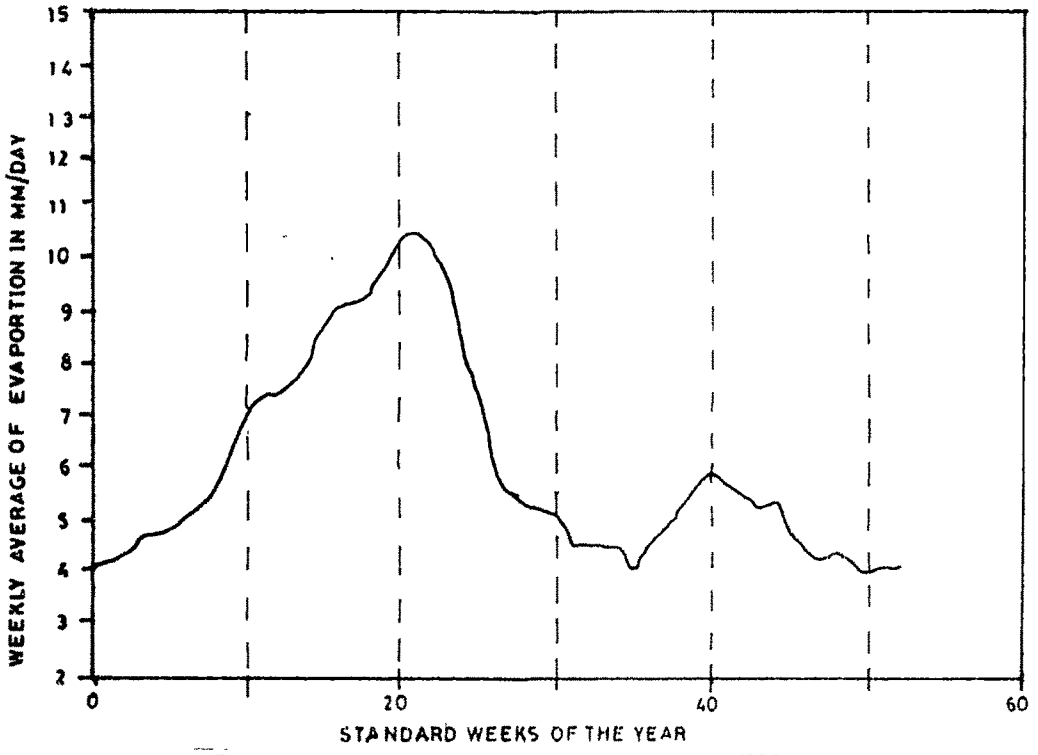

FIG: 6·23-EVAPORATION AT VADODARA

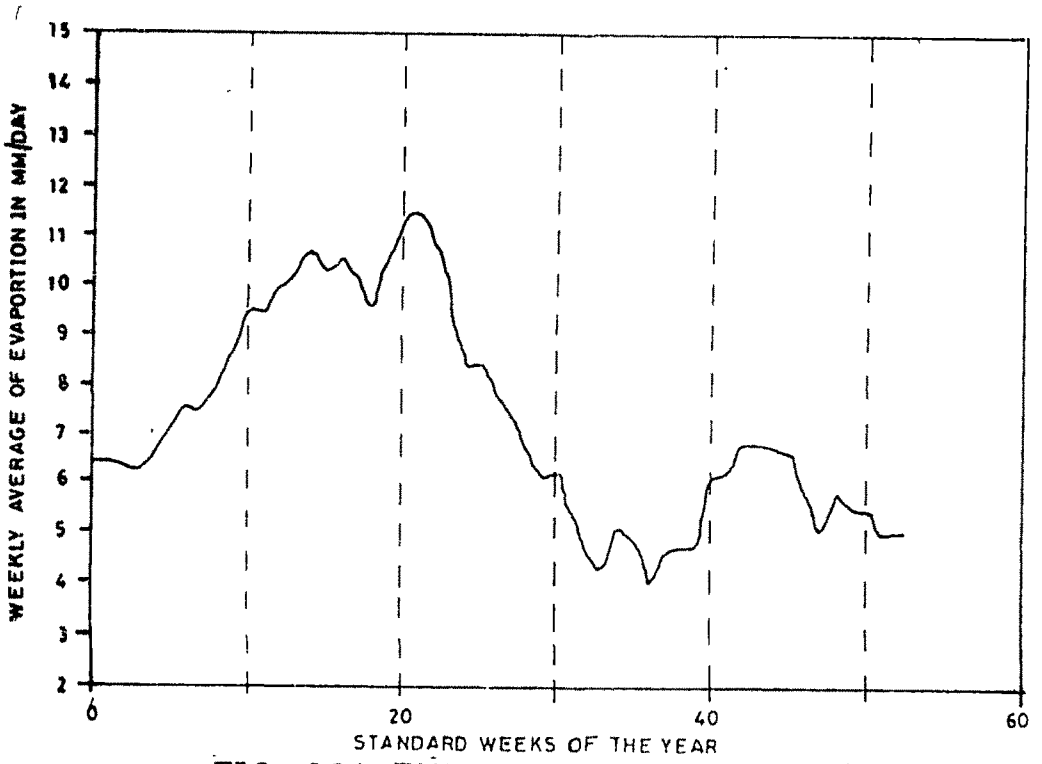

FIG: 6·24-EVAPORATION AT JUNAGADH

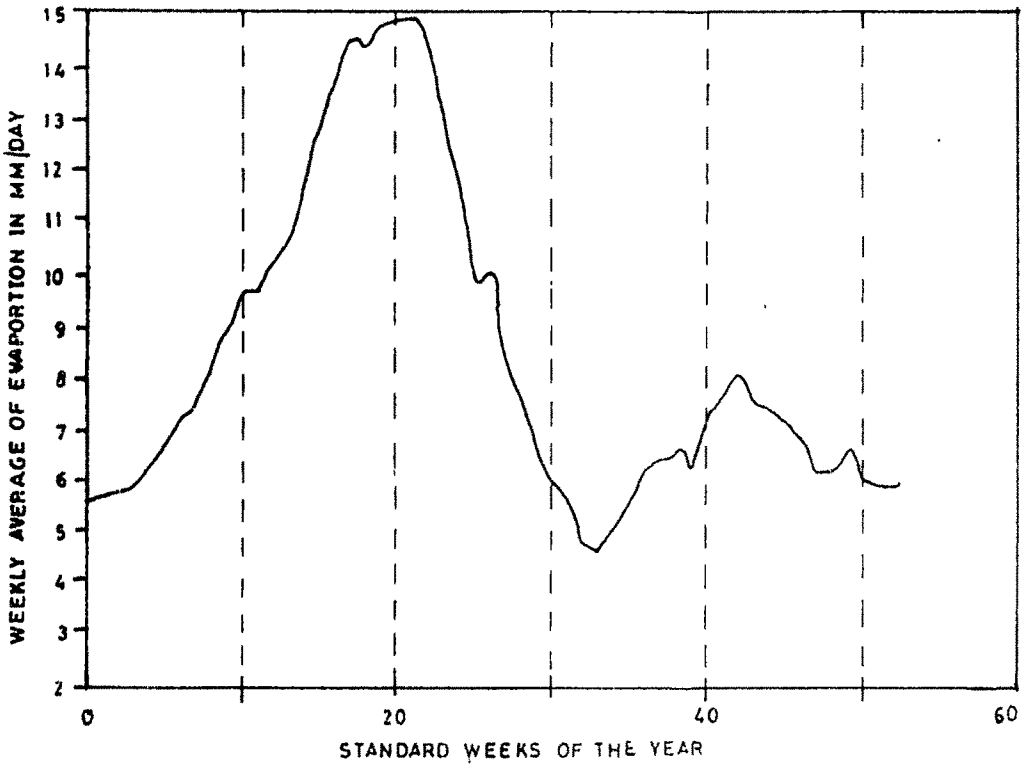

FIG: 6·25-EVAPORATION AT RAJKOT

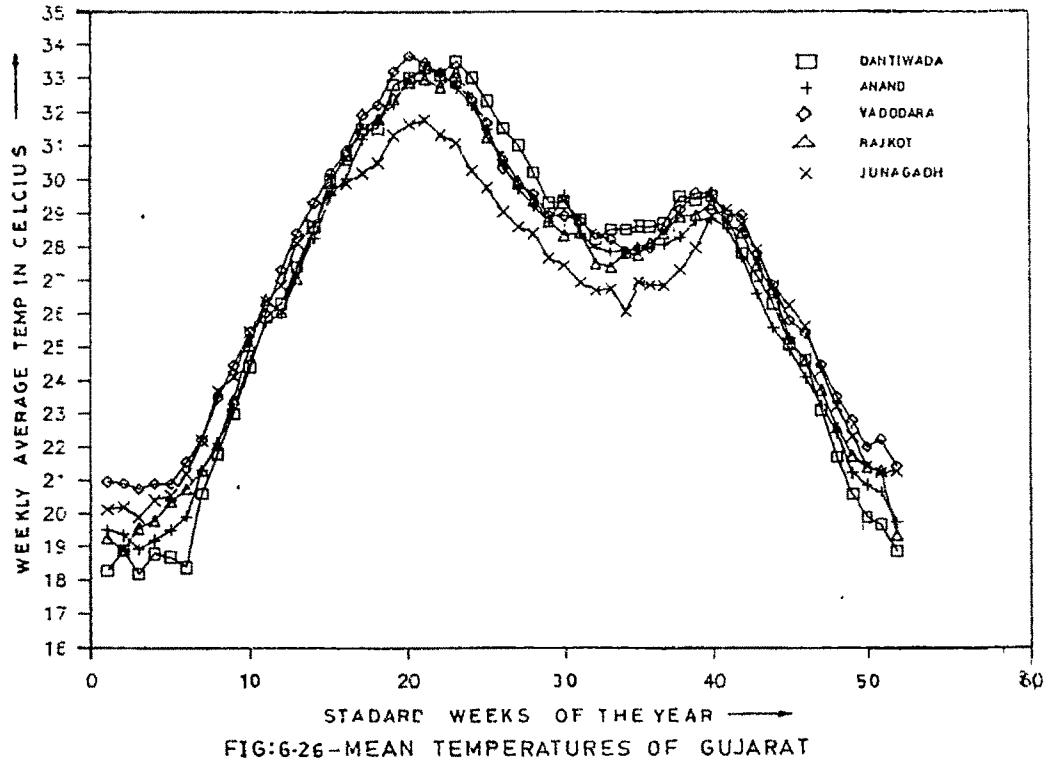

FIG:6·26-MEAN TEMPERATURES OF GUJARAT

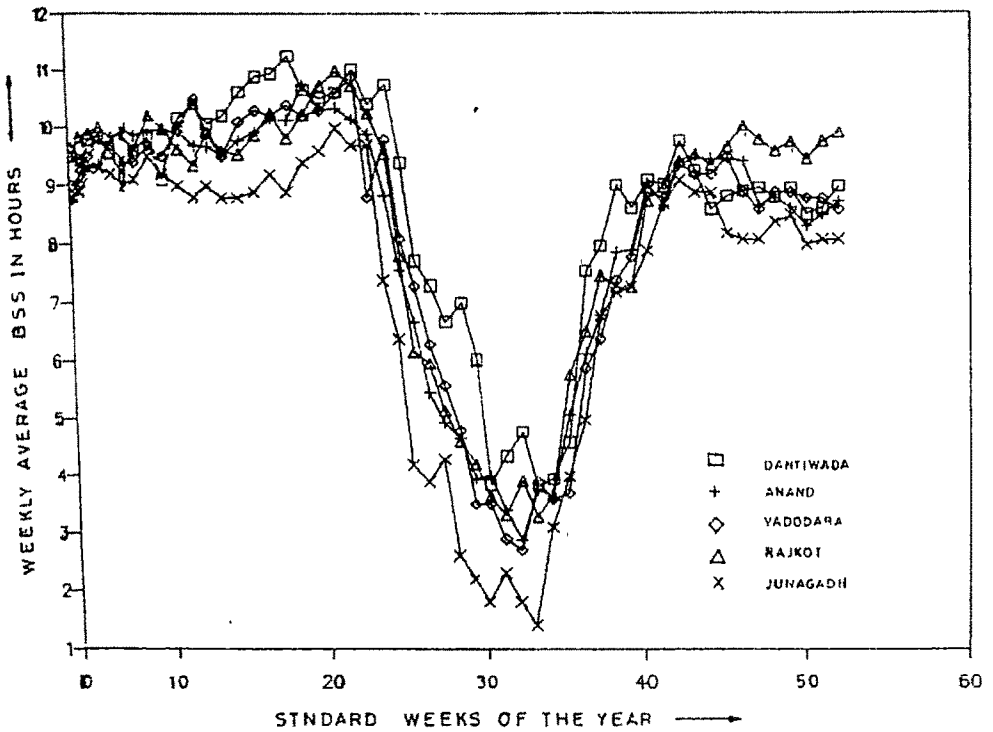

FIG: 6.27- BRIGHT SUN SHINE HOURS OF GUJARAT

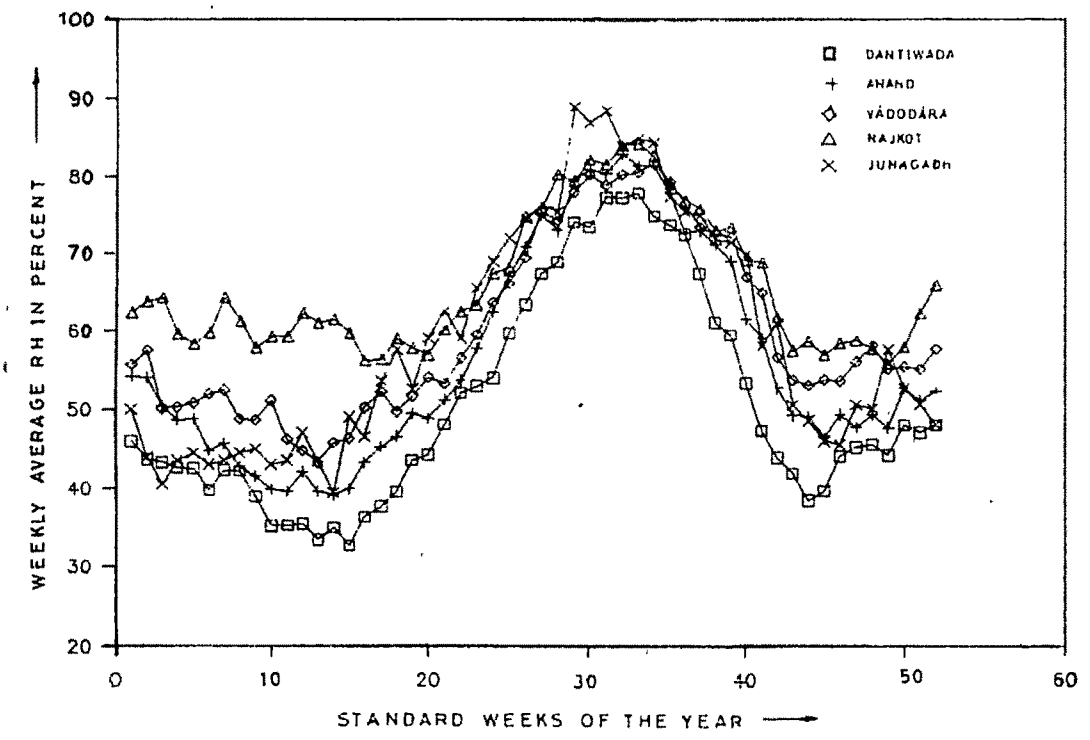

FIG: 6.28- RELATIVE HUMIDITY OF GUJARAT

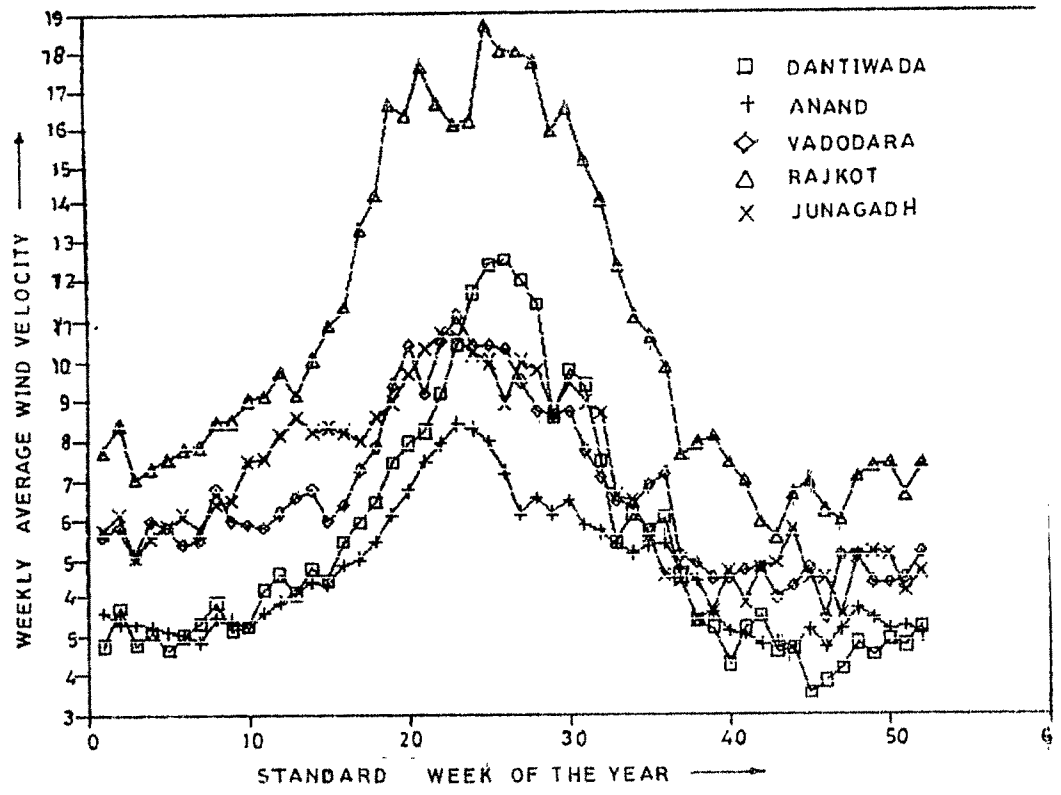

FIG: 6·29-WIND VELOCITY OF GUJARAT

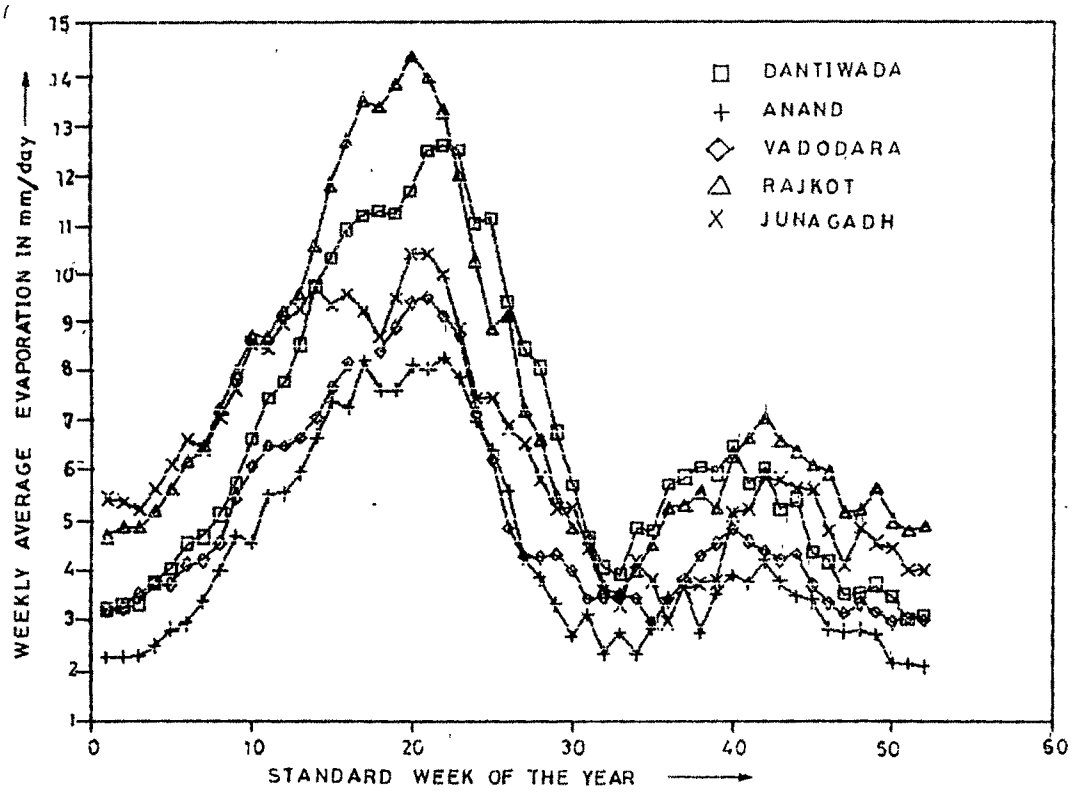

FIG: 6·30-EVAPORATION OF GUJARAT

6.3 ANALYSIS AND DISCUSSIONS ON OBSERVED DATA

Analysis of various meteorological parameters is discussed referring figures 6.26 to 6.30 and tables 6.1 to 6.6.

6.3.1 The highest temperature ranges between 39 to 41 degree celsius for all stations and likewise minimum values are 9 to 12 degree celsius for all stations. From fig.6.26 it can be seen that the pattern of variation is same for all the station. From the fig. 6.1 to 6.5 it can be seen that the difference between maximum and minimum temperatures during entire year varies from 6 to 17 degree celsius. Between 1st to 5th week the temperature is minimum and it attains peak between 18th to 22nd week and then follows receding pattern up to 30th to 35th week. After gaining litle peak in 42nd week again it falls at the end of the year up to 9 to 11 degree celcius. For weeks 1 to 5 and 48 to 52 the variation in mean temperature amongst the stations is upto 3 degree celsius, whereas for weeks 6 to 47 the variation is upto 1.5 degree celsius except Junagadh. The mean temperature for Junagadh is lower than all other stations from weeks 15 to 40.

6.3.2 Bright Sun Shine (B S S) for all stations follows a specific variation with respect to weeks of year. From 9 to 10 hours per day in January, with a rise of 2 to 1 hour per day in mid of May it achieves highest value of 11 hours per day. And then follows a receding pattern upto 3 hours a day at the end of July. Thus difference between maximum and minimum value is about 8 hours a day in a year. Around 42nd week of the year it again rises to 9.5 hours a day and in end

of year the values are in the range of 9 hours a day. For all the regions the variation in BSS is uniform and having negligible deviation amongst each other except for Junagadh where the deviation is more during March to August. BSS for Junagadh have almost lower values compared to other stations.

6.3.3 Difference between maximum and minimum relative humidity (Fig. 6.6 to 6.10) for a week throughout a year varies from 20 % to 32 % for Dantiwada, 15 % to 39 % for Anand, 10% to 30% for vadodara, and 15 % to 40 % for Rajkot, and 15% to 45% for Junagadh. The maximum yearly difference between highest and lowest relative humidity value is 70 % , 75 % , 62 % , 60 % and 74 % for Dantiwada, Anand, Vadodara, Rajkot and Junagadh respectively. Maximum value of relative humidity for all the stations are between 30th to 34th week, whereas minimum values are observed around 15th and 45th week. Thus from the variation of BSS, temperature and relative humidity it can be confirmed that the pattern of relative humidity is inverse to the pattern of BSS and temperatures. The distribution of mean relative humidity for all stations in a year is uniform. However for winter and summer more variation is observed amongst the various stations whereas for monsoon period the values are in closer proximity. The value of relative humidity for Dantiwada is lowest amongst all the station.

6.3.4 Compared to the above three parameters the distribution in wind velocity (Fig. 6.16 to 6.20) between all the stations is not in close proximity with average values. The pattern of variation is similar in a span of year. The

reason may be the effect of surrounding area and difference in local topography. The value of wind veocity steadily increases from January reaching their maximum peak values in the month of June , decreasing thereafter touching the minimum values in the end of November. Higher values of wind velocity is recorded at Rajkot throughout the year and difference in variation is also large compared with other stations. The average weekly maximum wind velocity at Anand is 9.5 km/hr whereas for Rajkot it is 19.5 km/hr. The monsoon wind velocity for Anand is lower than other stations.

6.3.5 The parameters reffered to above are the contributing factors towards evaporation from open pan. Temperature, sunshine and relative humidity are following uniform variation whereas wind velocity have less uniformity. The pattern of variation of evaporation is similar to the pattern of temperature. The distribution pattern is almost similar for all the stations having peak in 20th and 42nd weeks. The lower value are observed in 1st, 33rd and last week of the year. Thus the higher and lower values are in correlation with temperature values. The nonuniform distribution of wind velocity has affected the difference in values amongst the station for evaporation. The evaporation for each station is as under.

Evaporation in mm/day

	Dantiwada	Anand	Vadodara	Rajkot	Junagadh
Maximum	13.8	9.0	10.5	15.5	11.5
Minimum	4.0	3.0	3.8	4.5	4.0
Standard Deviation	2.98	1.93	1.45	3.09	2.13