Supplementary material 4

Supplementary material 4a: District-wise trends of Local Moran's I value to depict the stability of the hotspots for the Dengue cases reported under IDSP in Punjab between 2012-19

District	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification
Amritsar	0.0316	0.271	NS	0.0098	0.357	NS	-0.05	0.48	NS	0.2022	0.047	L-L	0.43	0.056	NS	0.3572	0.227	NS	0.3548	0.066	NS	-0.3727	0.281	NS
Barnala	-0.043	0.344	NS	-0.0903	0.258	NS	-0.2	0.238	NS	-0.5613	0.06	NS	-0.01	0.364	NS	-0.0097	0.484	NS	-0.0591	0.305	NS	-0.0354	0.253	NS
Bathinda	0.0924	0.166	NS	-0.0052	0.381	NS	0.074	0.129	NS	-0.2572	0.457	NS	0.08	0.368	NS	0.0555	0.329	NS	-0.0327	0.279	NS	-0.0771	0.153	NS
Faridkot	0.0777	0.434	NS	0.0731	0.307	NS	0.065	0.213	NS	0.0094	0.3	NS	-0.1	0.399	NS	-0.0901	0.317	NS	-0.0268	0.414	NS	0.0385	0.499	NS
Fatehgarh Sahib	-0.3475	0.052	NS	-0.2668	0.033	L-H	-0.31	0.124	NS	-0.1786	0.051	NS	-0.66	0.002	L-H	-0.9603	0.01	L-H	-0.6431	0.016	L-H	-0.0954	0.288	NS
Fazilka	0.1013	0.405	NS	0.1962	0.227	NS	0.243	0.303	NS	0.1068	0.478	NS	0.03	0.392	NS	-0.0018	0.421	NS	-0.0787	0.299	NS	-0.8933	0.472	NS
Ferozepur	0.0577	0.182	NS	0.1635	0.092	NS	0.096	0.31	NS	-0.2304	0.071	NS	-0.22	0.197	NS	-0.0872	0.304	NS	0.0328	0.352	NS	0.0241	0.334	NS
Gurdaspur	0.0385	0.355	NS	0.0021	0.354	NS	-0.11	0.217	NS	0.3506	0.128	NS	0.3	0.127	NS	0.3293	0.164	NS	0.3756	0.015	L-L	0.1053	0.416	NS
Hoshiarpur	-0.117	0.146	NS	-0.0144	0.255	NS	-0.36	0.45	NS	0.134	0.066	NS	0.12	0.075	NS	0.2632	0.166	NS	0.2521	0.109	NS	0.257	0.218	NS
Jalandhar	-0.0491	0.287	NS	-0.0226	0.348	NS	0.463	0.042	H-H	0.0096	0.438	NS	0.05	0.299	NS	0.0999	0.228	NS	0.1637	0.054	NS	-0.0396	0.433	NS
Kapurthala	0.0555	0.457	NS	-0.018	0.313	NS	0.015	0.303	NS	0.1223	0.198	NS	0.12	0.103	NS	-0.2638	0.035	H-L	0.1544	0.001	L-L	-0.0808	0.329	NS
Ludhiana	-0.6726	0.063	NS	-0.7647	0.005	H-L	-1.3	0.173	NS	0.0007	0.452	NS	0.01	0.459	NS	0.1226	0.147	NS	0.0538	0.415	NS	0.0061	0.349	NS
Mansa	0.1246	0.294	NS	-0.0396	0.341	NS	0.202	0.214	NS	0.6806	0.096	NS	-0.06	0.245	NS	0.074	0.327	NS	0.2345	0.214	NS	-0.4442	0.17	NS
Moga	-0.0309	0.348	NS	-0.0066	0.42	NS	-0.26	0.119	NS	-0.0547	0.308	NS	0.01	0.471	NS	0.1127	0.335	NS	0.0616	0.34	NS	-0.0132	0.394	NS
Muktsar	0.1007	0.488	NS	0.0858	0.307	NS	0.142	0.28	NS	-0.2276	0.281	NS	0.02	0.471	NS	-0.1106	0.318	NS	-0.0274	0.407	NS	-0.5524	0.087	NS
Pathankot	0.0051	0.191	NS	-0.007	0.234	NS	-0.49	0.125	NS	0.3974	0.208	NS	0.27	0.311	NS	0.3357	0.062	NS	0.44	0.014	L-L	0.8088	0.035	L-L
Patiala	-0.3879	0.099	NS	-1.1762	0.422	NS	-0.31	0.182	NS	0.9048	0.142	NS	3.24	0.009	H-H	2.2743	0.014	H-H	0.5595	0.139	NS	-0.0527	0.235	NS
Rupnagar	-0.4003	0.009	L-H	-0.0833	0.305	NS	-0.41	0.038	L-H	0.1603	0.293	NS	-0	0.497	NS	0.037	0.439	NS	-0.1947	0.057	NS	0.08	0.378	NS
SAS Nagar	-1.4378	0.001	H-L	-0.133	0.096	NS	0.045	0.456	NS	-0.4476	0.115	NS	1.23	0.103	NS	1.1177	0.129	NS	-0.0688	0.055	NS	0.0461	0.272	NS
Sangrur	-0.0326	0.406	NS	-0.47	0.017	L-H	-0.29	0.135	NS	1.0364	0.051	NS	0.75	0.104	NS	0.3985	0.178	NS	0.7373	0.071	NS	-0.4962	0.336	NS
Nawanshahr	-0.0981	0.252	NS	-0.0906	0.285	NS	-0.64	0.005	L-H	-0.0112	0.219	NS	0.21	0.246	NS	0.1159	0.245	NS	0.1606	0.201	NS	-0.2154	0.28	NS
Tarn Taran	0.0698	0.373	NS	0.0812	0.431	NS	0.029	0.393	NS	0.0779	0.463	NS	0.11	0.483	NS	-0.0154	0.445	NS	0.2736	0.242	NS	-0.4955	0.198	NS

NS: Non-significant; L-L: Low-Low; L-H: low-High; H-L: High Low; H-H: High-High

Supplementary material 4b: District wise trends of Local Moran's I value to depict the stability of the hotspots for the Chikungunya cases reported under IDSP in Punjab between 2012-19

	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification	Moran's I	p-value	Classification
Amritsar		0.001	L-L		0.001	L-L	0.0455	0.14	NS		0.001	L-L	0.3306	0.071	NS	0.0729	0.324	NS	0.2008	0.401	NS	-0.1266	0.158	NS
Barnala		0.001	L-L		0.001	L-L	0.0455	0.234	NS		0.001	L-L	-0.0972	0.37	NS	0.0148	0.369	NS	0.1365	0.291	NS	0.1612	0.298	NS
Bathinda		0.001	L-L		0.001	L-L	0.0455	0.234	NS		0.001	L-L	-1.1123	0.161	NS	0.0686	0.36	NS	0.0583	0.311	NS	0.1612	0.298	NS
Faridkot		0.001	L-L		0.001	L-L	0.0455	0.195	NS		0.001	L-L	-0.2704	0.097	NS	0.0513	0.283	NS	0.3876	0.261	NS	0.1612	0.001	L-L
Fatehgarh Sahib		0.001	L-L		0.001	L-L	-0.1545	0.001	L-H		0.001	L-L	-0.2374	0.18	NS	-0.2352	0.047	L-H	0.111	0.375	NS	0.0197	0.5	NS
Fazilka		0.001	L-L		0.001	L-L	0.0455	0.095	NS		0.001	L-L	-0.1681	0.246	NS	0.0729	0.48	NS	-0.1609	0.211	NS	0.1612	0.001	L-L
Ferozepur		0.001	L-L		0.001	L-L	0.0455	0.337	NS		0.001	L-L	-0.3633	0.272	NS	0.0694	0.226	NS	0.0308	0.491	NS	-0.1913	0.111	NS
Gurdaspur		0.001	L-L		0.001	L-L	0.0455	0.195	NS		0.001	L-L	0.1852	0.291	NS	0.0658	0.442	NS	0.2008	0.295	NS	-0.1474	0.19	NS
Hoshiarpur		0.001	L-L		0.001	L-L	-0.1212	0.054	NS		0.001	L-L	-0.0972	0.28	NS	0.043	0.336	NS	-0.1133	0.281	NS	-0.4298	0.001	L-H
Jalandhar		0.001	L-L		0.001	L-L	0.0455	0.287	NS		0.001	L-L	-0.0891	0.473	NS	0.0637	0.432	NS	-0.159	0.19	NS	-0.1549	0.27	NS
Kapurthala		0.001	L-L		0.001	L-L	0.0455	0.337	NS		0.001	L-L	-0.0094	0.482	NS	0.0669	0.377	NS	-0.1076	0.248	NS	0.296	0.335	NS
Ludhiana		0.001	L-L		0.001	L-L	-0.0974	0.04	L-H		0.001	L-L	0.1432	0.245	NS	0.0295	0.47	NS	-0.0684	0.336	NS	-0.169	0.108	NS
Mansa		0.001	L-L		0.001	L-L	0.0455	0.14	NS		0.001	L-L	-0.2099	0.208	NS	-0.024	0.251	NS	0.0936	0.486	NS	0.1612	0.001	L-L
Moga		0.001	L-L		0.001	L-L	0.0455	0.287	NS		0.001	L-L	-0.18	0.117	NS	0.0688	0.274	NS	-0.2215	0.105	NS	-0.1062	0.258	NS
Muktsar		0.001	L-L		0.001	L-L	0.0455	0.195	NS		0.001	L-L	-0.3666	0.125	NS	0.0675	0.457	NS	-0.4326	0.038	L-H	0.1612	0.001	L-L
Pathankot		0.001	L-L		0.001	L-L	0.0455	0.095	NS		0.001	L-L	0.0547	0.414	NS	0.0586	0.212	NS	0.2008	0.438	NS	-0.21	0.29	NS
Patiala		0.001	L-L		0.001	L-L	0.0455	0.14	NS		0.001	L-L	-0.5558	0.422	NS	0.3876	0.15	NS	0.2008	0.402	NS	0.1612	0.001	L-L
Rupnagar		0.001	L-L		0.001	L-L	-0.9545	0.001	H-L		0.001	L-L	0.0809	0.345	NS	0.0651	0.474	NS	0.1066	0.396	NS	-0.5463	0.421	NS
SAS Nagar		0.001	L-L		0.001	L-L	-0.2879	0.001	L-H		0.001	L-L	0.1428	0.109	NS	-0.3437	0.138	NS	0.0511	0.427	NS	-0.0747	0.283	NS
Sangrur		0.001	L-L		0.001	L-L	0.0455	0.222	NS		0.001	L-L	-0.0332	0.345	NS	0.5291	0.231	NS	0.2008	0.221	NS	0.1612	0.314	NS
Nawanshahr		0.001	L-L		0.001	L-L	-0.1545	0.222	NS		0.001	L-L	0.0282	0.492	NS	0.0571	0.488	NS	-0.6824	0.474	NS	-0.4738	0.001	L-H
Tarn Taran		0.001	L-L		0.001	L-L	0.0455	0.138	NS		0.001	L-L	-0.0016	0.399	NS	0.0729	0.327	NS	-0.0403	0.315	NS	-0.1266	0.173	NS

NS: Non-significant; L-L: Low-Low; L-H: low-High; H-L: High Low; H-H: High-High

Supplementary material 4c: District-wise trends of Local Moran's I value to depict the stability of the hotspots for the Malaria (P. *Falciparum*)cases reported under IDSP in Punjab between 2012-19

District	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification
Amritsar	0.0569	0.201	NS	0.0461	0.134	NS	0.0638	0.419	NS	0.0647	0.25	NS		0.001	L-L	0.1315	0.358	NS	0.1361	0.389	NS	0.0495	0.39	NS
Barnala	-0.1761	0.137	NS	-0.163	0.024	L-H	0.0486	0.464	NS	0.0647	0.406	NS		0.001	L-L	0.0846	0.413	NS	0.1361	0.408	NS	0.0381	0.317	NS
Bathinda	0.0413	0.367	NS	0.0442	0.404	NS	-0.1731	0.099	NS	0.0647	0.406	NS		0.001	L-L	-0.0652	0.451	NS	0.1361	0.408	NS	0.0381	0.317	NS
Faridkot	0.0268	0.331	NS	0.0422	0.422	NS	-1.1207	0.001	H-L	0.0647	0.326	NS		0.001	L-L	0.0128	0.347	NS	0.1361	0.493	NS	0.0638	0.407	NS
Fatehgarh Sahib	-0.1887	0.002	L-H	-0.162	0.061	NS	0.0486	0.448	NS	-0.22	0.001	L-H		0.001	L-L	-0.4322	0.417	NS	1.6863	0.054	NS	0.0638	0.299	NS
Fazilka	0.0597	0.324	NS	0.0475	0.499	NS	0.0638	0.284	NS	0.0647	0.175	NS		0.001	L-L	-0.1264	0.107	NS	0.1361	0.292	NS	0.0638	0.343	NS
Ferozepur	0.0552	0.129	NS	0.0478	0.22	NS	-0.1054	0.317	NS	0.0647	0.445	NS		0.001	L-L	-0.14	0.141	NS	0.1361	0.257	NS	0.0574	0.284	NS
Gurdaspur	0.0477	0.325	NS	0.0467	0.249	NS	0.0638	0.485	NS	0.0647	0.326	NS		0.001	L-L	0.1315	0.259	NS	0.1361	0.498	NS	-0.0755	0.047	L-H
Hoshiarpur	0.0399	0.144	NS	0.0458	0.225	NS	0.04	0.338	NS	0.0647	0.477	NS		0.001	L-L	0.1051	0.241	NS	0.0169	0.487	NS	-0.8644	0.286	NS
Jalandhar	0.0545	0.196	NS	0.045	0.405	NS	0.0273	0.274	NS	0.0647	0.477	NS		0.001	L-L	0.0821	0.158	NS	0.1361	0.333	NS	-0.0391	0.148	NS
Kapurthala	0.056	0.088	NS	0.0475	0.305	NS	0.0434	0.424	NS	0.0647	0.445	NS		0.001	L-L	0.1245	0.107	NS	0.1361	0.257	NS	-0.1184	0.115	NS
Ludhiana	-0.0824	0.282	NS	-0.0804	0.243	NS	-0.0084	0.428	NS	0.0647	0.445	NS		0.001	L-L	0.0161	0.453	NS	-0.1689	0.101	NS	0.0574	0.266	NS
Mansa	-0.3289	0.062	NS	-0.272	0.069	NS	0.0638	0.38	NS	0.0647	0.25	NS		0.001	L-L	0.0534	0.39	NS	0.1361	0.399	NS	-0.065	0.001	H-L
Moga	0.05	0.484	NS	0.0461	0.351	NS	-0.1463	0.079	NS	0.0647	0.477	NS		0.001	L-L	0.0842	0.394	NS	0.1361	0.333	NS	0.0563	0.449	NS
Muktsar	0.0485	0.398	NS	0.0436	0.487	NS	-0.2323	0.067	NS	0.0647	0.326	NS		0.001	L-L	0.2733	0.035	H-H	0.1361	0.498	NS	0.0638	0.405	NS
Pathankot	0.0467	0.375	NS	0.0476	0.442	NS	0.0638	0.271	NS	0.0647	0.175	NS		0.001	L-L	0.1315	0.491	NS	0.1361	0.292	NS	-0.5514	0.009	L-H
Patiala	-0.1825	0.02	L-H	-0.2996	0.093	NS	0.0638	0.38	NS	0.2862	0.052	NS		0.001	L-L	-0.085	0.19	NS	-0.6236	0.001	L-H	0.0638	0.486	NS
Rupnagar	0.0383	0.311	NS	0.0454	0.274	NS	0.02	0.229	NS	0.0159	0.224	NS		0.001	L-L	0.0003	0.38	NS	1.3602	0.051	NS	-0.1736	0.132	NS
SAS Nagar	0.0159	0.256	NS	0.0473	0.001	L-L	0.0638	0.38	NS	0.91	0.129	NS		0.001	L-L	-0.1214	0.162	NS	3.0586	0.001	H-H	0.0638	0.486	NS
Sangrur	-0.9429	0.396	NS	-0.9367	0.196	NS	0.0486	0.448	NS	-0.1712	0.037	L-H		0.001	L-L	0.0016	0.388	NS	-0.1479	0.291	NS	0.0381	0.322	NS
Nawanshahr	0.0515	0.407	NS	0.0413	0.387	NS	-0.0601	0.401	NS	0.0647	0.421	NS		0.001	L-L	0.0998	0.311	NS	-0.0069	0.491	NS	-0.1827	0.069	NS
Tarn Taran	0.0597	0.163	NS	0.0485	0.233	NS	0.0638	0.368	NS	0.0647	0.255	NS		0.001	L-L	0.1315	0.334	NS	0.1361	0.401	NS	0.0638	0.486	NS

NS: Non-significant; L-L: Low-Low; L-H: low-High; H-L: High Low; H-H: High-High

Supplementary material 4d: District-wise trends of Local Moran's I value to depict the stability of the hotspots for the Malaria *(P. Vivax)* cases reported under IDSP in Punjab between 2012-19

District	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	2019 Classification
Amritsar	0.3747	0.085	NS	0.2752	0.111	NS	0.1709	0.111	NS	0.1827	0.204	NS	0.3114	0.076	NS	0.2592	0.087	NS	0.1634	0.173	NS	0.2767	0.087	NS
Barnala	-0.342	0.126	NS	-0.4121	0.033	L-H	-0.0711	0.023	L-H	-0.1642	0.068	NS	-0.2876	0.023	L-H	-0.1957	0.057	NS	-0.4379	0.071	NS	-0.4864	0.037	L-H
Bathinda	-0.4936	0.002	L-H	0.4448	0.001	H-H	2.2373	0.001	H-H	0.7067	0.024	H-H	1.0893	0.029	H-H	0.585	0.093	NS	0.5971	0.028	H-H	1.2219	0.062	NS
Faridkot	1.4894	0.039	H-H	0.697	0.171	NS	0.9415	0.068	NS	0.1794	0.24	NS	0.1418	0.301	NS	0.0084	0.307	NS	0.0383	0.252	NS	0.1964	0.245	NS
Fatehgarh Sahib	0.0758	0.413	NS	0.1068	0.36	NS	0.2257	0.263	NS	-0.0781	0.387	NS	-0.0708	0.368	NS	0.0327	0.451	NS	-0.0047	0.381	NS	0.1298	0.346	NS
Fazilka	-0.6304	0.144	NS	-0.438	0.138	NS	-0.3406	0.266	NS	-0.0418	0.391	NS	0.0636	0.464	NS	-0.0478	0.399	NS	-0.0057	0.357	NS	-0.0071	0.444	NS
Ferozepur	0.1397	0.081	NS	-0.029	0.319	NS	-0.0335	0.41	NS	-0.0483	0.359	NS	0.0432	0.37	NS	0.0111	0.278	NS	0.0446	0.428	NS	0.0496	0.302	NS
Gurdaspur	0.4279	0.029	L-L	0.3355	0.019	L-L	0.3482	0.075	NS	0.4235	0.032	L-L	0.3635	0.058	NS	0.1981	0.25	NS	0.3048	0.036	L-L	0.1142	0.337	NS
Hoshiarpur	0.3367	0.004	L-L	0.2873	0.004	L-L	0.2884	0.002	L-L	0.2959	0.001	L-L	0.0425	0.001	L-L	-0.3581	0.001	H-L	0.2415	0.01	L-L	-0.2965	0.023	H-L
Jalandhar	0.0545	0.33	NS	0.1434	0.231	NS	0.2044	0.197	NS	0.1787	0.133	NS	0.1798	0.124	NS	0.1691	0.196	NS	0.1764	0.055	NS	0.1678	0.187	NS
Kapurthala	0.2674	0.072	NS	0.2681	0.02	L-L	0.3357	0.038	L-L	0.2407	0.101	NS	0.3384	0.058	NS	0.1876	0.11	NS	0.2322	0.065	NS	0.189	0.116	NS
Ludhiana	0.071	0.232	NS	0.0034	0.115	NS	0.0364	0.159	NS	0.0294	0.022	L-L	-0.0076	0.037	H-L	0.1639	0.008	L-L	0.1139	0.018	L-L	0.2241	0.007	L-L
Mansa	-0.4292	0.438	NS	-0.2804	0.332	NS	1.6818	0.052	NS	0.5414	0.182	NS	1.3573	0.055	NS	0.6592	0.117	NS	-0.1817	0.273	NS	1.4381	0.098	NS
Moga	0.178	0.183	NS	0.0126	0.372	NS	0.0783	0.172	NS	-0.1511	0.223	NS	-0.1733	0.19	NS	0.0029	0.443	NS	-0.0024	0.412	NS	-0.089	0.363	NS
Muktsar	0.7755	0.09	NS	0.4134	0.228	NS	0.6971	0.114	NS	-0.0885	0.156	NS	-0.2188	0.093	NS	-0.0805	0.216	NS	0.0785	0.224	NS	0.0839	0.108	NS
Pathankot	0.4304	0.136	NS	0.334	0.143	NS	0.3814	0.185	NS	0.4615	0.126	NS	0.2888	0.367	NS	0.0306	0.413	NS	0.2844	0.09	NS	-0.0374	0.288	NS
Patiala	0.0063	0.446	NS	0.0463	0.462	NS	0.1634	0.355	NS	-0.1939	0.469	NS	-0.0146	0.337	NS	-0.0111	0.338	NS	0.0007	0.336	NS	0.05	0.436	NS
Rupnagar	0.2654	0.125	NS	0.2079	0.199	NS	0.2753	0.173	NS	0.2233	0.216	NS	0.0515	0.449	NS	0.0107	0.415	NS	0.084	0.433	NS	0.0449	0.467	NS
SAS Nagar	-0.0844	0.205	NS	0.0141	0.156	NS	0.0955	0.058	NS	-0.0554	0.47	NS	-0.6187	0.121	NS	-0.4839	0.167	NS	-0.2138	0.418	NS	-0.2882	0.137	NS
Sangrur	0.0412	0.362	NS	-0.0324	0.164	NS	-0.065	0.207	NS	-0.1374	0.068	NS	0.0371	0.139	NS	-0.0837	0.2	NS	-0.1673	0.166	NS	-0.0593	0.271	NS
Nawanshahr	0.3313	0.075	NS	0.261	0.081	NS	0.2926	0.08	NS	0.3521	0.058	NS	0.2744	0.145	NS	0.204	0.206	NS	0.1491	0.053	NS	0.1706	0.252	NS
Tarn Taran	0.1501	0.337	NS	0.1436	0.168	NS	0.1601	0.217	NS	-0.0203	0.411	NS	0.1635	0.12	NS	0.1029	0.217	NS	0.0544	0.202	NS	0.2622	0.206	NS

NS: Non-significant; L-L: Low-Low; L-H: low-High; H-L: High Low; H-H: High-High

Supplementary material 4e: District-wise trends of Local Moran's I value to depict the stability of the hotspots for the Enteric Fever cases reported under IDSP in Punjab between 2012-19

District	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification	Moran's I	p_value	Classification
Amritsar	-0.0611	0.349	NS	-0.0347	0.338	NS	-0.0456	0.256	NS	0.0308	0.496	NS	-0.0299	0.471	NS	0.0042	0.466	NS	-0.0005	0.477	NS	-0.2654	0.328	NS
Barnala	-0.3078	0.183	NS	-0.3834	0.145	NS	-0.1485	0.381	NS	-0.1663	0.381	NS	-0.0191	0.467	NS	0.1899	0.313	NS	-0.0058	0.482	NS	-0.4974	0.241	NS
Bathinda	0.0602	0.118	NS	0.0006	0.12	NS	-0.0504	0.132	NS	-0.4304	0.048	H-L	0.239	0.152	NS	0.5044	0.108	NS	0.2225	0.269	NS	0.2977	0.225	NS
Faridkot	-0.1559	0.304	NS	0.0287	0.463	NS	-0.1851	0.353	NS	-0.1595	0.363	NS	0.0501	0.348	NS	0.3209	0.153	NS	0.2074	0.186	NS	-0.0333	0.495	NS
Fatehgarh Sahib	-0.2379	0.23	NS	-0.1049	0.231	NS	-0.0003	0.471	NS	-0.0162	0.491	NS	-0.0045	0.421	NS	-0.0236	0.398	NS	-0.0869	0.298	NS	-0.0258	0.19	NS
Fazilka	-0.7206	0.197	NS	0.1447	0.47	NS	-0.2127	0.364	NS	-0.0244	0.455	NS	0.1457	0.307	NS	-0.1528	0.349	NS	0.0398	0.404	NS	0.4038	0.122	NS
Ferozepur	-0.1272	0.438	NS	0.0263	0.374	NS	0.157	0.246	NS	0.1879	0.178	NS	0.3802	0.049	H-H	-0.0931	0.07	NS	-0.5949	0.036	L-H	0.3242	0.036	H-H
Gurdaspur	-0.0631	0.437	NS	-0.0038	0.437	NS	0.0313	0.388	NS	0.0201	0.462	NS	-0.0753	0.417	NS	-0.0094	0.46	NS	0.0198	0.494	NS	0.0632	0.417	NS
Hoshiarpur	-0.0074	0.36	NS	0.0743	0.166	NS	-0.025	0.089	NS	-0.1885	0.185	NS	-0.1299	0.139	NS	-0.0319	0.389	NS	-0.088	0.346	NS	-0.1937	0.31	NS
Jalandhar	0.5394	0.131	NS	0.5131	0.183	NS	1.0773	0.03	H-H	0.6072	0.099	NS	0.5592	0.12	NS	-0.1228	0.476	NS	-0.3019	0.381	NS	0.4791	0.147	NS
Kapurthala	0.3163	0.097	NS	0.2686	0.146	NS	0.6523	0.062	NS	0.2255	0.247	NS	0.0844	0.313	NS	-0.115	0.455	NS	-0.3651	0.243	NS	-0.4154	0.316	NS
Ludhiana	-0.0541	0.222	NS	-0.104	0.067	NS	-0.178	0.173	NS	-0.0806	0.246	NS	-0.0542	0.34	NS	0.0217	0.42	NS	0.0022	0.442	NS	0.0677	0.361	NS
Mansa	-0.2235	0.15	NS	-0.213	0.17	NS	-0.0217	0.406	NS	-0.0203	0.414	NS	-0.1448	0.381	NS	-0.0229	0.319	NS	-0.0952	0.357	NS	-0.1235	0.305	NS
Moga	-0.0399	0.2	NS	0.0239	0.278	NS	0.0827	0.259	NS	0.024	0.194	NS	-0.0788	0.318	NS	0.1865	0.174	NS	0.2833	0.119	NS	0.0065	0.455	NS
Muktsar	-0.0385	0.453	NS	0.1851	0.22	NS	0.1337	0.308	NS	-0.1593	0.31	NS	-0.1107	0.288	NS	0.0184	0.292	NS	0.0819	0.371	NS	-0.2154	0.355	NS
Pathankot	-0.2099	0.324	NS	-0.1836	0.259	NS	-0.1637	0.406	NS	0.2781	0.289	NS	0.1688	0.253	NS	0.0567	0.408	NS	0.1519	0.217	NS	0.1919	0.099	NS
Patiala	0.1645	0.189	NS	0.1551	0.157	NS	0.131	0.325	NS	0.1769	0.271	NS	0.0138	0.261	NS	0.0721	0.351	NS	0.07	0.361	NS	0.111	0.292	NS
Rupnagar	0.2574	0.157	NS	0.1259	0.327	NS	0.2063	0.233	NS	0.1783	0.317	NS	0.2233	0.29	NS	0.3176	0.195	NS	0.1851	0.145	NS	0.1416	0.215	NS
SAS Nagar	0.1834	0.277	NS	0.1208	0.411	NS	-0.0177	0.466	NS	-0.0021	0.441	NS	0.0342	0.317	NS	-0.0296	0.426	NS	0.0342	0.447	NS	0.0337	0.461	NS
Sangrur	-0.9617	0.275	NS	-0.7856	0.36	NS	-0.1892	0.42	NS	-0.0774	0.446	NS	-0.2173	0.414	NS	-0.0446	0.464	NS	-0.1695	0.479	NS	0.093	0.342	NS
Nawanshahr	-0.1306	0.238	NS	-0.1404	0.064	NS	-0.0547	0.076	NS	-0.0669	0.127	NS	-0.1719	0.069	NS	-0.0445	0.318	NS	-0.0819	0.25	NS	-0.5018	0.061	NS
Tarn Taran	-0.5193	0.07	NS	-0.2586	0.269	NS	-0.897	0.1	NS	-0.6831	0.189	NS	-0.671	0.153	NS	-0.0646	0.415	NS	0.0455	0.444	NS	-0.1268	0.186	NS

Supplementary material 4f: District-wise trends of Local Moran's I value to depict the stability of the hotspots for the Malaria *(P. Vivax)*cases reported under IDSP in Punjab between 2012-19

District	2012			2013			2014			2015			2016			2017			2018			2019		
	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification	Moran's I	p value	Classification
Amritsar	-0.1644	0.247	NS	-0.5694	0.16	NS	-0.356	0.179	NS	-0.5323	0.143	NS	-0.4409	0.302	NS	-0.2015	0.353	NS	-0.0615	0.384	NS	-0.3494	0.283	NS
Barnala	0.0189	0.367	NS	-0.0009	0.464	NS	-0.0585	0.39	NS	-0.0461	0.461	NS	0.0044	0.269	NS	-0.0168	0.353	NS	-0.0808	0.15	NS	-0.0502	0.171	NS
Bathinda	0.3199	0.138	NS	0.2783	0.156	NS	0.3907	0.143	NS	0.3676	0.199	NS	0.5432	0.076	NS	0.2328	0.214	NS	-0.0271	0.184	NS	0.0155	0.206	NS
Faridkot	-0.12	0.355	NS	0.1011	0.323	NS	0.1326	0.287	NS	0.4257	0.108	NS	0.4544	0.058	NS	0.3134	0.165	NS	0.0716	0.389	NS	0.04	0.43	NS
Fatehgarh Sahib	-0.1755	0.239	NS	-0.2189	0.21	NS	0.0117	0.159	NS	-0.0728	0.154	NS	0.0066	0.455	NS	-0.0834	0.453	NS	-0.2132	0.223	NS	-0.0759	0.351	NS
Fazilka	-1.6419	0.073	NS	-0.6972	0.318	NS	-0.5958	0.306	NS	0.1707	0.335	NS	-0.5609	0.332	NS	-0.0349	0.43	NS	-0.0971	0.385	NS	-0.0372	0.322	NS
Ferozepur	-0.6272	0.33	NS	-0.1467	0.426	NS	-0.2782	0.315	NS	0.0067	0.448	NS	0.1223	0.21	NS	-0.0303	0.182	NS	0.0055	0.285	NS	0.1348	0.094	NS
Gurdaspur	-0.0759	0.485	NS	-0.0952	0.395	NS	-0.0804	0.461	NS	0.0366	0.338	NS	-0.0899	0.233	NS	-0.0378	0.292	NS	0.0108	0.44	NS	-0.0236	0.446	NS
Hoshiarpur	0.0217	0.414	NS	0.0073	0.461	NS	0.0113	0.452	NS	-0.0063	0.454	NS	0.1752	0.273	NS	0.0642	0.335	NS	0.0145	0.493	NS	-0.0556	0.35	NS
Jalandhar	0.6139	0.063	NS	0.4676	0.122	NS	0.3699	0.141	NS	0.3619	0.137	NS	0.4619	0.128	NS	0.1426	0.316	NS	-0.0738	0.479	NS	0.2381	0.24	NS
Kapurthala	0.4943	0.024	H-H	0.512	0.035	H-H	0.4655	0.069	NS	0.1572	0.286	NS	0.1994	0.272	NS	0.0664	0.36	NS	-0.1728	0.382	NS	-0.3293	0.389	NS
Ludhiana	0.0023	0.496	NS	-0.0163	0.493	NS	-0.0638	0.301	NS	-0.0051	0.469	NS	0.0306	0.38	NS	-0.0385	0.421	NS	-0.0122	0.273	NS	0.0591	0.268	NS
Mansa	-0.0042	0.429	NS	0.0285	0.339	NS	-0.2669	0.205	NS	0.0164	0.358	NS	-0.0157	0.472	NS	0.0927	0.183	NS	-0.5879	0.067	NS	-0.4608	0.077	NS
Moga	-0.1968	0.179	NS	-0.1423	0.352	NS	-0.1459	0.354	NS	0.0133	0.458	NS	0.0739	0.343	NS	0.082	0.334	NS	-0.0379	0.428	NS	-0.1261	0.259	NS
Muktsar	0.0535	0.435	NS	0.2269	0.173	NS	0.2353	0.16	NS	0.556	0.112	NS	-0.0405	0.475	NS	-0.0063	0.367	NS	-0.0432	0.295	NS	-0.1162	0.269	NS
Pathankot	-1.1491	0.156	NS	-1.3142	0.17	NS	-1.1733	0.176	NS	-0.5787	0.236	NS	-0.0778	0.347	NS	-0.0203	0.392	NS	0.1077	0.416	NS	0.0943	0.295	NS
Patiala	0.2913	0.238	NS	0.6325	0.177	NS	1.023	0.044	H-H	1.1892	0.078	NS	0.013	0.154	NS	-0.8402	0.08	NS	-1.0868	0.064	NS	-1.0989	0.092	NS
Rupnagar	0.0373	0.453	NS	0.0126	0.425	NS	-0.2516	0.353	NS	-0.1738	0.455	NS	-0.3237	0.362	NS	0.0238	0.432	NS	0.2315	0.302	NS	0.2383	0.282	NS
SAS Nagar	0.0084	0.394	NS	-0.0334	0.44	NS	-0.0198	0.486	NS	0.0296	0.432	NS	-0.8159	0.121	NS	-1.1411	0.001	H-L	-0.5351	0.004	H-L	-0.1585	0.006	H-L
Sangrur	0.0385	0.377	NS	0.2011	0.313	NS	0.2941	0.253	NS	0.4938	0.125	NS	-0.167	0.403	NS	-1.1621	0.155	NS	-1.5969	0.117	NS	-1.2327	0.16	NS
Nawanshahr	-0.178	0.175	NS	-0.1682	0.161	NS	-0.0086	0.258	NS	-0.232	0.185	NS	-0.0268	0.164	NS	-0.0461	0.267	NS	-0.006	0.439	NS	-0.2477	0.189	NS
Tarn Taran	-0.4095	0.053	NS	0.1299	0.174	NS	-0.1733	0.143	NS	-0.1858	0.209	NS	-0.2234	0.238	NS	-0.0816	0.362	NS	-0.0727	0.352	NS	-0.1517	0.25	NS

*NS: Non-significant; L-L: Low-Low; L-H: low-High; H-L: High Low; H-H: High-High