



## Estimation of flood mitigation parameter for Tiruchirappalli city using Mathematical Relational Model

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Table S1 — Rainfall intensity and duration for different return periods using the Log-Pearson Type III method

Return period	1 hr	4 hrs	8 hrs	12 hrs	16 hrs	20 hrs	24 hrs
<b>Town</b>							
2	0.7	1.5	2.1	2.5	2.9	3.2	3.6
5	0.8	1.6	2.3	2.8	3.3	3.7	4
10	0.9	1.7	2.4	3	3.4	3.8	4.2
50	0.9	1.8	2.6	3.1	3.6	4.1	4.4
100	0.9	1.8	2.6	3.2	3.7	4.1	4.5
<b>Junction</b>							
2	0.7	1.4	1.97	2.42	2.79	3.12	3.42
5	0.78	1.57	2.22	2.72	3.14	3.51	3.84
10	0.82	1.64	2.31	2.83	3.27	3.66	4.01
50	0.86	1.72	2.43	2.97	3.43	3.84	4.2
100	0.87	1.74	2.46	3.01	3.47	3.88	4.25
<b>Airport</b>							
2	0.71	1.42	2.01	2.46	2.84	3.18	3.48
5	0.8	1.6	2.27	2.78	3.21	3.59	3.93
10	0.84	1.67	2.37	2.9	3.35	3.74	4.1
50	0.88	1.76	2.49	3.05	3.52	3.94	4.31
100	0.89	1.78	2.52	3.09	3.56	3.98	4.36
<b>Ponmalai</b>							
2	0.72	1.44	2.04	2.5	2.89	3.23	3.54
5	0.82	1.63	2.31	2.83	3.27	3.66	4
10	0.85	1.71	2.42	2.96	3.42	3.82	4.18
50	0.9	1.8	2.54	3.11	3.6	4.02	4.4
100	0.91	1.82	2.57	3.15	3.64	4.07	4.46
<b>CLC</b>							
2	0.54	1.07	1.52	1.86	2.14	2.4	2.63
5	0.67	1.33	1.88	2.31	2.66	2.98	3.26
10	0.72	1.44	2.03	2.49	2.87	3.21	3.52
50	0.79	1.57	2.22	2.72	3.14	3.52	3.85
100	0.8	1.61	2.27	2.78	3.21	3.59	3.93

Table S2 — Rainfall intensity and duration for different return periods using Log-normal Method

Return period	1 hr	4 hrs	8 hrs	12 hrs	16 hrs	20 hrs	24 hrs
<b>Town</b>							
2	3	2.34	2.72	2.91	3.03	3.11	3.63
5	2.43	1.77	2.15	2.34	2.46	2.54	3.06
10	0.72	0.06	0.44	0.63	0.75	0.83	1.35
50	2.13	1.47	1.85	2.04	2.16	2.24	2.76
100	2.1	1.44	1.82	2.01	2.13	2.21	2.72
<b>Junction</b>							
2	2.85	2.4	2.78	2.97	3.08	3.17	3.69
5	2.28	1.83	2.21	2.4	2.51	2.6	3.12
10	0.57	0.12	0.49	0.68	0.8	0.89	1.41
50	1.98	1.53	1.9	2.09	2.21	2.3	2.82
100	1.95	1.49	1.87	2.06	2.18	2.26	2.79
<b>Airport</b>							
2	2.89	2.38	2.76	2.95	3.06	3.15	3.67
5	2.32	1.81	2.19	2.38	2.5	2.58	3.1
10	0.61	0.09	0.48	0.66	0.78	0.87	1.39
50	2.02	1.5	1.89	2.07	2.19	2.28	2.8
100	1.99	1.47	1.85	2.04	2.16	2.25	2.77
<b>Ponmalai</b>							
2	2.95	2.36	2.74	2.93	3.05	3.13	3.65
5	2.38	1.79	2.17	2.36	2.48	2.56	3.08
10	0.67	0.08	0.46	0.65	0.77	0.85	1.37
50	2.08	1.49	1.87	2.06	2.18	2.26	2.78
100	2.05	1.46	1.84	2.03	2.14	2.23	2.75

Contd.

<b>CLC</b>								<i>Contd.</i>
2	1.56	1.56	2.06	2.3	2.44	2.53	3.01	
5	0.99	0.99	1.49	1.73	1.87	1.97	2.45	
10	-0.72	-0.72	-0.22	0.02	0.16	0.25	0.73	
50	0.69	0.69	1.19	1.43	1.57	1.66	2.14	
100	0.66	0.66	1.16	1.4	1.54	1.63	2.11	

Table S3 — Chi-square test

CLC		Town		Airport		Ponmalai		Junction	
observed	expected	observed	expected	observed	expected	observed	expected	observed	expected
0	2.07	1	2.9	2	6.02	1	6.11	1	4.99
6	1.86	16	9.7	13	7.8	15	7.41	14	9.76
6	2.76	10	10.1	14	9.92	9	9.22	5	9.1
11	5.67	2	4.96	6	8.91	12	8.97	8	4.96
0	4.17	0	1.05	3	5.43	2	5.49	3	1.05
5	4.08	0	0.09	2	2.16	1	2.62	0	0.09
4	3.45	1	0	0	0.6	0	0.9	1	1.05
2	3.21	1	1	0	0.11	0	0.2	0.28	1.02
2	1.68	1	0.9	0	0	0	0		
0	0.93			1		1			

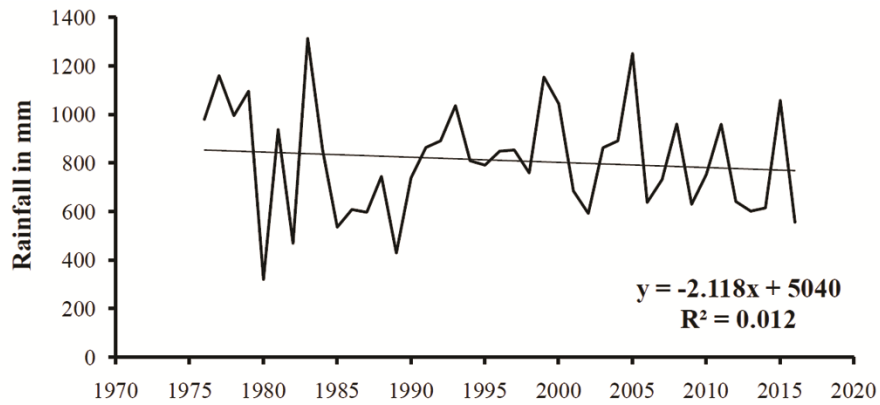


Fig. S1 — Historical maximum rainfall events in Tiruchirappalli city

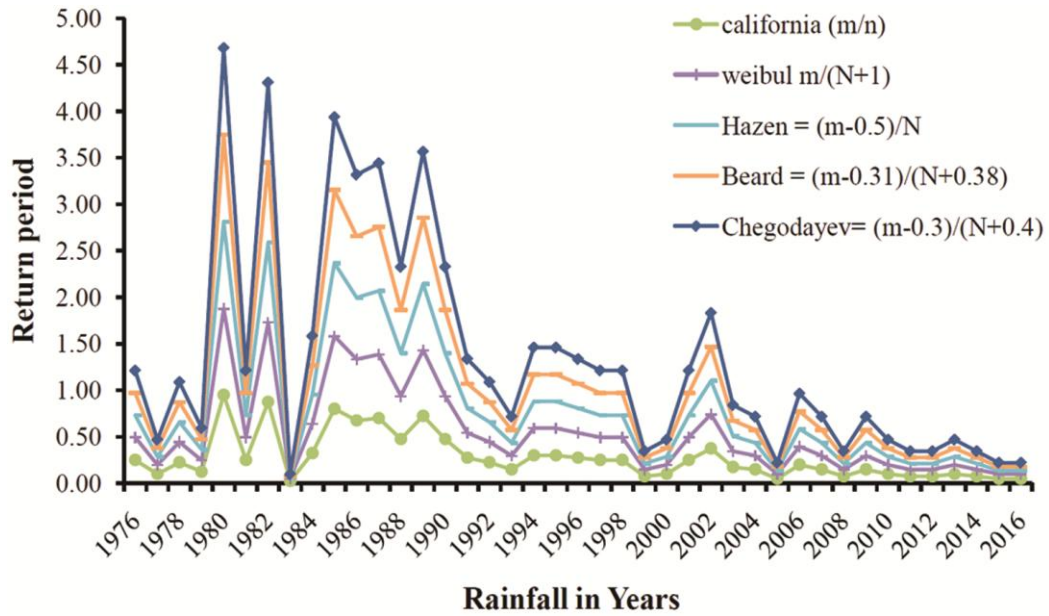
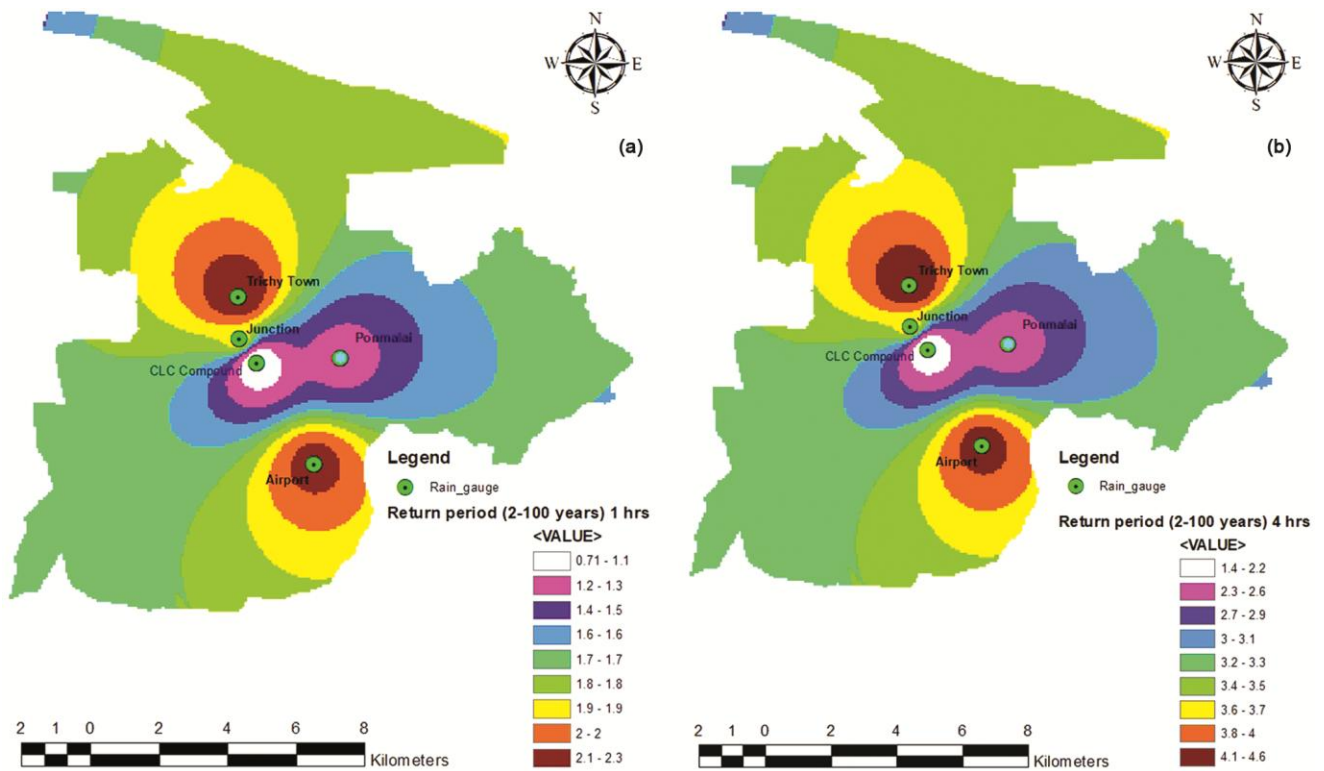
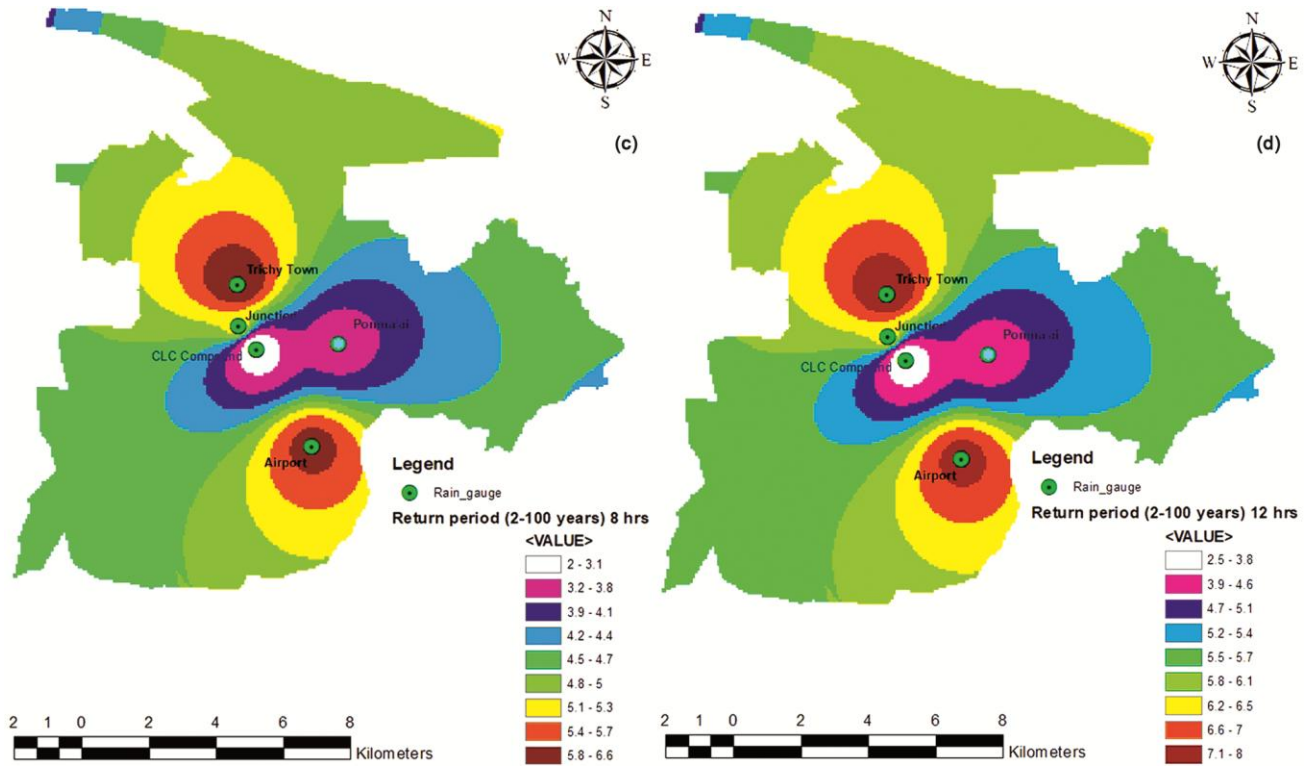


Fig. S2 — Frequency analysis methods





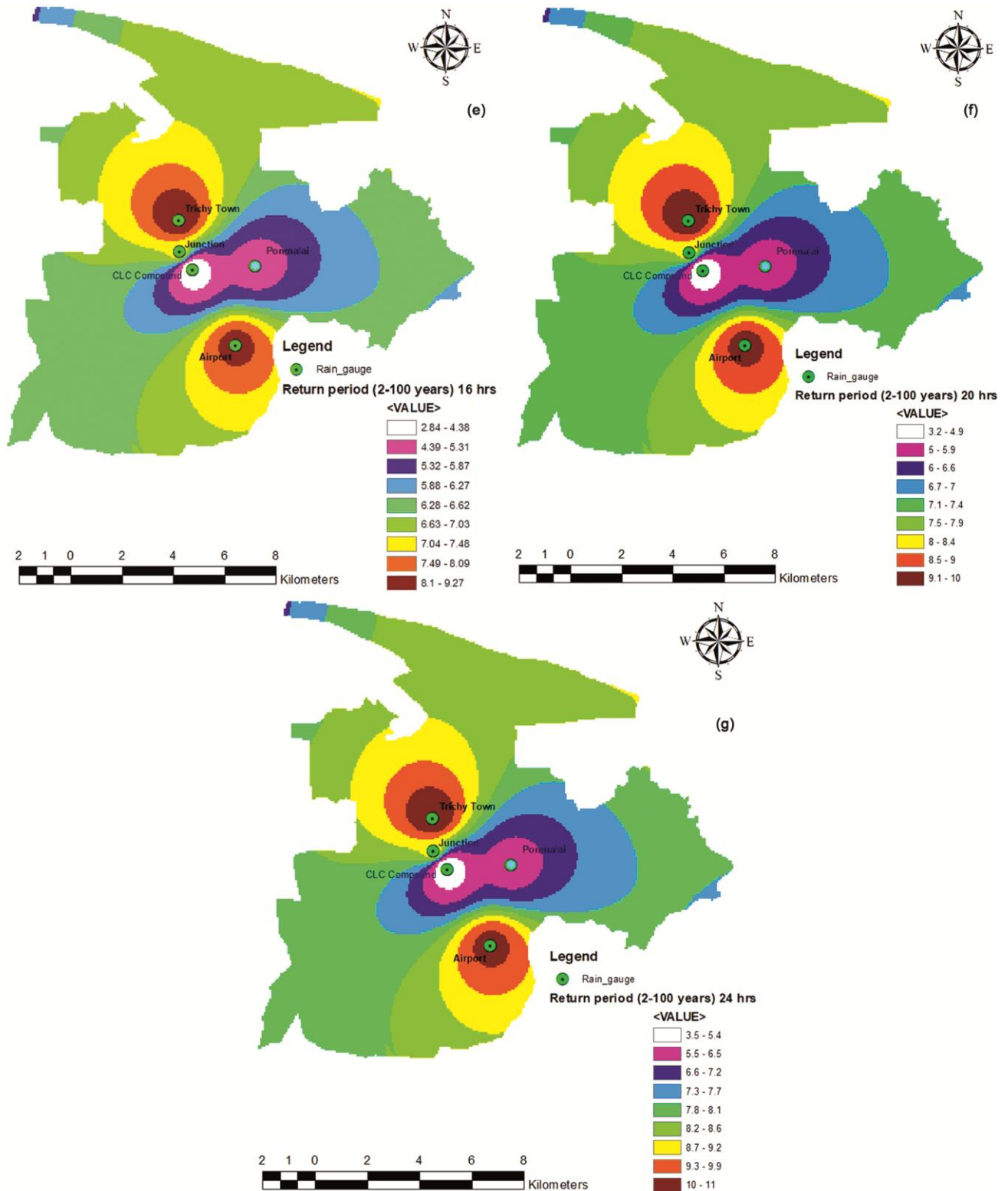


Fig. S3 — Iso-pluvial maps for return periods (2, 5, 10, and 50, 100) for various durations: (A) 1 hour, (B) 4 hours, (C) 8 hours, (D) 12 hours, (E) 16 hours, (F) 20 hours, and (G) 24 hours