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Short Communication

Agro-meteorological conditions of Sriniketan, West Bengal

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Rainfall pattern of a locality dictates decision and selection of enterprise, planning, investment and the care and management of crops and animals. Different weather parameters regulate the nature and extent of infestation of pests including weeds, pathogens, parasites, predators and population and foraging of pollinating agents and thus productivity of crops and animals.

Therefor, a study has been undertaken to assess the agrometeorological conditions of Sriniketan (23.39° N latitude, 87.42° E longitude and altitude of 58.9 m above the MSL), Birbhum, West Bengal using 35 years (1966-2000) of data of meteorological observatory, Sriniketan. In the case of sunshine hours and relative humidity the available records were for 22 years (1979 to 2000) and that for evaporation it was only 4 years (1979 to 1982). Soils of Sriniketan are mostly sandy. This area comes under dry sub-humid zone having only 3.5 humid months (Ganguly *et al.* 1992, Majumdar, 1985).

The analysis revealed that the total annual rainfall (Table 1) ranged between 831.4 mm (1982) to 2087.9 mm (1978) with the average annual rainfall (AAR) of 1484 mm and co-efficient of variation (CV) of 20.1 %. Out of 35 years 63% years received normal (± 20% of AAR) rainfall while 17% years (1971, '78, '80, '89, '97 and '99) experienced excess (more than 20% to 59% of AAR) rainfall and 20% years (1966, '69, '72, '76, '79, '82 and '92) were deficient (-20% to -59% to AAR) in rainfall causing slight to severe drought situations. The annual average rainy days (inclusive of 'trace' rainfall) ranged between 85 days in 1972 to 154 days in 1990 with an average of 112.6 days with CV values of 12.0%.

Monthly mean weather parameters of Sriniketan (Table 2) revealed that the rainfall was highest (330.9 ± 122.3) in July followed by August (301.2 ± 88.6). About 77.6% of annual rainfall were received during June to September months in 77 days. Post monsoon period (October and November) and per-monsoon summer period (April and May) received rainfall of 112.2 and 145.4 mm respectively.

The monthly average pan evaporation (Table 2) ranged from 74.1 mm (in January) to 238.3 mm (in May) The annual average pan evaporation (1657.3 mm) exceeded the annual average rainfall (1484.0 mm). Monthly pan evaporation was more that rainfall in eight months during. Only during June to September period its was less than rainfall. The daily average bright sunshine hours (Table 2) were less than 6 hrs day^{-1} during June to September. It ranged between 7 to 8 hrs in rest of the months. The lowest

Table 1 : Annual average rainfall, rainy months, weeks and days

Year	Rainfall (mm)	Annual rainy days*
1966	1104.8	10
1967	1260.2	113
1968	1200.7	121
1969	1164.2	109
1970	1630.2	101
1971	2072.3	120
1972	1030.8	85
1973	1522.7	121
1974	1462.8	95
1975	1557.2	117
1976	1153.6	107
1977	1681.5	133
1978	2087.8	126
1979	1176.6	93
1980	1907.1	114
1981	1422.2	117
1982	831.4	95
1983	1467.2	110
1984	1514.3	102
1985	1229.8	109
1986	1495.2	122
1987	1218.6	108
1988	1641.7	115
1989	1832.8	113
1990	1543.9	154
1991	1499.2	111
1992	1042.4	95
1993	1507.6	113
1994	1594.6	114
1995	1742.2	115
1996	1442.4	94
1997	1831.2	132
1998	1672.9	130
1999	1860.5	121
2000	1538.3	113
Mean	1484.0	113
SD ()	298.84	13.6
CV (%)	20.14	12.0

* Months, weeks and days with any amount of rainfall

Table 2 : Monthly mean and standard deviation (± SD) of different weather parameter at Sriniketan.

Month	Rainfall (mm)		Rainy days/month		Pan evaporation (mm)		Relative humidity (%) at 8.30 a.m.		Bright sunshine hours		Maximum temperature (°C)		Minimum temperature (°C)	
	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)	Mean	SD(±)
January	12.9	15.4	2.1	1.4	74.1	6.2	73.5	5.9	7.8	0.8	24.8	1.2	11.8	0.8
February	22.0	24.9	3.3	2.3	90.2	3.5	64.3	7.9	8.0	1.1	28.2	1.5	14.5	1.0
March	29.5	39.2	4.2	3.0	143.9	11.7	57.1	8.9	7.9	0.7	33.7	1.9	19.3	1.2
April	51.5	44.3	5.3	3.0	199.7	24.2	63.2	9.3	8.1	0.6	37.1	2.1	23.4	1.1
May	93.9	52.2	8.6	3.6	238.3	64.2	71.9	6.8	7.8	1.1	37.1	2.2	25.1	1.0
June	247.8	127.0	15.1	4.3	173.6	43.9	79.5	4.4	5.2	1.2	34.8	1.6	25.9	0.7
July	330.9	122.3	22.7	3.5	163.4	48.8	85.4	3.1	3.9	0.9	32.7	0.8	25.9	0.4
Aughust	301.2	88.6	22.2	3.4	124.8	8.3	87.0	1.9	4.7	0.7	32.1	0.6	25.8	0.4
September	272.0	154.5	17.0	4.0	122.8	18.5	85.4	2.5	4.9	1.3	32.1	0.7	25.3	0.5
October	92.9	71.6	7.4	3.7	119.2	19.0	79.8	4.7	7.4	1.2	31.6	0.9	22.5	0.9
November	19.3	34.6	2.5	2.1	107.9	16.7	74.1	4.8	8.0	1.0	29.3	0.9	17.4	1.3
December	9.3	17.9	1.1	1.4	99.7	33.5	72.1	5.7	7.8	0.8	26.1	0.7	12.7	1.0

Table 3 : Weekly mean rainfall and pan evaporation

Standard week (Jan. 01 to Dec.31)	Average rainfall (mm)*	S D (±mm)	Average pan evaporation (mm)**	S D (±mm)
1	2.5	8.5	17.1	2.6
2	2.1	5.2	16.1	3.0
3	4.6	11.5	16.3	2.3
4	2.0	4.1	15.9	1.4
5	5.6	13.4	17.8	2.3
6	5.0	13.0	19.2	2.7
7	3.6	6.5	19.7	2.1
8	7.2	14.8	27.9	2.6
9	5.3	11.2	30.3	2.4
10	7.3	16.1	30.4	4.4
11	4.4	8.8	31.3	3.8
12	6.9	13.5	36.8	2.9
13	8.4	16.5	34.5	7.0
14	6.4	11.3	49.3	10.4
15	7.9	16.8	46.8	5.8
16	17.0	29.0	40.7	6.9
17	15.5	19.8	48.6	6.0
18	14.2	17.1	55.0	14.7
19	17.8	21.1	57.3	19.3
20	27.7	25.1	57.3	19.3
21	19.8	21.0	49.9	10.9
22	25.8	30.5	52.9	17.6
23	49.4	45.7	53.2	20.7
24	52.1	57.3	37.5	6.0
25	63.1	43.0	33.0	8.1
26	84.0	65.8	34.9	5.5
27	71.8	48.0	33.9	10.1
28	74.9	68.5	39.8	13.1
29	75.7	58.0	42.3	19.2
30	82.2	69.4	32.9	7.5
31	66.2	43.6	28.8	4.8
32	74.5	50.5	30.8	2.1
33	69.1	47.1	28.4	2.1
34	59.6	51.4	25.5	4.6
35	64.4	56.2	27.6	4.8
36	64.2	72.7	28.4	5.8
37	63.1	43.3	26.4	1.2
38	57.0	79.9	32.1	7.2
39	69.6	98.4	28.4	7.1
40	40.4	49.3	28.5	6.0
41	19.9	25.8	29.6	5.1
42	15.9	27.8	26.6	1.9
43	11.8	37.5	22.7	5.5
44	11.3	20.5	27.7	6.6
45	9.1	28.6	25.3	4.9
46	1.9	6.9	24.3	3.0
47	2.0	7.7	24.6	3.9
48	2.7	11.5	24.9	5.3
49	1.2	5.9	24.3	8.1
50	3.0	8.8	22.4	6.7
51	0.1	03	21.3	8.0
52	5.2	16.3	25.6	9.0

* Average of 35 years (1966 to 2000), ** Average of 4 years (1979 to 1982)

and highest records of maximum temperatures during 35 years were 16.2°C on 27.01.1971 and 48.0°C on 07.05.1972 respectively. The lowest and the highest minimum temperatures during the same period were 6.0°C recorded on 10.02.1974 and 31.8°C on 02. 08.1985. The mean monthly relative humidity was lowest (57%) in March and highest (87%) in August. Maximum temperature ranged between 24.8°C (January) to 37.1°C (both in April or May). While minimum temperature ranged between 11.8°C (January) to 25.9°C (June and July).

The weekly average rainfall (Table 3) during the last 35 years ranged between 0.1 mm (in 51st week) to 84.0 mm (in 26th week). There were a total of 17 weeks (Table 3) starting from 24th to 40th week when rainfall exceeded the pan evaporation. While 20th, 23rd, 41st, 42nd and 43rd weeks had rainfall more than 50% of pan evaporation and the rest 35 weeks were dry to semi-dry. It is to note that rain-fed crops suitable under aerobic soil require sowing in 22nd week and the crops preferring saturated soil are to sow on 24th week onward. Short duration post-monsoon crops grown as rain-fed as well as on residual soil moisture can be sown on 45th week and the *paria or utera* crops can be sown during 40th to 42nd week. Rain -fed drought tolerant summer crops require sowing in 7th week with moisture conservation and anticipating rainfall.

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REFERENCES

De, G. C. 1993. Harvesting more solar energy by expanding *rabi* cropping. *Indian Agriculturist.* 37 (1) : 61-67.

Ganguly, S. Majumdar, D. K. and De, G. C. 1992. Integrated watershed management- a practical approach in lateritic belt of West Bengal. *Proc. Nat. Workshop on Watershed Management, Development of Wastelands of Watershed basis.* Org. by Regional Centre for Wasteland Development, National Development Board, Govt. of India and Indian Institute of Forest Management, Bhopal. pp. 38-46.

Majumdar, D. K. 1985. Constraints and Strategy of water management for high crop production in west Bengal *Proc.* 72nd *Indian Science Congress,* Part IV: pp. 144-145.