

Supplementary Information

This appendix provides additional information on the data, methods, and robustness analyses supporting the results presented in the main manuscript. The material is organised into thematic supplementary notes that expand on key methodological components and sensitivity analyses.

Content:

Supplementary Note 1 | Composite risk results for baseline scenario

Supplementary Note 2 | Extended list of Vulnerability and Coping Capacity indicators

Supplementary Note 3 | Sensitivity analysis: weighting schemes, Spearman correlations, and top-decile rankings

Supplementary Note 4 | Sensitivity analysis: CDD thresholds

Supplementary Note 5 | Dominant heat risk components

Supplementary Note 6 | Spearman correlations of risk components

Supplementary Note 1 | Composite risk results for baseline scenario

Table S1.1 Ranking under the baseline specification (equal weighting across indicators and dimensions), in descending order.

City Name	Country Name	Total Population	Normalised Hazard Score	Normalised Vulnerability Score	Normalised LCA Score	Composite Risk score
Al Basrah	Iraq	1114933	0.96	0.83	0.73	0.83
Ahmadabad	India	6721469	0.89	0.57	0.79	0.79
Bamako	Mali	3807302	0.90	0.90	0.71	0.78
Nagpur	India	2350840	0.86	0.54	0.71	0.76
Quezon City	Philippines	17060195	0.87	0.73	0.55	0.70
Baghdad	Iraq	3638813	0.84	0.56	0.70	0.70
Madurai	India	1316792	0.99	0.72	0.67	0.73
Faisalabad	Pakistan	3770671	0.77	0.69	0.89	0.78
Lagos	Nigeria	12025166	0.91	0.80	0.57	0.76
Hyderabad	Pakistan	1366633	0.86	0.72	0.97	0.79
Barranquilla	Colombia	2043439	0.91	0.63	0.64	0.78
Ibadan	Nigeria	3003695	0.91	0.88	0.53	0.73
Port Harcourt	Nigeria	1004315	0.90	0.79	0.53	0.74
Conakry	Guinea	1369142	0.88	0.83	0.77	0.77
Bhopal	India	1457813	0.75	0.66	0.65	0.75
Ho Chi Minh City	Vietnam	12102505	1.00	0.66	0.57	0.70
Kaduna	Nigeria	1101425	0.76	0.95	0.63	0.74
Bandung	Indonesia	5640818	0.77	0.73	0.50	0.71
Port-au-Prince	Haiti	2756073	0.86	0.51	0.62	0.65
Kanpur	India	2949817	0.77	0.67	0.69	0.67
Luanda	Angola	12045280	0.85	0.81	0.58	0.72
Cairo	Egypt	18359205	0.68	0.51	0.76	0.69
Pune	India	6560440	0.74	0.62	0.66	0.66
Kinshasa	Congo, DRC	6394123	0.84	0.84	0.45	0.67
Manila	Philippines	17060195	0.87	0.73	0.55	0.69
Patna	India	1658600	0.75	0.77	0.72	0.73
Manaus	Brazil	2118792	0.96	0.52	0.39	0.66
Lahore	Pakistan	8440497	0.74	0.63	0.80	0.65
Abidjan	Cote d'Ivoire	4436144	0.84	0.68	0.58	0.71
Rawalpindi	Pakistan	2498182	0.59	0.64	0.87	0.69
Hyderabad	India	7781013	0.76	0.56	0.71	0.68
Accra	Ghana	5139757	0.77	0.65	0.76	0.70
Bangalore	India	10906703	0.64	0.65	0.68	0.69
Hanoi	Vietnam	3410323	0.75	0.63	0.58	0.65
Kolkata	India	14035780	0.82	0.64	0.59	0.66
Jaipur	India	3242035	0.78	0.62	0.77	0.70
Palembang	Indonesia	1321557	0.93	0.71	0.40	0.68
Bangkok	Thailand	16696153	0.98	0.38	0.52	0.61

Benin City	Nigeria	1003445	0.93	0.84	0.50	0.65
Dar es Salaam	Tanzania	4692228	0.74	0.73	0.54	0.70
Lucknow	India	3307272	0.73	0.68	0.70	0.68
Phnom Penh	Cambodia	2201647	0.98	0.66	0.69	0.73
Surabaya	Indonesia	4914370	0.94	0.71	0.49	0.72
Guayaquil	Ecuador	1644302	0.79	0.73	0.47	0.67
Mumbai	India	15544429	0.73	0.53	0.60	0.63
Goiania	Brazil	1771384	0.74	0.53	0.54	0.61
Merida	Mexico	1071416	0.89	0.39	0.54	0.58
Maputo	Mozambique	2034919	0.58	0.76	0.51	0.59
Chennai	India	9242295	0.79	0.64	0.62	0.64
Dhaka	Bangladesh	12269507	0.79	0.58	0.52	0.65
Kuala Lumpur	Malaysia	8001533	0.97	0.46	0.34	0.57
Lima	Peru	8253823	0.56	0.58	0.80	0.58
Amman	Jordan	3563859	0.56	0.54	0.83	0.64
Cali	Colombia	1762303	0.63	0.61	0.60	0.63
Khartoum	Sudan	1199197	0.96	0.64	0.66	0.67
San Luis Potosi	Mexico	1153602	0.54	0.46	0.71	0.65
Da Nang	Vietnam	1032940	0.58	0.78	0.55	0.59
Delhi	India	27905716	0.74	0.47	0.72	0.63
Medan	Indonesia	2909227	0.96	0.73	0.38	0.64
Maracaibo	Venezuela	1727552	0.92	0.54	0.89	0.70
Peshawar	Pakistan	1629493	0.64	0.67	0.88	0.74
Semarang	Indonesia	1368742	0.88	0.73	0.41	0.68
Rangoon	Myanmar	3313760	0.94	0.40	0.39	0.58
Yaounde	Cameroon	2711427	0.75	0.84	0.61	0.62
Kano	Nigeria	3342952	0.84	1.00	0.68	0.78
Belo Horizonte	Brazil	4092640	0.57	0.57	0.51	0.68
Fortaleza	Brazil	3041081	0.67	0.42	0.54	0.54
Chittagong	Bangladesh	1955979	0.75	0.44	0.35	0.51
Samut Prakan	Thailand	16696153	0.98	0.38	0.52	0.53
Jakarta	Indonesia	28809600	0.94	0.53	0.47	0.60
Sanaa	Yemen	1312904	0.54	0.60	1.00	0.65
Jeddah	Saudi Arabia	1197779	0.92	0.17	0.73	0.58
Queretaro	Mexico	1132794	0.54	0.29	0.64	0.47
Karachi	Pakistan	13249870	0.71	0.68	1.00	0.60
Phoenix	United States	4363441	0.84	0.14	0.63	0.58
Rabat	Morocco	1352835	0.48	0.55	0.61	0.48
Sao Paulo	Brazil	19581749	0.52	0.44	0.51	0.52
Puebla	Mexico	2213473	0.49	0.40	0.63	0.50
T'aichung	China	3367273	0.65	0.34	0.62	0.51
Guadalajara	Mexico	4912429	0.65	0.36	0.64	0.53
Kathmandu	Nepal	5663987	0.45	0.46	0.63	0.52
Guatemala	Guatemala	1938799	0.53	0.62	0.58	0.54
Rio de Janeiro	Brazil	8722166	0.64	0.48	0.43	0.54
Fuzhou	China	2962443	0.54	0.44	0.45	0.49

Antananarivo	Madagascar	1011415	0.44	0.73	0.61	0.53
Nairobi	Kenya	4070964	0.50	0.63	0.57	0.57
Kampala	Uganda	2769056	0.59	0.83	0.53	0.60
Brasilia	Brazil	1963307	0.61	0.41	0.52	0.57
Recife	Brazil	2701475	0.61	0.53	0.42	0.51
Casablanca	Morocco	3605674	0.45	0.53	0.66	0.53
Kumasi	Ghana	3659999	0.87	0.81	0.71	0.65
Chongqing	China	4381696	0.48	0.41	0.47	0.60
Changsha	China	3669366	0.50	0.42	0.50	0.46
Mexico City	Mexico	19067976	0.49	0.34	0.63	0.47
Luoyang	China	1688094	0.43	0.49	0.52	0.48
Guangzhou	China	55244118	0.63	0.21	0.41	0.43
Singapore	Singapore	4229092	0.72	0.20	0.37	0.38
Algiers	Algeria	3513892	0.44	0.43	0.48	0.41
Mashhad	Iran	1149813	0.43	0.46	0.62	0.47
Johannesburg	South Africa	13437744	0.44	0.25	0.55	0.44
Riyadh	Saudi Arabia	2204791	0.87	0.05	0.73	0.35
Santiago	Chile	6340178	0.47	0.39	0.61	0.39
Kaoshiung	China	3348968	0.66	0.40	0.60	0.51
Monterrey	Mexico	5001169	0.67	0.15	0.58	0.46
Taipei	China	8070593	0.60	0.31	0.37	0.40
Alexandria	Egypt	4183620	0.41	0.47	0.75	0.47
Tehran	Iran	7210710	0.44	0.30	0.62	0.48
Lanzhou	China	2484689	0.26	0.49	0.68	0.44
Az Zarqa'	Jordan	3563859	0.56	0.54	0.83	0.53
Toluca	Mexico	1195106	0.46	0.37	0.61	0.55
Tashkent	Uzbekistan	1322935	0.43	0.32	0.60	0.45
Caracas	Venezuela	1706185	0.63	0.47	0.51	0.48
Tunis	Tunisia	2249912	0.43	0.38	0.61	0.50
Chengdu	China	10522528	0.46	0.33	0.49	0.44
San Antonio	United States	2055273	0.63	0.20	0.41	0.40
Bogota	Colombia	8491211	0.36	0.52	0.66	0.43
Nanjing	China	6324426	0.41	0.34	0.48	0.45
Quito	Ecuador	1898595	0.37	0.60	0.47	0.44
Curitiba	Brazil	2277126	0.45	0.43	0.49	0.46
Porto Alegre	Brazil	3207469	0.47	0.37	0.36	0.42
Shijiazhuang	China	3869698	0.39	0.31	0.57	0.40
Zhengzhou	China	7199169	0.43	0.43	0.54	0.44
Hefei	China	4515635	0.44	0.48	0.52	0.47
Jinan	China	4616177	0.37	0.32	0.51	0.43
Nanning	China	2796135	0.62	0.42	0.47	0.44
Beijing	China	25264895	0.36	0.28	0.50	0.43
Taiyuan	China	4705479	0.29	0.38	0.62	0.39
Los Angeles	United States	16705268	0.57	0.12	0.48	0.36
Salvador	Brazil	2837244	0.44	0.49	0.30	0.36
Yinchuan	China	1796753	0.29	0.48	0.64	0.42

Guiyang	China	2776807	0.32	0.53	0.43	0.43
Hangzhou	China	7089984	0.47	0.36	0.46	0.42
Xi'an	China	6881464	0.38	0.32	0.55	0.42
Kunming	China	3583588	0.32	0.43	0.53	0.41
Urumqi	China	4192058	0.24	0.54	0.69	0.43
Shanghai	China	29717596	0.41	0.29	0.51	0.42
Bucharest	Romania	2043133	0.34	0.39	0.46	0.39
Baku	Azerbaijan	1926800	0.34	0.24	0.60	0.38
Wuhan	China	4200401	0.46	0.33	0.53	0.40
Rostov-on-Don	Russia	1003388	0.24	0.42	0.42	0.39
Sendai	Japan	1098948	0.28	0.33	0.61	0.37
Durban	South Africa	3088105	0.47	0.41	0.25	0.37
Buenos Aires	Argentina	13212490	0.34	0.46	0.50	0.39
Pretoria	South Africa	13437744	0.44	0.25	0.55	0.41
Izmir	Turkey	2307217	0.39	0.42	0.60	0.42
Tangshan	China	2501860	0.34	0.34	0.58	0.43
Baotou	China	2302683	0.23	0.44	0.67	0.41
Osaka	Japan	11460335	0.39	0.27	0.54	0.40
Istanbul	Turkey	9089216	0.32	0.37	0.53	0.39
Kwangju	South Korea	1213516	0.31	0.34	0.42	0.37
Montevideo	Uruguay	1146035	0.26	0.58	0.65	0.40
Brisbane	Australia	1740274	0.52	0.16	0.30	0.37
Tianjin	China	10546355	0.34	0.24	0.59	0.33
Rome	Italy	2890755	0.40	0.15	0.33	0.31
Inch'on	South Korea	20238764	0.26	0.29	0.43	0.29
Taegu	South Korea	1546494	0.30	0.27	0.47	0.33
Barcelona	Spain	5852288	0.33	0.39	0.41	0.35
Tokyo	Japan	30460789	0.39	0.21	0.51	0.36
Shenyang	China	6875013	0.23	0.34	0.58	0.35
Fukuoka	Japan	1779400	0.34	0.30	0.46	0.36
Qingdao	China	4525376	0.29	0.35	0.57	0.38
Milan	Italy	4122031	0.34	0.35	0.39	0.37
Huhot	China	2042678	0.21	0.42	0.65	0.37
Bursa	Turkey	1598504	0.35	0.21	0.54	0.36
Anshan	China	2269788	0.23	0.38	0.54	0.35
Fushun	China	6875013	0.23	0.34	0.58	0.36
Cape Town	South Africa	4366689	0.35	0.28	0.48	0.36
Kawasaki	Japan	30460789	0.39	0.21	0.51	0.36
Yokohama	Japan	30460789	0.39	0.21	0.51	0.35
Kyoto	Japan	11460335	0.39	0.27	0.54	0.37
Nagoya	Japan	6521352	0.39	0.17	0.52	0.36
Medellin	Colombia	2689036	0.49	0.58	0.50	0.41
Paris	France	10679964	0.23	0.53	0.24	0.40
Warsaw	Poland	1724434	0.15	0.47	0.37	0.30
Madrid	Spain	6796772	0.40	0.25	0.59	0.34
San Jose	United States	5798080	0.40	0.13	0.37	0.32

San Diego	United States	3097877	0.49	0.05	0.38	0.24
Seoul	South Korea	20238764	0.26	0.29	0.43	0.26
Munich	Germany	1469977	0.19	0.30	0.26	0.28
Berlin	Germany	2852694	0.18	0.60	0.21	0.27
Sydney	Australia	3035889	0.37	0.24	0.15	0.26
Ankara	Turkey	3238745	0.36	0.24	0.67	0.30
Dalian	China	3561976	0.21	0.37	0.50	0.36
Kharkiv	Ukraine	1234464	0.18	0.50	0.44	0.34
Xining	China	1306103	0.20	0.52	0.63	0.37
Pusan	South Korea	2121985	0.26	0.28	0.27	0.33
Islamabad	Pakistan	2498182	0.59	0.64	0.87	0.43
Jilin	China	1565112	0.13	0.37	0.59	0.46
Budapest	Hungary	1865631	0.25	0.42	0.44	0.33
Kyiv	Ukraine	1432372	0.17	0.41	0.35	0.32
Montreal	Canada	2742250	0.14	0.35	0.44	0.28
Brussels	Belgium	1538307	0.20	0.37	0.13	0.24
Perth	Australia	1587826	0.39	0.17	0.43	0.26
Houston	United States	6321278	0.59	0.01	0.31	0.19
Toronto	Canada	7169055	0.19	0.24	0.36	0.18
Nanchang	China	2505830	0.52	0.47	0.57	0.36
Prague	Czech Republic	1013824	0.19	0.54	0.27	0.39
Ottawa	Canada	1134458	0.13	0.25	0.37	0.26
Hamburg	Germany	1445521	0.14	0.46	0.19	0.23
New York	United States	7161125	0.27	0.17	0.11	0.20
Minsk	Belarus	2077299	0.08	0.67	0.40	0.22
Calgary	Canada	1366331	0.10	0.23	0.57	0.26
Harbin	China	4098925	0.10	0.32	0.63	0.25
Melbourne	Australia	3266648	0.25	0.22	0.23	0.25
Beirut	Lebanon	4235121	0.31	0.38	0.60	0.31
Changchun	China	3676674	0.14	0.31	0.61	0.35
Taejon	South Korea	1217473	0.27	0.30	0.41	0.31
Chicago	United States	8225476	0.22	0.08	0.34	0.24
Auckland	New Zealand	1042783	0.23	0.37	0.03	0.15
Philadelphia	United States	3376769	0.31	0.12	0.10	0.14
Almaty	Kazakhstan	1540615	0.23	0.44	0.53	0.24
Vienna	Austria	1733892	0.21	0.31	0.31	0.32
Birmingham	United Kingdom	2492293	0.14	0.60	0.08	0.23
Dallas	United States	6511756	0.52	0.01	0.44	0.17
Glasgow	United Kingdom	1195909	0.06	0.61	0.08	0.15
Moscow	Russia	14652500	0.06	0.34	0.31	0.16
Edmonton	Canada	1183271	0.02	0.34	0.55	0.16
Sapporo	Japan	1690825	0.16	0.54	0.54	0.23
Novosibirsk	Russia	1000238	0.00	0.51	0.58	0.20
London	United Kingdom	10451604	0.17	0.51	0.00	0.07

Supplementary Note 2: Extended list of Vulnerability and Coping Capacity indicators

This section presents the extended set of vulnerability and coping capacity indicators considered in the analysis. Candidate indicators were evaluated based on the following criteria:

- Conceptual relevance to hazard and exposure, vulnerability, coping capacity
- Global data availability, ensuring coverage across all cities included in the analysis
- Spatial comparability, with preference for datasets available or aggregable at consistent city-scale resolution
- Temporal consistency, prioritising datasets aligned with the 2019–2020 study period

Additional indicators that did not meet these criteria, or were deferred to maintain a focused and comparable set of core indicators, are documented in the table below, along with the rationale.

While the selected indicators provide a robust and globally consistent foundation, this framework is intended as a starting point rather than a final or exhaustive representation. Future work could extend the analysis by incorporating additional indicators, particularly at finer spatial resolution or within more targeted city-level studies as more harmonised and locally relevant data become available.

Table S2.1 Extended list of indicators considered for vulnerability (V) and coping capacity (C) dimensions.

Dimension	Conceptual domain	Indicator considered	Included in analysis?	Data source/reference	Spatial resolution	Temporal resolution	Rationale (included/excluded/deferred)
Vulnerability	Demographic sensitivity	Population aged >65 years	Yes	(WorldPop, 2018)	1 km gridded	Annual, 2020 baseline	High heat-risk group; global data available
	Demographic sensitivity	Population aged <4 years	Yes	(WorldPop, 2018)	1 km gridded	Annual, 2020 baseline	Physiologically vulnerable; global coverage available
	Economic sensitivity	GDP per capita (inverse)	Yes	(Kummu et al., 2025)	10 km gridded GDP per capita	Annual, 2020 baseline	Proxy for economic capacity; globally harmonised
	Cooling access	Air-conditioning penetration (inverse)	Yes	(Davis et al., 2021; Falchetta et al., 2024)	1 km gridded / modelled estimates	Annual, 2020 baseline	Retained as a dominant determinant of household-level cooling access.
	Informal housing	Informal settlement prevalence/slum population share	No	(UN-Habitat, 2024; World Bank, n.d.-a)	Often national or regional level	Inconsistent across sources	Excluded due to lack of globally harmonised, city-comparable data.

	Housing quality	Building materials, roof type, dwelling quality, insulation	No	Household surveys, case studies such as (Hondula et al., 2015; Ye & Yang, 2025)	Usually household or neighbourhood level; no global city-scale layer	Irregular census/survey periods	Deferred to focus on core indicators as a starting point; can be incorporated in future work with a more targeted city-level analysis.
	Occupational exposure	Share of outdoor workers	No	(International Labour Organization, 2024)	Commonly national or subnational	Annual or survey-based	Excluded due to absence of globally consistent city-scale indicators.
	Urban form / crowding	Built-up density / floor-area	No	Google open buildings (Sirko et al., 2021)	Available at high spatial resolution; available for global south	Multi-year / varying baselines	Deferred to focus on core indicators as a starting point; can be incorporated in future city-level analyses of the global south.
	Baseline health sensitivity	Chronic disease prevalence	No	WHO and national health statistics; Masselot et al. (2023)	Predominantly national or regional	Irregular years	Excluded due to lack of harmonised city-scale datasets.
	Access to services	Healthcare access/distance	No	National surveys, WHO service-access indicators	Mostly national/subnational	Irregular years	Deferred to focus on core indicators as a starting point; can be incorporated in future with a more targeted city-level analysis.
Coping capacity	Ecological buffering	NDVI (inverse)	Yes	Didan (2015); Du et al. (2025); Li et al. (2024)	1 km gridded	Monthly; 2020 year used	Retained as a globally available proxy for vegetative cooling capacity.
	Ecological buffering	Fractional tree cover (inverse)	Yes	Liu et al. (2024); Li et al. (2024)	High-resolution gridded	Annual, 2020 baseline	Retained as directly captures shade-related cooling potential.
	Cooling affordability	Electricity price	Yes	(World Bank Group, 2021)	National average	Annual, 2019 baseline	Retained as a proxy for affordability of cooling technologies.
	Health-system response capacity	Emergency care/health infrastructure	No	(WHO, n.d.)	Mostly national or subnational	Irregular years	Deferred to focus on core indicators as a starting point; can be incorporated in the future with a more targeted city-level analysis.
	Institutional readiness	Institutional capacity/implementation readiness	No	(World Bank, n.d.-b)	Predominantly national	Annual for national data, but not city-specific	Excluded as data are only available at the national scale and are not globally comparable.

	Adaptation preparedness	Heat action plans / early warning systems/cooling centres	No	(United Nations Office for Disaster Risk Reduction (UNDRR), 2022)	City-specific, but highly incomplete globally	Irregular and event-specific	Excluded due to incomplete and inconsistent global coverage.
	Basic service reliability	Reliable electricity access/water access	No	(World Bank, n.d.-a)	Often, national or broad subnational coverage only	Annual, but not city-comparable globally	Deferred to focus on core indicators as a starting point; can be incorporated in future city-level analyses using infrastructure and service data.
	Spatial equity of cooling resources	Access to green space/cooling centres / public shade	No	City-specific land-use products; local case studies (Rocha et al., 2024)	Neighbourhood to parcel scale in case studies	Varies by source and year	Deferred to focus on core indicators as a starting point; can be incorporated in future work with a more targeted city-level analysis.
	Long-term adaptive capacity	Technology access / social protection / institutional learning	No	(IPCC, 2023; Palermo et al., 2025)	Conceptually multidimensional; limited measurable proxies	Varies substantially	Excluded to maintain focus of the study on measurable, near-term coping capacity.

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Supplementary Note 3 | Sensitivity analysis: weighting schemes, Spearman correlations, top-decile rankings and aggregation methods

This section presents descriptive sensitivity analysis for the results using alternative weighting schemes, Spearman correlations, top-decile rankings and aggregation methods.

Table S3.1 Alternative weighting schemes applied in the sensitivity analysis.

Scenario	Hazard (H)	Vulnerability (V)	Coping capacity (C)
Baseline (equal weightage)	0.33	0.33	0.33
Hazard-weighted	0.5	0.25	0.25
Vulnerability-weighted	0.25	0.5	0.25
Lack of Coping-capacity-weighted (LCA-weighted)	0.25	0.25	0.5

Table S3.2 City-level heat risk scores and rankings under baseline and alternative weighting scenarios

City Name	Risk Score				Risk ranking				Percentile
	Baseline	Hazard-weighted	Vulnerability-weighted	LCA-weighted	Baseline	Hazard-weighted	Vulnerability-weighted	LCA-weighted	Baseline
Hyderabad	0.85	0.85	0.81	0.88	1	2	5	1	0.005
Bamako	0.83	0.85	0.85	0.8	2	2	2	6	0.010
Al Basrah	0.83	0.86	0.83	0.81	2	1	3	3	0.010
Conakry	0.83	0.84	0.83	0.81	2	4	3	3	0.010
Kano	0.83	0.83	0.87	0.79	2	5	1	7	0.010
Karachi	0.79	0.77	0.76	0.83	6	16	9	2	0.029
Kumasi	0.79	0.81	0.79	0.77	6	7	7	8	0.029
Faisalabad	0.78	0.78	0.75	0.81	8	11	13	3	0.038
Madurai	0.78	0.83	0.76	0.75	8	5	9	10	0.038
Kaduna	0.77	0.76	0.81	0.73	10	17	5	16	0.048
Phnom Penh	0.76	0.81	0.74	0.75	11	7	17	10	0.052
Patna	0.75	0.75	0.75	0.74	12	21	13	13	0.057
Ibadan	0.75	0.79	0.78	0.69	12	9	8	24	0.057
Luanda	0.74	0.76	0.75	0.69	14	17	13	24	0.067
Khartoum	0.74	0.79	0.71	0.72	14	9	19	20	0.067
Lagos	0.74	0.78	0.76	0.7	14	11	9	21	0.067
Ahmadabad	0.74	0.78	0.69	0.75	14	11	29	10	0.067
Benin City	0.73	0.78	0.76	0.66	18	11	9	39	0.086
Yaounde	0.73	0.73	0.75	0.69	18	26	13	24	0.086
Port Harcourt	0.72	0.76	0.74	0.67	20	17	17	35	0.095
Lahore	0.72	0.72	0.7	0.74	20	30	25	13	0.095
Jaipur	0.72	0.74	0.7	0.74	20	22	25	13	0.095
Accra	0.72	0.73	0.7	0.73	20	26	25	16	0.095
Ho Chi Minh City	0.72	0.78	0.71	0.68	20	11	19	30	0.095
Peshawar	0.72	0.7	0.71	0.76	20	37	19	9	0.095

Barranquilla	0.71	0.76	0.69	0.69	26	17	29	24	0.124
Kanpur	0.7	0.72	0.69	0.7	27	30	29	21	0.129
Manila	0.7	0.74	0.71	0.66	27	22	19	39	0.129
Lucknow	0.7	0.71	0.7	0.7	27	33	25	21	0.129
Quezon City	0.7	0.74	0.71	0.66	27	22	19	39	0.129
Islamabad	0.69	0.66	0.68	0.73	31	50	34	16	0.148
Nagpur	0.69	0.73	0.65	0.69	31	26	49	24	0.148
Abidjan	0.69	0.72	0.69	0.66	31	30	29	39	0.148
Baghdad	0.69	0.73	0.66	0.69	31	26	44	24	0.148
Rawalpindi	0.69	0.66	0.68	0.73	31	50	34	16	0.148
Surabaya	0.69	0.74	0.69	0.63	31	22	29	48	0.148
Bhopal	0.69	0.7	0.68	0.68	31	37	34	30	0.148
Kolkata	0.68	0.71	0.67	0.65	38	33	39	45	0.181
Chennai	0.68	0.7	0.67	0.66	38	37	39	39	0.181
Kinshasa	0.68	0.71	0.71	0.61	38	33	19	51	0.181
Pune	0.67	0.69	0.66	0.67	41	43	44	35	0.195
Hyderabad	0.67	0.7	0.64	0.68	41	37	52	30	0.195
Bandung	0.66	0.68	0.67	0.61	43	45	39	51	0.205
Bangalore	0.66	0.65	0.65	0.66	43	56	49	39	0.205
Dar es Salaam	0.66	0.68	0.68	0.63	43	45	34	48	0.205
Port-au-Prince	0.65	0.69	0.61	0.64	46	43	56	47	0.219
Hanoi	0.65	0.67	0.65	0.63	46	49	49	48	0.219
Guayaquil	0.65	0.68	0.67	0.6	46	45	39	57	0.219
Az Zarqa'	0.64	0.62	0.61	0.68	49	63	56	30	0.233
Palembang	0.64	0.7	0.66	0.57	49	37	44	66	0.233
Medan	0.64	0.71	0.66	0.56	49	33	44	69	0.233
Amman	0.64	0.62	0.61	0.68	49	63	56	30	0.233
Lima	0.64	0.62	0.62	0.67	49	63	54	35	0.233
Cairo	0.64	0.65	0.6	0.67	49	56	61	35	0.233
Kampala	0.64	0.63	0.68	0.61	49	61	34	51	0.233
Semarang	0.64	0.7	0.67	0.58	49	37	39	61	0.233
Da Nang	0.63	0.62	0.66	0.61	57	63	44	51	0.271
Delhi	0.63	0.65	0.59	0.65	57	56	64	45	0.271
Jakarta	0.62	0.68	0.6	0.58	59	45	61	61	0.281
Mumbai	0.62	0.64	0.6	0.61	59	59	61	51	0.281
Dhaka	0.62	0.66	0.61	0.59	59	50	56	59	0.281
Cali	0.61	0.62	0.61	0.61	62	63	56	51	0.295
Maputo	0.61	0.6	0.64	0.58	62	70	52	61	0.295
Goiania	0.6	0.63	0.58	0.58	64	61	66	61	0.305
Antananarivo	0.58	0.54	0.62	0.59	65	77	54	59	0.310
Bangkok	0.58	0.66	0.52	0.56	65	50	74	69	0.310
Samut Prakan	0.58	0.66	0.52	0.56	65	50	74	69	0.310

Manaus	0.58	0.66	0.56	0.52	65	50	68	83	0.310
Merida	0.57	0.64	0.52	0.56	69	59	74	69	0.329
Guatemala	0.57	0.56	0.59	0.58	69	72	64	61	0.329
San Luis Potosi	0.56	0.56	0.54	0.6	71	72	71	57	0.338
Nairobi	0.56	0.54	0.58	0.56	71	77	66	69	0.338
Belo Horizonte	0.55	0.55	0.55	0.54	73	76	69	76	0.348
Rabat	0.55	0.53	0.55	0.56	73	82	69	69	0.348
Casablanca	0.54	0.52	0.54	0.57	75	84	71	66	0.357
Fortaleza	0.53	0.56	0.5	0.53	76	72	81	78	0.362
Kuala Lumpur	0.53	0.62	0.51	0.48	76	63	78	103	0.362
Rangoon	0.53	0.61	0.49	0.49	76	69	86	94	0.362
Guadalajara	0.53	0.56	0.48	0.56	76	72	87	69	0.362
Alexandria	0.53	0.49	0.51	0.57	76	91	78	66	0.362
Nanchang	0.52	0.52	0.51	0.53	81	84	78	78	0.386
Recife	0.52	0.54	0.52	0.49	81	77	74	94	0.386
Medellin	0.52	0.51	0.53	0.52	81	87	73	83	0.386
Rio de Janeiro	0.51	0.54	0.5	0.49	84	77	81	94	0.400
Kathmandu	0.51	0.49	0.5	0.53	84	91	81	78	0.400
Brasilia	0.51	0.53	0.48	0.51	84	82	87	86	0.400
Puebla	0.5	0.5	0.47	0.53	87	88	94	78	0.414
Bogota	0.5	0.46	0.5	0.53	87	101	81	78	0.414
Chittagong	0.49	0.54	0.48	0.45	89	77	87	115	0.424
Nanning	0.49	0.52	0.47	0.49	89	84	94	94	0.424
Mashhad	0.49	0.48	0.48	0.52	89	94	87	83	0.424
Jeddah	0.49	0.57	0.37	0.54	89	71	136	76	0.424
Sao Paulo	0.49	0.5	0.48	0.5	89	88	87	89	0.424
Hefei	0.48	0.47	0.48	0.49	94	99	87	94	0.448
Santiago	0.48	0.48	0.46	0.51	94	94	97	86	0.448
Luoyang	0.48	0.46	0.48	0.49	94	101	87	94	0.448
Mexico City	0.47	0.48	0.44	0.51	97	94	106	86	0.462
Toluca	0.47	0.47	0.44	0.5	97	99	106	89	0.462
Quito	0.47	0.45	0.5	0.47	97	106	81	106	0.462
Zhengzhou	0.47	0.46	0.46	0.48	97	101	97	103	0.462
Fuzhou	0.47	0.49	0.46	0.47	97	91	97	106	0.462
Changsha	0.47	0.48	0.46	0.48	97	94	97	103	0.462
Queretaro	0.46	0.48	0.41	0.5	103	94	116	89	0.490
Curitiba	0.46	0.46	0.45	0.47	103	101	101	106	0.490
Tunis	0.46	0.45	0.44	0.5	103	106	106	89	0.490
Izmir	0.46	0.44	0.45	0.49	103	110	101	94	0.490
Chongqing	0.45	0.46	0.44	0.45	107	101	106	115	0.510
Yinchuan	0.45	0.4	0.45	0.49	107	122	101	94	0.510
Algiers	0.45	0.45	0.45	0.46	107	106	101	112	0.510

Urumqi	0.45	0.39	0.47	0.5	107	131	94	89	0.510
Lanzhou	0.44	0.39	0.45	0.49	111	131	101	94	0.529
Tashkent	0.44	0.44	0.41	0.47	111	110	116	106	0.529
Wuhan	0.43	0.44	0.41	0.46	113	110	116	112	0.538
Buenos Aires	0.43	0.4	0.43	0.44	113	122	111	119	0.538
Tehran	0.43	0.43	0.4	0.47	113	114	120	106	0.538
Phoenix	0.42	0.5	0.32	0.47	116	88	164	106	0.552
Kunming	0.42	0.39	0.42	0.44	116	131	113	119	0.552
Hangzhou	0.42	0.43	0.41	0.43	116	114	116	127	0.552
Chengdu	0.42	0.43	0.39	0.44	116	114	123	119	0.552
Guiyang	0.42	0.39	0.44	0.42	116	131	106	134	0.552
Xi'an	0.41	0.4	0.38	0.44	121	122	131	119	0.576
Tangshan	0.41	0.39	0.39	0.44	121	131	123	119	0.576
Baotou	0.41	0.36	0.42	0.46	121	144	113	112	0.576
Nanjing	0.41	0.41	0.39	0.42	121	119	123	134	0.576
Taiyuan	0.41	0.37	0.4	0.45	121	142	120	115	0.576
Shijiazhuang	0.41	0.4	0.38	0.44	121	122	131	119	0.576
Salvador	0.4	0.41	0.42	0.37	127	119	113	161	0.605
Istanbul	0.4	0.38	0.39	0.43	127	139	123	127	0.605
Xining	0.4	0.33	0.43	0.45	127	160	111	115	0.605
Shanghai	0.39	0.4	0.37	0.42	130	122	136	134	0.619
Bucharest	0.39	0.38	0.39	0.41	130	139	123	141	0.619
Pretoria	0.39	0.4	0.35	0.43	130	122	143	127	0.619
Osaka	0.39	0.39	0.35	0.42	130	131	143	134	0.619
Porto Alegre	0.39	0.41	0.39	0.38	130	119	123	157	0.619
Monterrey	0.39	0.45	0.31	0.43	130	106	169	127	0.619
Qingdao	0.39	0.36	0.38	0.43	130	144	131	127	0.619
Ankara	0.39	0.38	0.34	0.44	130	139	156	119	0.619
Johannesburg	0.39	0.4	0.35	0.43	130	122	143	127	0.619
Jinan	0.39	0.39	0.37	0.42	130	131	136	134	0.619
Kyoto	0.39	0.39	0.35	0.42	130	131	143	134	0.619
Madrid	0.39	0.4	0.35	0.43	130	122	143	127	0.619
Huhot	0.38	0.33	0.39	0.44	142	160	123	119	0.676
Almaty	0.38	0.33	0.39	0.41	142	160	123	141	0.676
Guangzhou	0.38	0.43	0.33	0.39	142	114	160	149	0.676
Beijing	0.37	0.36	0.34	0.4	145	144	156	144	0.690
Singapore	0.37	0.44	0.32	0.37	145	110	164	161	0.690
Barcelona	0.37	0.36	0.38	0.38	145	144	131	157	0.690
San Antonio	0.37	0.42	0.32	0.38	145	118	164	157	0.690
Baku	0.37	0.36	0.33	0.42	145	144	160	134	0.690
Tianjin	0.36	0.36	0.33	0.41	150	144	160	141	0.714
Sapporo	0.36	0.3	0.4	0.4	150	170	120	144	0.714

Cape Town	0.36	0.36	0.34	0.39	150	144	156	149	0.714
Anshan	0.36	0.32	0.37	0.4	150	166	136	144	0.714
Fushun	0.36	0.32	0.35	0.4	150	166	143	144	0.714
Budapest	0.36	0.33	0.37	0.38	150	160	136	157	0.714
Fukuoka	0.36	0.36	0.35	0.39	150	144	143	149	0.714
Milan	0.36	0.35	0.36	0.37	150	155	142	161	0.714
Shenyang	0.36	0.32	0.35	0.4	150	166	143	144	0.714
Rostov-on-Don	0.35	0.32	0.37	0.37	159	166	136	161	0.757
Tokyo	0.35	0.36	0.31	0.39	159	144	169	149	0.757
Kawasaki	0.35	0.36	0.31	0.39	159	144	169	149	0.757
Kwangju	0.35	0.34	0.35	0.37	159	157	143	161	0.757
Yokohama	0.35	0.36	0.31	0.39	159	144	169	149	0.757
Taegu	0.34	0.33	0.32	0.37	164	160	164	161	0.781
Dalian	0.34	0.3	0.35	0.37	164	170	143	161	0.781
Bursa	0.34	0.35	0.31	0.39	164	155	169	149	0.781
Kharkiv	0.34	0.29	0.38	0.36	164	176	131	169	0.781
Nagoya	0.33	0.34	0.28	0.37	168	157	181	161	0.800
Inch`on	0.32	0.3	0.31	0.34	169	170	169	173	0.805
Taejon	0.32	0.3	0.31	0.34	169	170	169	173	0.805
Seoul	0.32	0.3	0.31	0.34	169	170	169	173	0.805
Los Angeles	0.32	0.37	0.25	0.36	169	142	187	169	0.805
Riyadh	0.31	0.4	0.2	0.39	173	122	200	149	0.824
Perth	0.31	0.33	0.26	0.33	173	160	185	177	0.824
Paris	0.31	0.29	0.35	0.29	173	176	143	183	0.824
Jilin	0.3	0.25	0.32	0.36	176	185	164	169	0.838
Warsaw	0.3	0.25	0.33	0.31	176	185	160	178	0.838
Changchun	0.3	0.25	0.3	0.36	176	185	178	169	0.838
Prague	0.3	0.27	0.35	0.29	176	179	143	183	0.838
Kyiv	0.29	0.25	0.31	0.3	180	185	169	181	0.857
Berlin	0.29	0.26	0.34	0.27	180	182	156	190	0.857
Brisbane	0.29	0.34	0.25	0.3	180	157	187	181	0.857
Montreal	0.28	0.23	0.29	0.31	183	191	179	178	0.871
Minsk	0.28	0.21	0.35	0.31	183	193	143	178	0.871
Vienna	0.27	0.26	0.28	0.28	185	182	181	187	0.881
Pusan	0.27	0.26	0.27	0.27	185	182	183	190	0.881
San Jose	0.27	0.29	0.22	0.29	185	176	197	183	0.881
Rome	0.27	0.3	0.23	0.28	185	170	193	187	0.881
Harbin	0.27	0.21	0.29	0.34	185	193	179	173	0.881
Munich	0.25	0.23	0.26	0.25	190	191	185	193	0.905
Toronto	0.25	0.24	0.25	0.28	190	189	187	187	0.905
Sydney	0.24	0.27	0.24	0.21	192	179	192	197	0.914
Calgary	0.23	0.19	0.23	0.29	193	200	193	183	0.919
Ottawa	0.23	0.2	0.23	0.26	193	196	193	192	0.919
Melbourne	0.23	0.24	0.23	0.23	193	189	193	195	0.919

Hamburg	0.23	0.2	0.27	0.22	193	196	183	196	0.919
San Diego	0.22	0.27	0.15	0.25	197	179	205	193	0.938
Brussels	0.21	0.21	0.25	0.19	198	193	187	201	0.943
Birmingham	0.19	0.17	0.25	0.15	199	204	187	205	0.948
Moscow	0.18	0.13	0.21	0.21	200	206	198	197	0.952
New York	0.18	0.2	0.18	0.16	200	196	201	204	0.952
Chicago	0.18	0.19	0.15	0.21	200	200	205	197	0.952
Dallas	0.15	0.2	0.08	0.19	203	196	209	201	0.967
Philadelphia	0.15	0.18	0.14	0.13	203	202	207	207	0.967
Glasgow	0.15	0.12	0.21	0.13	203	207	198	207	0.967
Edmonton	0.14	0.08	0.18	0.2	206	208	201	200	0.981
Auckland	0.13	0.15	0.17	0.09	207	205	203	209	0.986
Houston	0.12	0.18	0.07	0.15	208	202	210	205	0.990
Novosibirsk	0.11	0.05	0.16	0.17	209	210	204	203	0.995
London	0.05	0.07	0.09	0.02	210	209	208	210	1.000

Table S3.3 Spearman rank correlations between baseline and alternative weighting scenarios.

Scenario	Spearman's ρ
Baseline vs Hazard-weighted	0.984
Baseline vs Vulnerability-weighted	0.983
Baseline vs LCA-weighted	0.988

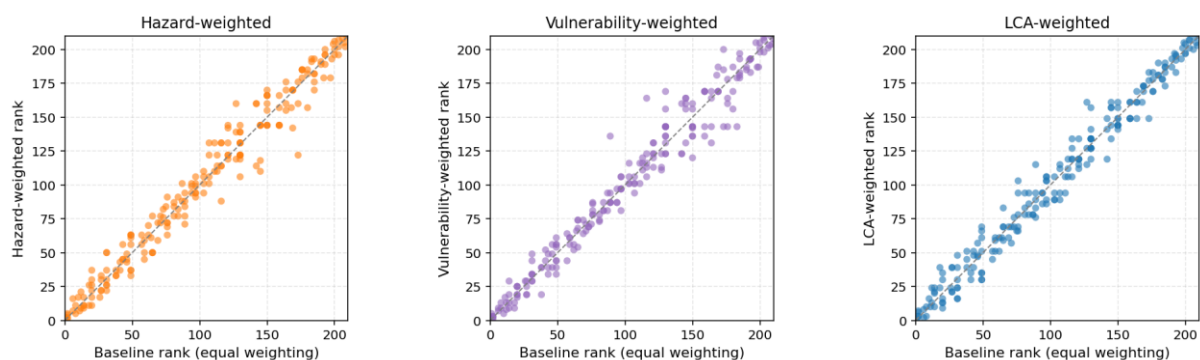


Figure S3.4 Comparison of baseline and alternative rankings under different weighting schemes:(a) hazard-weighted, (b) vulnerability-weighted, and (c) LCA-weighted.

Table S3.5 Overlap in the top 10% of cities between baseline and alternative weighting scenarios

Scenario	Top-decile overlap (%)
Baseline vs Hazard-weighted	90.5
Baseline vs Vulnerability-weighted	90.5
Baseline vs LCA-weighted	71.4

Table S3.6 Comparison of city-level risk scores and rankings using geometric and additive aggregation methods.

The table compares city-level risk scores and rankings using geometric and additive aggregation methods. The results show that rankings remain highly consistent between approaches (Spearman's $\rho = 0.984$), with substantial overlap in the top-decile composition (95.5%). This indicates that the overall spatial patterns and identification of high-risk cities are robust to the choice of aggregation method.

City Name	Country Name	H	V	C	Risk (geometric)	Risk (additive)	Rank (geometric)	Rank (additive)
Hyderabad	Pakistan	0.86	0.72	0.97	0.85	0.85	1	1
Al Basrah	Iraq	0.96	0.83	0.73	0.83	0.84	2	2
Kano	Nigeria	0.84	1	0.68	0.83	0.84	2	2
Conakry	Guinea	0.88	0.83	0.77	0.83	0.83	2	5
Bamako	Mali	0.9	0.9	0.71	0.83	0.84	2	4
Karachi	Pakistan	0.71	0.68	1	0.79	0.80	6	6
Kumasi	Ghana	0.87	0.81	0.71	0.79	0.80	6	6
Madurai	India	0.99	0.72	0.67	0.78	0.79	8	8
Faisalabad	Pakistan	0.77	0.69	0.89	0.78	0.78	8	9
Kaduna	Nigeria	0.76	0.95	0.63	0.77	0.78	10	10
Phnom Penh	Cambodia	0.98	0.66	0.69	0.76	0.78	11	11
Ibadan	Nigeria	0.91	0.88	0.53	0.75	0.77	12	12
Patna	India	0.75	0.77	0.72	0.75	0.75	12	17
Luanda	Angola	0.85	0.81	0.58	0.74	0.75	14	17
Khartoum	Sudan	0.96	0.64	0.66	0.74	0.75	14	15
Ahmadabad	India	0.89	0.57	0.79	0.74	0.75	14	16
Lagos	Nigeria	0.91	0.8	0.57	0.74	0.76	14	13
Benin City	Nigeria	0.93	0.84	0.5	0.73	0.76	18	14
Yaounde	Cameroon	0.75	0.84	0.61	0.73	0.73	18	21
Jaipur	India	0.78	0.62	0.77	0.72	0.72	20	25
Ho Chi Minh City	Vietnam	1	0.66	0.57	0.72	0.74	20	19
Port Harcourt	Nigeria	0.9	0.79	0.53	0.72	0.74	20	20
Accra	Ghana	0.77	0.65	0.76	0.72	0.73	20	24
Lahore	Pakistan	0.74	0.63	0.8	0.72	0.72	20	25
Peshawar	Pakistan	0.64	0.67	0.88	0.72	0.73	20	22
Barranquilla	Colombia	0.91	0.63	0.64	0.71	0.73	26	23
Kanpur	India	0.77	0.67	0.69	0.70	0.71	27	30
Quezon City	Philippines	0.87	0.73	0.55	0.70	0.72	27	27
Lucknow	India	0.73	0.68	0.7	0.70	0.70	27	32
Manila	Philippines	0.87	0.73	0.55	0.70	0.72	27	27
Rawalpindi	Pakistan	0.59	0.64	0.87	0.69	0.70	31	34
Baghdad	Iraq	0.84	0.56	0.7	0.69	0.70	31	37
Abidjan	Cote d'Ivoire	0.84	0.68	0.58	0.69	0.70	31	34
Surabaya	Indonesia	0.94	0.71	0.49	0.69	0.71	31	29
Islamabad	Pakistan	0.59	0.64	0.87	0.69	0.70	31	34

Bhopal	India	0.75	0.66	0.65	0.69	0.69	31	39
Nagpur	India	0.86	0.54	0.71	0.69	0.70	31	33
Kinshasa	Congo, DRC	0.84	0.84	0.45	0.68	0.71	38	30
Chennai	India	0.79	0.64	0.62	0.68	0.68	38	40
Kolkata	India	0.82	0.64	0.59	0.68	0.68	38	41
Pune	India	0.74	0.62	0.66	0.67	0.67	41	44
Hyderabad	India	0.76	0.56	0.71	0.67	0.68	41	43
Bandung	Indonesia	0.77	0.73	0.5	0.66	0.67	43	47
Dar es Salaam	Tanzania	0.74	0.73	0.54	0.66	0.67	43	46
Bangalore	India	0.64	0.65	0.68	0.66	0.66	43	50
Guayaquil	Ecuador	0.79	0.73	0.47	0.65	0.66	46	49
Hanoi	Vietnam	0.75	0.63	0.58	0.65	0.65	46	51
Port-au-Prince	Haiti	0.86	0.51	0.62	0.65	0.66	46	48
Cairo	Egypt	0.68	0.51	0.76	0.64	0.65	49	52
Amman	Jordan	0.56	0.54	0.83	0.64	0.64	49	56
Az Zarqa'	Jordan	0.56	0.54	0.83	0.64	0.64	49	56
Lima	Peru	0.56	0.58	0.8	0.64	0.65	49	54
Medan	Indonesia	0.96	0.73	0.38	0.64	0.69	49	38
Palembang	Indonesia	0.93	0.71	0.4	0.64	0.68	49	42
Semarang	Indonesia	0.88	0.73	0.41	0.64	0.67	49	44
Kampala	Uganda	0.59	0.83	0.53	0.64	0.65	49	52
Delhi	India	0.74	0.47	0.72	0.63	0.64	57	58
Da Nang	Vietnam	0.58	0.78	0.55	0.63	0.64	57	59
Dhaka	Bangladesh	0.79	0.58	0.52	0.62	0.63	59	60
Mumbai	India	0.73	0.53	0.6	0.62	0.62	59	64
Jakarta	Indonesia	0.94	0.53	0.47	0.62	0.65	59	55
Cali	Colombia	0.63	0.61	0.6	0.61	0.61	62	66
Maputo	Mozambique	0.58	0.76	0.51	0.61	0.62	62	65
Goiania	Brazil	0.74	0.53	0.54	0.60	0.60	64	69
Bangkok	Thailand	0.98	0.38	0.52	0.58	0.63	65	61
Samut Prakan	Thailand	0.98	0.38	0.52	0.58	0.63	65	61
Antananarivo	Madagascar	0.44	0.73	0.61	0.58	0.59	65	70
Manaus	Brazil	0.96	0.52	0.39	0.58	0.62	65	63
Merida	Mexico	0.89	0.39	0.54	0.57	0.61	69	67
Guatemala	Guatemala	0.53	0.62	0.58	0.57	0.58	69	72
Nairobi	Kenya	0.5	0.63	0.57	0.56	0.57	71	75
San Luis Potosi	Mexico	0.54	0.46	0.71	0.56	0.57	71	74
Rabat	Morocco	0.48	0.55	0.61	0.55	0.55	73	79
Belo Horizonte	Brazil	0.57	0.57	0.51	0.55	0.55	73	76
Casablanca	Morocco	0.45	0.53	0.66	0.54	0.55	75	79
Guadalajara	Mexico	0.65	0.36	0.64	0.53	0.55	76	76
Alexandria	Egypt	0.41	0.47	0.75	0.53	0.54	76	81

Rangoon	Myanmar	0.94	0.4	0.39	0.53	0.58	76	72
Fortaleza	Brazil	0.67	0.42	0.54	0.53	0.54	76	81
Kuala Lumpur	Malaysia	0.97	0.46	0.34	0.53	0.59	76	71
Medellin	Colombia	0.49	0.58	0.5	0.52	0.52	81	84
Recife	Brazil	0.61	0.53	0.42	0.52	0.52	81	85
Nanchang	China	0.52	0.47	0.57	0.52	0.52	81	85
Kathmandu	Nepal	0.45	0.46	0.63	0.51	0.51	84	88
Brasilia	Brazil	0.61	0.41	0.52	0.51	0.51	84	88
Rio de Janeiro	Brazil	0.64	0.48	0.43	0.51	0.52	84	87
Bogota	Colombia	0.36	0.52	0.66	0.50	0.51	87	88
Puebla	Mexico	0.49	0.4	0.63	0.50	0.51	87	92
Sao Paulo	Brazil	0.52	0.44	0.51	0.49	0.49	89	96
Chittagong	Bangladesh	0.75	0.44	0.35	0.49	0.51	89	88
Mashhad	Iran	0.43	0.46	0.62	0.49	0.50	89	93
Nanning	China	0.62	0.42	0.47	0.49	0.50	89	93
Jeddah	Saudi Arabia	0.92	0.17	0.73	0.49	0.61	89	67
Luoyang	China	0.43	0.49	0.52	0.48	0.48	94	100
Santiago	Chile	0.47	0.39	0.61	0.48	0.49	94	96
Hefei	China	0.44	0.48	0.52	0.48	0.48	94	100
Zhengzhou	China	0.43	0.43	0.54	0.47	0.47	97	110
Mexico City	Mexico	0.49	0.34	0.63	0.47	0.49	97	99
Quito	Ecuador	0.37	0.6	0.47	0.47	0.48	97	100
Changsha	China	0.5	0.42	0.5	0.47	0.47	97	106
Toluca	Mexico	0.46	0.37	0.61	0.47	0.48	97	100
Fuzhou	China	0.54	0.44	0.45	0.47	0.48	97	105
Izmir	Turkey	0.39	0.42	0.6	0.46	0.47	103	108
Curitiba	Brazil	0.45	0.43	0.49	0.46	0.46	103	112
Queretaro	Mexico	0.54	0.29	0.64	0.46	0.49	103	95
Tunis	Tunisia	0.43	0.38	0.61	0.46	0.47	103	106
Algiers	Algeria	0.44	0.43	0.48	0.45	0.45	107	115
Urumqi	China	0.24	0.54	0.69	0.45	0.49	107	96
Chongqing	China	0.48	0.41	0.47	0.45	0.45	107	113
Yinchuan	China	0.29	0.48	0.64	0.45	0.47	107	108
Tashkent	Uzbekistan	0.43	0.32	0.6	0.44	0.45	111	115
Lanzhou	China	0.26	0.49	0.68	0.44	0.48	111	104
Wuhan	China	0.46	0.33	0.53	0.43	0.44	113	119
Buenos Aires	Argentina	0.34	0.46	0.5	0.43	0.43	113	120
Tehran	Iran	0.44	0.3	0.62	0.43	0.45	113	113
Guiyang	China	0.32	0.53	0.43	0.42	0.43	116	124
Kunming	China	0.32	0.43	0.53	0.42	0.43	116	124
Chengdu	China	0.46	0.33	0.49	0.42	0.43	116	124
Phoenix	United States	0.84	0.14	0.63	0.42	0.54	116	83
Hangzhou	China	0.47	0.36	0.46	0.42	0.43	116	121

Taiyuan	China	0.29	0.38	0.62	0.41	0.43	121	121
Shijiazhuang	China	0.39	0.31	0.57	0.41	0.42	121	128
Xi'an	China	0.38	0.32	0.55	0.41	0.42	121	131
Baotou	China	0.23	0.44	0.67	0.41	0.45	121	118
Tangshan	China	0.34	0.34	0.58	0.41	0.42	121	130
Nanjing	China	0.41	0.34	0.48	0.41	0.41	121	138
Istanbul	Turkey	0.32	0.37	0.53	0.40	0.41	127	140
Salvador	Brazil	0.44	0.49	0.3	0.40	0.41	127	138
Xining	China	0.2	0.52	0.63	0.40	0.45	127	115
Jinan	China	0.37	0.32	0.51	0.39	0.40	130	146
Ankara	Turkey	0.36	0.24	0.67	0.39	0.42	130	128
Bucharest	Romania	0.34	0.39	0.46	0.39	0.40	130	148
Monterrey	Mexico	0.67	0.15	0.58	0.39	0.47	130	110
Pretoria	South Africa	0.44	0.25	0.55	0.39	0.41	130	134
Shanghai	China	0.41	0.29	0.51	0.39	0.40	130	141
Osaka	Japan	0.39	0.27	0.54	0.39	0.40	130	143
Kyoto	Japan	0.39	0.27	0.54	0.39	0.40	130	143
Johannesburg	South Africa	0.44	0.25	0.55	0.39	0.41	130	134
Madrid	Spain	0.4	0.25	0.59	0.39	0.41	130	134
Porto Alegre	Brazil	0.47	0.37	0.36	0.39	0.40	130	146
Qingdao	China	0.29	0.35	0.57	0.39	0.40	130	141
Almaty	Kazakhstan	0.23	0.44	0.53	0.38	0.40	142	143
Huhot	China	0.21	0.42	0.65	0.38	0.43	142	124
Guangzhou	China	0.63	0.21	0.41	0.38	0.42	142	131
Barcelona	Spain	0.33	0.39	0.41	0.37	0.38	145	157
Beijing	China	0.36	0.28	0.5	0.37	0.38	145	156
Singapore	Singapore	0.72	0.2	0.37	0.37	0.43	145	121
Baku	Azerbaijan	0.34	0.24	0.6	0.37	0.39	145	149
San Antonio	United States	0.63	0.2	0.41	0.37	0.41	145	134
Cape Town	South Africa	0.35	0.28	0.48	0.36	0.37	150	159
Shenyang	China	0.23	0.34	0.58	0.36	0.38	150	152
Budapest	Hungary	0.25	0.42	0.44	0.36	0.37	150	159
Tianjin	China	0.34	0.24	0.59	0.36	0.39	150	150
Milan	Italy	0.34	0.35	0.39	0.36	0.36	150	168
Anshan	China	0.23	0.38	0.54	0.36	0.38	150	152
Sapporo	Japan	0.16	0.54	0.54	0.36	0.41	150	133
Fukuoka	Japan	0.34	0.3	0.46	0.36	0.37	150	164
Fushun	China	0.23	0.34	0.58	0.36	0.38	150	152
Tokyo	Japan	0.39	0.21	0.51	0.35	0.37	159	159
Kawasaki	Japan	0.39	0.21	0.51	0.35	0.37	159	159
Yokohama	Japan	0.39	0.21	0.51	0.35	0.37	159	159
Kwangju	South Korea	0.31	0.34	0.42	0.35	0.36	159	172
Rostov-on-Don	Russia	0.24	0.42	0.42	0.35	0.36	159	171
Bursa	Turkey	0.35	0.21	0.54	0.34	0.37	164	164

Taegu	South Korea	0.3	0.27	0.47	0.34	0.35	164	175
Kharkiv	Ukraine	0.18	0.5	0.44	0.34	0.37	164	158
Dalian	China	0.21	0.37	0.5	0.34	0.36	164	168
Nagoya	Japan	0.39	0.17	0.52	0.33	0.36	168	168
Inch`on	South Korea	0.26	0.29	0.43	0.32	0.33	169	181
Seoul	South Korea	0.26	0.29	0.43	0.32	0.33	169	181
Taejon	South Korea	0.27	0.3	0.41	0.32	0.33	169	181
Los Angeles	United States	0.57	0.12	0.48	0.32	0.39	169	150
Riyadh	Saudi Arabia	0.87	0.05	0.73	0.31	0.55	173	76
Paris	France	0.23	0.53	0.24	0.31	0.33	173	176
Perth	Australia	0.39	0.17	0.43	0.31	0.33	173	178
Jilin	China	0.13	0.37	0.59	0.30	0.36	176	166
Warsaw	Poland	0.15	0.47	0.37	0.30	0.33	176	178
Prague	Czech Republic	0.19	0.54	0.27	0.30	0.33	176	176
Changchun	China	0.14	0.31	0.61	0.30	0.35	176	173
Brisbane	Australia	0.52	0.16	0.3	0.29	0.33	180	181
Berlin	Germany	0.18	0.6	0.21	0.29	0.33	180	178
Kyiv	Ukraine	0.17	0.41	0.35	0.29	0.31	180	186
Minsk	Belarus	0.08	0.67	0.4	0.28	0.38	183	152
Montreal	Canada	0.14	0.35	0.44	0.28	0.31	183	186
Pusan	South Korea	0.26	0.28	0.27	0.27	0.27	185	196
Harbin	China	0.1	0.32	0.63	0.27	0.35	185	174
San Jose	United States	0.4	0.13	0.37	0.27	0.30	185	191
Vienna	Austria	0.21	0.31	0.31	0.27	0.28	185	194
Rome	Italy	0.4	0.15	0.33	0.27	0.29	185	193
Toronto	Canada	0.19	0.24	0.36	0.25	0.26	190	197
Munich	Germany	0.19	0.3	0.26	0.25	0.25	190	200
Sydney	Australia	0.37	0.24	0.15	0.24	0.25	192	199
Ottawa	Canada	0.13	0.25	0.37	0.23	0.25	193	200
Hamburg	Germany	0.14	0.46	0.19	0.23	0.26	193	197
Calgary	Canada	0.1	0.23	0.57	0.23	0.30	193	191
Melbourne	Australia	0.25	0.22	0.23	0.23	0.23	193	205
San Diego	United States	0.49	0.05	0.38	0.22	0.31	197	188
Brussels	Belgium	0.2	0.37	0.13	0.21	0.23	198	204
Birmingham	United Kingdom	0.14	0.6	0.08	0.19	0.27	199	195
Moscow	Russia	0.06	0.34	0.31	0.18	0.24	200	203
Chicago	United States	0.22	0.08	0.34	0.18	0.21	200	207
New York	United States	0.27	0.17	0.11	0.18	0.18	200	209
Dallas	United States	0.52	0.01	0.44	0.15	0.32	203	185
Philadelphia	United States	0.31	0.12	0.1	0.15	0.18	203	210
Glasgow	United Kingdom	0.06	0.61	0.08	0.15	0.25	203	202
Edmonton	Canada	0.02	0.34	0.55	0.14	0.30	206	189
Auckland	New Zealand	0.23	0.37	0.03	0.13	0.21	207	208

Houston	United States	0.59	0.01	0.31	0.12	0.30	208	190
Novosibirsk	Russia	0	0.51	0.58	0.11	0.36	209	166
London	United Kingdom	0.17	0.51	0	0.05	0.23	210	206

Supplementary Note 4 | Sensitivity analysis

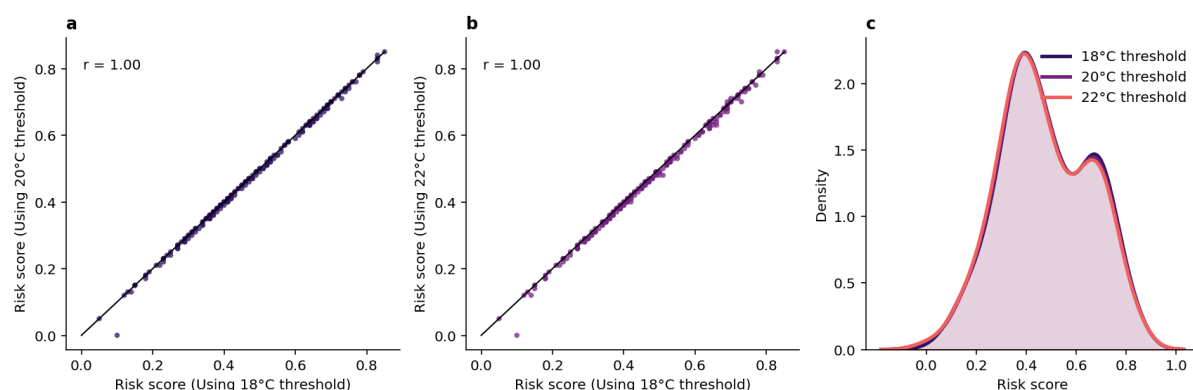


Figure S4.1 Sensitivity of risk estimates to UTCI threshold selection:

(a) Comparison of risk scores derived using 18°C and 20°C thresholds for CDD_{UTCI} . (b) Comparison of risk scores derived using 18°C and 22°C thresholds for CDD_{UTCI} . (c) Kernel density distributions of risk scores across thresholds, showing strong overlap and consistent distributional structure.

Table S4.2 City-level risk scores under alternative thresholds (18°C, 20°C, 22°C) for CDD_{UTCI} .

City Name	Country Name	Total Population	Risk score_18C	Risk score_20C	Risk score_22C
Hyderabad	Pakistan	1366633	0.85	0.85	0.85
Al Basrah	Iraq	1114933	0.83	0.84	0.85
Bamako	Mali	3807302	0.83	0.83	0.83
Kano	Nigeria	3342952	0.83	0.83	0.83
Conakry	Guinea	1369142	0.83	0.82	0.82
Kumasi	Ghana	3659999	0.79	0.79	0.78
Karachi	Pakistan	13249870	0.78	0.78	0.78
Madurai	India	1316792	0.78	0.78	0.78
Faisalabad	Pakistan	3770671	0.78	0.78	0.79
Kaduna	Nigeria	1101425	0.77	0.76	0.75
Phnom Penh	Cambodia	2201647	0.76	0.76	0.76
Maracaibo	Venezuela	1727552	0.76	0.76	0.76
Ibadan	Nigeria	3003695	0.75	0.75	0.74
Patna	India	1658600	0.75	0.74	0.74
Lagos	Nigeria	12025166	0.74	0.74	0.74
Khartoum	Sudan	1199197	0.74	0.74	0.74
Ahmadabad	India	6721469	0.74	0.74	0.74
Luanda	Angola	12045280	0.74	0.73	0.73
Benin City	Nigeria	1003445	0.73	0.73	0.73
Yaounde	Cameroon	2711427	0.73	0.71	0.70
Ho Chi Minh City	Vietnam	12102505	0.72	0.72	0.72
Accra	Ghana	5139757	0.72	0.72	0.71

Jaipur	India	3242035	0.72	0.72	0.72
Peshawar	Pakistan	1629493	0.72	0.72	0.72
Port Harcourt	Nigeria	1004315	0.72	0.72	0.72
Lahore	Pakistan	8440497	0.72	0.72	0.72
Barranquilla	Colombia	2043439	0.71	0.71	0.71
Kanpur	India	2949817	0.70	0.70	0.71
Quezon City	Philippines	17060195	0.70	0.70	0.70
Manila	Philippines	17060195	0.70	0.70	0.70
Lucknow	India	3307272	0.70	0.70	0.70
Baghdad	Iraq	3638813	0.69	0.69	0.70
Abidjan	Cote d'Ivoire	4436144	0.69	0.69	0.68
Nagpur	India	2350840	0.69	0.69	0.69
Islamabad	Pakistan	2498182	0.69	0.69	0.69
Rawalpindi	Pakistan	2498182	0.69	0.69	0.69
Bhopal	India	1457813	0.69	0.68	0.68
Sanaa	Yemen	1312904	0.69	0.68	0.67
Surabaya	Indonesia	4914370	0.69	0.69	0.68
Chennai	India	9242295	0.68	0.68	0.68
Kinshasa	Congo, DRC	6394123	0.68	0.67	0.67
Kolkata	India	14035780	0.68	0.68	0.68
Hyderabad	India	7781013	0.67	0.67	0.66
Pune	India	6560440	0.67	0.66	0.66
Dar es Salaam	Tanzania	4692228	0.66	0.66	0.65
Bandung	Indonesia	5640818	0.66	0.65	0.63
Bangalore	India	10906703	0.66	0.65	0.64
Hanoi	Vietnam	3410323	0.65	0.65	0.65
Guayaquil	Ecuador	1644302	0.65	0.64	0.63
Port-au-Prince	Haiti	2756073	0.65	0.64	0.64
Semarang	Indonesia	1368742	0.64	0.64	0.64
Medan	Indonesia	2909227	0.64	0.64	0.64
Palembang	Indonesia	1321557	0.64	0.64	0.64
Cairo	Egypt	18359205	0.64	0.64	0.64
Kampala	Uganda	2769056	0.64	0.63	0.62
Lima	Peru	8253823	0.64	0.63	0.62
Az Zarqa'	Jordan	3563859	0.64	0.63	0.63
Amman	Jordan	3563859	0.64	0.63	0.63
Delhi	India	27905716	0.63	0.63	0.63
Da Nang	Vietnam	1032940	0.63	0.63	0.63
Mumbai	India	15544429	0.62	0.61	0.61
Dhaka	Bangladesh	12269507	0.62	0.62	0.61
Jakarta	Indonesia	28809600	0.62	0.61	0.61

Cali	Colombia	1762303	0.61	0.61	0.60
Maputo	Mozambique	2034919	0.61	0.60	0.60
Goiania	Brazil	1771384	0.60	0.59	0.59
Antananarivo	Madagascar	1011415	0.58	0.58	0.57
Bangkok	Thailand	16696153	0.58	0.58	0.58
Samut Prakan	Thailand	16696153	0.58	0.58	0.58
Manaus	Brazil	2118792	0.58	0.58	0.58
Guatemala	Guatemala	1938799	0.57	0.57	0.56
Merida	Mexico	1071416	0.57	0.57	0.57
San Luis Potosi	Mexico	1153602	0.56	0.56	0.55
Nairobi	Kenya	4070964	0.56	0.55	0.55
Belo Horizonte	Brazil	4092640	0.55	0.54	0.54
Rabat	Morocco	1352835	0.55	0.54	0.53
Kaoshiung	China	3348968	0.54	0.54	0.54
Casablanca	Morocco	3605674	0.54	0.53	0.53
Kuala Lumpur	Malaysia	8001533	0.53	0.53	0.53
Guadalajara	Mexico	4912429	0.53	0.53	0.53
Caracas	Venezuela	1706185	0.53	0.52	0.52
Fortaleza	Brazil	3041081	0.53	0.53	0.52
Rangoon	Myanmar	3313760	0.53	0.53	0.53
Alexandria	Egypt	4183620	0.53	0.52	0.52
Medellin	Colombia	2689036	0.52	0.51	0.51
Nanchang	China	2505830	0.52	0.52	0.52
T'aichung	China	3367273	0.52	0.51	0.51
Recife	Brazil	2701475	0.52	0.51	0.51
Rio de Janeiro	Brazil	8722166	0.51	0.50	0.50
Kathmandu	Nepal	5663987	0.51	0.50	0.48
Brasilia	Brazil	1963307	0.50	0.50	0.49
Puebla	Mexico	2213473	0.50	0.50	0.49
Bogota	Colombia	8491211	0.50	0.49	0.48
Nanning	China	2796135	0.49	0.49	0.49
Mashhad	Iran	1149813	0.49	0.49	0.49
Sao Paulo	Brazil	19581749	0.49	0.49	0.48
Chittagong	Bangladesh	1955979	0.49	0.49	0.48
Jeddah	Saudi Arabia	1197779	0.49	0.48	0.49
Santiago	Chile	6340178	0.48	0.48	0.47
Hefei	China	4515635	0.48	0.47	0.47
Luoyang	China	1688094	0.48	0.47	0.47
Mexico City	Mexico	19067976	0.47	0.47	0.46
Fuzhou	China	2962443	0.47	0.47	0.47
Quito	Ecuador	1898595	0.47	0.46	0.46

Toluca	Mexico	1195106	0.47	0.47	0.46
Changsha	China	3669366	0.47	0.47	0.46
Zhengzhou	China	7199169	0.46	0.46	0.46
Queretaro	Mexico	1132794	0.46	0.46	0.46
Montevideo	Uruguay	1146035	0.46	0.46	0.46
Tunis	Tunisia	2249912	0.46	0.46	0.45
Izmir	Turkey	2307217	0.46	0.46	0.46
Curitiba	Brazil	2277126	0.46	0.45	0.45
Algiers	Algeria	3513892	0.45	0.45	0.45
Chongqing	China	4381696	0.45	0.45	0.44
Urumqi	China	4192058	0.45	0.45	0.44
Yinchuan	China	1796753	0.45	0.44	0.44
Lanzhou	China	2484689	0.44	0.44	0.43
Tashkent	Uzbekistan	1322935	0.44	0.44	0.44
Tehran	Iran	7210710	0.43	0.43	0.43
Wuhan	China	4200401	0.43	0.43	0.43
Buenos Aires	Argentina	13212490	0.43	0.42	0.42
Hangzhou	China	7089984	0.42	0.42	0.42
Phoenix	United States	4363441	0.42	0.42	0.42
Chengdu	China	10522528	0.42	0.42	0.41
Kunming	China	3583588	0.42	0.41	0.41
Guiyang	China	2776807	0.42	0.41	0.40
Taipei	China	8070593	0.41	0.41	0.41
Baotou	China	2302683	0.41	0.41	0.41
Beirut	Lebanon	4235121	0.41	0.41	0.41
Shijiazhuang	China	3869698	0.41	0.41	0.40
Xi'an	China	6881464	0.41	0.40	0.40
Taiyuan	China	4705479	0.41	0.40	0.40
Nanjing	China	6324426	0.41	0.40	0.40
Tangshan	China	2501860	0.40	0.40	0.40
Salvador	Brazil	2837244	0.40	0.40	0.40
Xining	China	1306103	0.40	0.40	0.39
Istanbul	Turkey	9089216	0.40	0.39	0.39
Shanghai	China	29717596	0.39	0.39	0.39
Porto Alegre	Brazil	3207469	0.39	0.39	0.39
Jinan	China	4616177	0.39	0.39	0.39
Madrid	Spain	6796772	0.39	0.39	0.39
Bucharest	Romania	2043133	0.39	0.39	0.39
Monterrey	Mexico	5001169	0.39	0.39	0.38
Johannesburg	South Africa	13437744	0.39	0.39	0.38
Pretoria	South Africa	13437744	0.39	0.39	0.38

Qingdao	China	4525376	0.39	0.38	0.38
Ankara	Turkey	3238745	0.39	0.39	0.38
Kyoto	Japan	11460335	0.38	0.38	0.38
Osaka	Japan	11460335	0.38	0.38	0.38
Sendai	Japan	1098948	0.38	0.38	0.38
Huhot	China	2042678	0.38	0.38	0.38
Guangzhou	China	55244118	0.38	0.38	0.38
Almaty	Kazakhstan	1540615	0.38	0.37	0.37
Barcelona	Spain	5852288	0.37	0.37	0.36
Singapore	Singapore	4229092	0.37	0.37	0.37
San Antonio	United States	2055273	0.37	0.37	0.37
Baku	Azerbaijan	1926800	0.37	0.36	0.36
Beijing	China	25264895	0.37	0.36	0.36
Tianjin	China	10546355	0.36	0.36	0.36
Durban	South Africa	3088105	0.36	0.36	0.35
Cape Town	South Africa	4366689	0.36	0.36	0.36
Fukuoka	Japan	1779400	0.36	0.36	0.35
Anshan	China	2269788	0.36	0.36	0.35
Sapporo	Japan	1690825	0.36	0.36	0.35
Milan	Italy	4122031	0.36	0.35	0.35
Budapest	Hungary	1865631	0.36	0.35	0.35
Shenyang	China	6875013	0.36	0.35	0.35
Fushun	China	6875013	0.36	0.35	0.35
Kwangju	South Korea	1213516	0.35	0.35	0.34
Tokyo	Japan	30460789	0.35	0.35	0.34
Kawasaki	Japan	30460789	0.35	0.35	0.34
Yokohama	Japan	30460789	0.35	0.35	0.34
Rostov-on-Don	Russia	1003388	0.35	0.35	0.34
Bursa	Turkey	1598504	0.34	0.34	0.34
Kharkiv	Ukraine	1234464	0.34	0.34	0.34
Dalian	China	3561976	0.34	0.33	0.33
Taegu	South Korea	1546494	0.34	0.33	0.33
Nagoya	Japan	6521352	0.33	0.32	0.32
Los Angeles	United States	16705268	0.32	0.32	0.32
Inch`on	South Korea	20238764	0.32	0.32	0.31
Seoul	South Korea	20238764	0.32	0.32	0.31
Taejon	South Korea	1217473	0.32	0.31	0.31
Riyadh	Saudi Arabia	2204791	0.31	0.31	0.31
Paris	France	10679964	0.31	0.31	0.30
Perth	Australia	1587826	0.31	0.30	0.30
Jilin	China	1565112	0.30	0.30	0.29

Prague	Czech Republic	1013824	0.30	0.30	0.29
Changchun	China	3676674	0.30	0.29	0.29
Warsaw	Poland	1724434	0.29	0.29	0.29
Brisbane	Australia	1740274	0.29	0.29	0.29
Kyiv	Ukraine	1432372	0.29	0.28	0.28
Berlin	Germany	2852694	0.29	0.28	0.28
Minsk	Belarus	2077299	0.28	0.28	0.28
Montreal	Canada	2742250	0.27	0.27	0.27
Harbin	China	4098925	0.27	0.27	0.26
Vienna	Austria	1733892	0.27	0.27	0.27
Rome	Italy	2890755	0.27	0.27	0.26
Pusan	South Korea	2121985	0.27	0.26	0.26
San Jose	United States	5798080	0.27	0.26	0.26
Toronto	Canada	7169055	0.25	0.25	0.25
Munich	Germany	1469977	0.25	0.24	0.24
Sydney	Australia	3035889	0.24	0.24	0.23
Calgary	Canada	1366331	0.23	0.23	0.23
Melbourne	Australia	3266648	0.23	0.23	0.23
Hamburg	Germany	1445521	0.23	0.23	0.23
Ottawa	Canada	1134458	0.23	0.22	0.22
San Diego	United States	3097877	0.22	0.21	0.21
Brussels	Belgium	1538307	0.21	0.21	0.21
Birmingham	United Kingdom	2492293	0.19	0.19	0.19
Moscow	Russia	14652500	0.18	0.18	0.17
Chicago	United States	8225476	0.18	0.18	0.18
New York	United States	7161125	0.18	0.17	0.17
Philadelphia	United States	3376769	0.15	0.15	0.15
Glasgow	United Kingdom	1195909	0.15	0.15	0.15
Dallas	United States	6511756	0.15	0.15	0.14
Edmonton	Canada	1183271	0.14	0.13	0.12
Auckland	New Zealand	1042783	0.13	0.13	0.13
Houston	United States	6321278	0.12	0.12	0.12
Novosibirsk	Russia	1000238	0.10	0.00	0.00
London	United Kingdom	10451604	0.05	0.05	0.05

Supplementary Note 5 | Dominant heat risk components

Cities were classified by their dominant risk component (H, V, or C), with mixed profiles assigned where the difference between top components was <0.05 (e.g., H–V or H–V–C), providing a simplified typology of risk drivers.

Table S5.1 Typological classification of cities based on dominant heat risk components

City Name	Country Name	H	V	C	Risk score	Risk profile	Dominant Component
Hyderabad	Pakistan	0.86	0.72	0.97	0.85	Lack of Coping Capacity	C
Al Basrah	Iraq	0.96	0.83	0.73	0.83	Hazard & Exposure	H
Conakry	Guinea	0.88	0.83	0.77	0.83	Hazard & Exposure	H
Bamako	Mali	0.9	0.9	0.71	0.83	Mixed	H/V
Kano	Nigeria	0.84	1	0.68	0.83	Vulnerability	V
Kumasi	Ghana	0.87	0.81	0.71	0.79	Hazard & Exposure	H
Karachi	Pakistan	0.71	0.68	1	0.79	Lack of Coping Capacity	C
Madurai	India	0.99	0.72	0.67	0.78	Hazard & Exposure	H
Faisalabad	Pakistan	0.77	0.69	0.89	0.78	Lack of Coping Capacity	C
Kaduna	Nigeria	0.76	0.95	0.63	0.77	Vulnerability	V
Phnom Penh	Cambodia	0.98	0.66	0.69	0.76	Hazard & Exposure	H
Patna	India	0.75	0.77	0.72	0.75	Mixed	H/V
Ibadan	Nigeria	0.91	0.88	0.53	0.75	Mixed	H/V
Khartoum	Sudan	0.96	0.64	0.66	0.74	Hazard & Exposure	H
Lagos	Nigeria	0.91	0.8	0.57	0.74	Hazard & Exposure	H
Ahmadabad	India	0.89	0.57	0.79	0.74	Hazard & Exposure	H
Luanda	Angola	0.85	0.81	0.58	0.74	Mixed	H/V
Benin City	Nigeria	0.93	0.84	0.5	0.73	Hazard & Exposure	H
Yaounde	Cameroon	0.75	0.84	0.61	0.73	Vulnerability	V
Port Harcourt	Nigeria	0.9	0.79	0.53	0.72	Hazard & Exposure	H
Ho Chi Minh City	Vietnam	1	0.66	0.57	0.72	Hazard & Exposure	H
Lahore	Pakistan	0.74	0.63	0.8	0.72	Lack of Coping Capacity	C
Peshawar	Pakistan	0.64	0.67	0.88	0.72	Lack of Coping Capacity	C
Jaipur	India	0.78	0.62	0.77	0.72	Mixed	H/C
Accra	Ghana	0.77	0.65	0.76	0.72	Mixed	H/C
Barranquilla	Colombia	0.91	0.63	0.64	0.71	Hazard & Exposure	H
Quezon City	Philippines	0.87	0.73	0.55	0.7	Hazard & Exposure	H
Manila	Philippines	0.87	0.73	0.55	0.7	Hazard & Exposure	H
Kanpur	India	0.77	0.67	0.69	0.7	Hazard & Exposure	H
Lucknow	India	0.73	0.68	0.7	0.7	Mixed	H/V/C
Baghdad	Iraq	0.84	0.56	0.7	0.69	Hazard & Exposure	H
Surabaya	Indonesia	0.94	0.71	0.49	0.69	Hazard & Exposure	H
Abidjan	Cote d'Ivoire	0.84	0.68	0.58	0.69	Hazard & Exposure	H
Nagpur	India	0.86	0.54	0.71	0.69	Hazard & Exposure	H
Bhopal	India	0.75	0.66	0.65	0.69	Hazard & Exposure	H

Islamabad	Pakistan	0.59	0.64	0.87	0.69	Lack of Coping Capacity	C
Rawalpindi	Pakistan	0.59	0.64	0.87	0.69	Lack of Coping Capacity	C
Chennai	India	0.79	0.64	0.62	0.68	Hazard & Exposure	H
Kolkata	India	0.82	0.64	0.59	0.68	Hazard & Exposure	H
Kinshasa	Congo, DRC	0.84	0.84	0.45	0.68	Mixed	H/V
Hyderabad	India	0.76	0.56	0.71	0.67	Hazard & Exposure	H
Pune	India	0.74	0.62	0.66	0.67	Hazard & Exposure	H
Bangalore	India	0.64	0.65	0.68	0.66	Mixed	H/V/C
Bandung	Indonesia	0.77	0.73	0.5	0.66	Mixed	H/V
Dar es Salaam	Tanzania	0.74	0.73	0.54	0.66	Mixed	H/V
Guayaquil	Ecuador	0.79	0.73	0.47	0.65	Hazard & Exposure	H
Hanoi	Vietnam	0.75	0.63	0.58	0.65	Hazard & Exposure	H
Port-au-Prince	Haiti	0.86	0.51	0.62	0.65	Hazard & Exposure	H
Semarang	Indonesia	0.88	0.73	0.41	0.64	Hazard & Exposure	H
Palembang	Indonesia	0.93	0.71	0.4	0.64	Hazard & Exposure	H
Medan	Indonesia	0.96	0.73	0.38	0.64	Hazard & Exposure	H
Lima	Peru	0.56	0.58	0.8	0.64	Lack of Coping Capacity	C
Cairo	Egypt	0.68	0.51	0.76	0.64	Lack of Coping Capacity	C
Az Zarqa'	Jordan	0.56	0.54	0.83	0.64	Lack of Coping Capacity	C
Amman	Jordan	0.56	0.54	0.83	0.64	Lack of Coping Capacity	C
Kampala	Uganda	0.59	0.83	0.53	0.64	Vulnerability	V
Delhi	India	0.74	0.47	0.72	0.63	Mixed	H/C
Da Nang	Vietnam	0.58	0.78	0.55	0.63	Vulnerability	V
Dhaka	Bangladesh	0.79	0.58	0.52	0.62	Hazard & Exposure	H
Jakarta	Indonesia	0.94	0.53	0.47	0.62	Hazard & Exposure	H
Mumbai	India	0.73	0.53	0.6	0.62	Hazard & Exposure	H
Cali	Colombia	0.63	0.61	0.6	0.61	Mixed	H/V/C
Maputo	Mozambique	0.58	0.76	0.51	0.61	Vulnerability	V
Goiania	Brazil	0.74	0.53	0.54	0.6	Hazard & Exposure	H
Manaus	Brazil	0.96	0.52	0.39	0.58	Hazard & Exposure	H
Bangkok	Thailand	0.98	0.38	0.52	0.58	Hazard & Exposure	H
Samut Prakan	Thailand	0.98	0.38	0.52	0.58	Hazard & Exposure	H
Antananarivo	Madagascar	0.44	0.73	0.61	0.58	Vulnerability	V
Merida	Mexico	0.89	0.39	0.54	0.57	Hazard & Exposure	H
Guatemala	Guatemala	0.53	0.62	0.58	0.57	Mixed	V/C
San Luis Potosi	Mexico	0.54	0.46	0.71	0.56	Lack of Coping Capacity	C
Nairobi	Kenya	0.5	0.63	0.57	0.56	Vulnerability	V
Rabat	Morocco	0.48	0.55	0.61	0.55	Lack of Coping Capacity	C
Belo Horizonte	Brazil	0.57	0.57	0.51	0.55	Mixed	H/V
Casablanca	Morocco	0.45	0.53	0.66	0.54	Lack of Coping Capacity	C
Fortaleza	Brazil	0.67	0.42	0.54	0.53	Hazard & Exposure	H
Kuala Lumpur	Malaysia	0.97	0.46	0.34	0.53	Hazard & Exposure	H
Rangoon	Myanmar	0.94	0.4	0.39	0.53	Hazard & Exposure	H
Alexandria	Egypt	0.41	0.47	0.75	0.53	Lack of Coping Capacity	C

Guadalajara	Mexico	0.65	0.36	0.64	0.53	Mixed	H/C
Recife	Brazil	0.61	0.53	0.42	0.52	Hazard & Exposure	H
Nanchang	China	0.52	0.47	0.57	0.52	Mixed	H/C
Medellin	Colombia	0.49	0.58	0.5	0.52	Vulnerability	V
Brasilia	Brazil	0.61	0.41	0.52	0.51	Hazard & Exposure	H
Rio de Janeiro	Brazil	0.64	0.48	0.43	0.51	Hazard & Exposure	H
Kathmandu	Nepal	0.45	0.46	0.63	0.51	Lack of Coping Capacity	C
Puebla	Mexico	0.49	0.4	0.63	0.5	Lack of Coping Capacity	C
Bogota	Colombia	0.36	0.52	0.66	0.5	Lack of Coping Capacity	C
Jeddah	Saudi Arabia	0.92	0.17	0.73	0.49	Hazard & Exposure	H
Nanning	China	0.62	0.42	0.47	0.49	Hazard & Exposure	H
Chittagong	Bangladesh	0.75	0.44	0.35	0.49	Hazard & Exposure	H
Mashhad	Iran	0.43	0.46	0.62	0.49	Lack of Coping Capacity	C
Sao Paulo	Brazil	0.52	0.44	0.51	0.49	Mixed	H/C
Santiago	Chile	0.47	0.39	0.61	0.48	Lack of Coping Capacity	C
Luoyang	China	0.43	0.49	0.52	0.48	Mixed	V/C
Hefei	China	0.44	0.48	0.52	0.48	Mixed	V/C
Fuzhou	China	0.54	0.44	0.45	0.47	Hazard & Exposure	H
Zhengzhou	China	0.43	0.43	0.54	0.47	Lack of Coping Capacity	C
Mexico City	Mexico	0.49	0.34	0.63	0.47	Lack of Coping Capacity	C
Toluca	Mexico	0.46	0.37	0.61	0.47	Lack of Coping Capacity	C
Changsha	China	0.5	0.42	0.5	0.47	Mixed	H/C
Quito	Ecuador	0.37	0.6	0.47	0.47	Vulnerability	V
Tunis	Tunisia	0.43	0.38	0.61	0.46	Lack of Coping Capacity	C
Izmir	Turkey	0.39	0.42	0.6	0.46	Lack of Coping Capacity	C
Queretaro	Mexico	0.54	0.29	0.64	0.46	Lack of Coping Capacity	C
Curitiba	Brazil	0.45	0.43	0.49	0.46	Mixed	H/C
Urumqi	China	0.24	0.54	0.69	0.45	Lack of Coping Capacity	C
Yinchuan	China	0.29	0.48	0.64	0.45	Lack of Coping Capacity	C
Algiers	Algeria	0.44	0.43	0.48	0.45	Mixed	H/V/C
Chongqing	China	0.48	0.41	0.47	0.45	Mixed	H/C
Tashkent	Uzbekistan	0.43	0.32	0.6	0.44	Lack of Coping Capacity	C
Lanzhou	China	0.26	0.49	0.68	0.44	Lack of Coping Capacity	C
Tehran	Iran	0.44	0.3	0.62	0.43	Lack of Coping Capacity	C
Wuhan	China	0.46	0.33	0.53	0.43	Lack of Coping Capacity	C
Buenos Aires	Argentina	0.34	0.46	0.5	0.43	Mixed	V/C
Phoenix	United States	0.84	0.14	0.63	0.42	Hazard & Exposure	H
Kunming	China	0.32	0.43	0.53	0.42	Lack of Coping Capacity	C
Chengdu	China	0.46	0.33	0.49	0.42	Mixed	H/C
Hangzhou	China	0.47	0.36	0.46	0.42	Mixed	H/C
Guiyang	China	0.32	0.53	0.43	0.42	Vulnerability	V
Baotou	China	0.23	0.44	0.67	0.41	Lack of Coping Capacity	C
Taiyuan	China	0.29	0.38	0.62	0.41	Lack of Coping Capacity	C
Tangshan	China	0.34	0.34	0.58	0.41	Lack of Coping Capacity	C

Shijiazhuang	China	0.39	0.31	0.57	0.41	Lack of Coping Capacity	C
Xi'an	China	0.38	0.32	0.55	0.41	Lack of Coping Capacity	C
Nanjing	China	0.41	0.34	0.48	0.41	Lack of Coping Capacity	C
Xining	China	0.2	0.52	0.63	0.4	Lack of Coping Capacity	C
Istanbul	Turkey	0.32	0.37	0.53	0.4	Lack of Coping Capacity	C
Salvador	Brazil	0.44	0.49	0.3	0.4	Mixed	H/V
Porto Alegre	Brazil	0.47	0.37	0.36	0.39	Hazard & Exposure	H
Monterrey	Mexico	0.67	0.15	0.58	0.39	Hazard & Exposure	H
Kyoto	Japan	0.39	0.27	0.54	0.39	Lack of Coping Capacity	C
Osaka	Japan	0.39	0.27	0.54	0.39	Lack of Coping Capacity	C
Bucharest	Romania	0.34	0.39	0.46	0.39	Lack of Coping Capacity	C
Qingdao	China	0.29	0.35	0.57	0.39	Lack of Coping Capacity	C
Shanghai	China	0.41	0.29	0.51	0.39	Lack of Coping Capacity	C
Jinan	China	0.37	0.32	0.51	0.39	Lack of Coping Capacity	C
Ankara	Turkey	0.36	0.24	0.67	0.39	Lack of Coping Capacity	C
Johannesburg	South Africa	0.44	0.25	0.55	0.39	Lack of Coping Capacity	C
Pretoria	South Africa	0.44	0.25	0.55	0.39	Lack of Coping Capacity	C
Madrid	Spain	0.4	0.25	0.59	0.39	Lack of Coping Capacity	C
Guangzhou	China	0.63	0.21	0.41	0.38	Hazard & Exposure	H
Almaty	Kazakhstan	0.23	0.44	0.53	0.38	Lack of Coping Capacity	C
Huhot	China	0.21	0.42	0.65	0.38	Lack of Coping Capacity	C
San Antonio	United States	0.63	0.2	0.41	0.37	Hazard & Exposure	H
Singapore	Singapore	0.72	0.2	0.37	0.37	Hazard & Exposure	H
Baku	Azerbaijan	0.34	0.24	0.6	0.37	Lack of Coping Capacity	C
Beijing	China	0.36	0.28	0.5	0.37	Lack of Coping Capacity	C
Barcelona	Spain	0.33	0.39	0.41	0.37	Mixed	V/C
Fukuoka	Japan	0.34	0.3	0.46	0.36	Lack of Coping Capacity	C
Tianjin	China	0.34	0.24	0.59	0.36	Lack of Coping Capacity	C
Shenyang	China	0.23	0.34	0.58	0.36	Lack of Coping Capacity	C
Fushun	China	0.23	0.34	0.58	0.36	Lack of Coping Capacity	C
Anshan	China	0.23	0.38	0.54	0.36	Lack of Coping Capacity	C
Cape Town	South Africa	0.35	0.28	0.48	0.36	Lack of Coping Capacity	C
Budapest	Hungary	0.25	0.42	0.44	0.36	Mixed	V/C
Milan	Italy	0.34	0.35	0.39	0.36	Mixed	H/V/C
Sapporo	Japan	0.16	0.54	0.54	0.36	Mixed	V/C
Kwangju	South Korea	0.31	0.34	0.42	0.35	Lack of Coping Capacity	C
Tokyo	Japan	0.39	0.21	0.51	0.35	Lack of Coping Capacity	C
Kawasaki	Japan	0.39	0.21	0.51	0.35	Lack of Coping Capacity	C
Yokohama	Japan	0.39	0.21	0.51	0.35	Lack of Coping Capacity	C
Rostov-on-Don	Russia	0.24	0.42	0.42	0.35	Mixed	V/C
Taegu	South Korea	0.3	0.27	0.47	0.34	Lack of Coping Capacity	C
Dalian	China	0.21	0.37	0.5	0.34	Lack of Coping Capacity	C
Bursa	Turkey	0.35	0.21	0.54	0.34	Lack of Coping Capacity	C
Kharkiv	Ukraine	0.18	0.5	0.44	0.34	Vulnerability	V

Nagoya	Japan	0.39	0.17	0.52	0.33	Lack of Coping Capacity	C
Los Angeles	United States	0.57	0.12	0.48	0.32	Hazard & Exposure	H
Inch`on	South Korea	0.26	0.29	0.43	0.32	Lack of Coping Capacity	C
Seoul	South Korea	0.26	0.29	0.43	0.32	Lack of Coping Capacity	C
Taejon	South Korea	0.27	0.3	0.41	0.32	Lack of Coping Capacity	C
Riyadh	Saudi Arabia	0.87	0.05	0.73	0.31	Hazard & Exposure	H
Perth	Australia	0.39	0.17	0.43	0.31	Mixed	H/C
Paris	France	0.23	0.53	0.24	0.31	Vulnerability	V
Changchun	China	0.14	0.31	0.61	0.3	Lack of Coping Capacity	C
Jilin	China	0.13	0.37	0.59	0.3	Lack of Coping Capacity	C
Prague	Czech Republic	0.19	0.54	0.27	0.3	Vulnerability	V
Warsaw	Poland	0.15	0.47	0.37	0.3	Vulnerability	V
Brisbane	Australia	0.52	0.16	0.3	0.29	Hazard & Exposure	H
Kyiv	Ukraine	0.17	0.41	0.35	0.29	Vulnerability	V
Berlin	Germany	0.18	0.6	0.21	0.29	Vulnerability	V
Montreal	Canada	0.14	0.35	0.44	0.28	Lack of Coping Capacity	C
Minsk	Belarus	0.08	0.67	0.4	0.28	Vulnerability	V
Rome	Italy	0.4	0.15	0.33	0.27	Hazard & Exposure	H
Harbin	China	0.1	0.32	0.63	0.27	Lack of Coping Capacity	C
Vienna	Austria	0.21	0.31	0.31	0.27	Mixed	V/C
Pusan	South Korea	0.26	0.28	0.27	0.27	Mixed	H/V/C
San Jose	United States	0.4	0.13	0.37	0.27	Mixed	H/C
Toronto	Canada	0.19	0.24	0.36	0.25	Lack of Coping Capacity	C
Munich	Germany	0.19	0.3	0.26	0.25	Mixed	V/C
Sydney	Australia	0.37	0.24	0.15	0.24	Hazard & Exposure	H
Calgary	Canada	0.1	0.23	0.57	0.23	Lack of Coping Capacity	C
Ottawa	Canada	0.13	0.25	0.37	0.23	Lack of Coping Capacity	C
Melbourne	Australia	0.25	0.22	0.23	0.23	Mixed	H/V/C
Hamburg	Germany	0.14	0.46	0.19	0.23	Vulnerability	V
San Diego	United States	0.49	0.05	0.38	0.22	Hazard & Exposure	H
Brussels	Belgium	0.2	0.37	0.13	0.21	Vulnerability	V
Birmingham	United Kingdom	0.14	0.6	0.08	0.19	Vulnerability	V
New York	United States	0.27	0.17	0.11	0.18	Hazard & Exposure	H
Chicago	United States	0.22	0.08	0.34	0.18	Lack of Coping Capacity	C
Moscow	Russia	0.06	0.34	0.31	0.18	Mixed	V/C
Dallas	United States	0.52	0.01	0.44	0.15	Hazard & Exposure	H
Philadelphia	United States	0.31	0.12	0.1	0.15	Hazard & Exposure	H
Glasgow	United Kingdom	0.06	0.61	0.08	0.15	Vulnerability	V
Edmonton	Canada	0.02	0.34	0.55	0.14	Lack of Coping Capacity	C
Auckland	New Zealand	0.23	0.37	0.03	0.13	Vulnerability	V

Houston	United States	0.59	0.01	0.31	0.12	Hazard & Exposure	H
Novosibirsk	Russia	0	0.51	0.58	0.11	Lack of Coping Capacity	C
London	United Kingdom	0.17	0.51	0	0.05	Vulnerability	V

Supplementary Note 6 | Spearman correlations of risk components

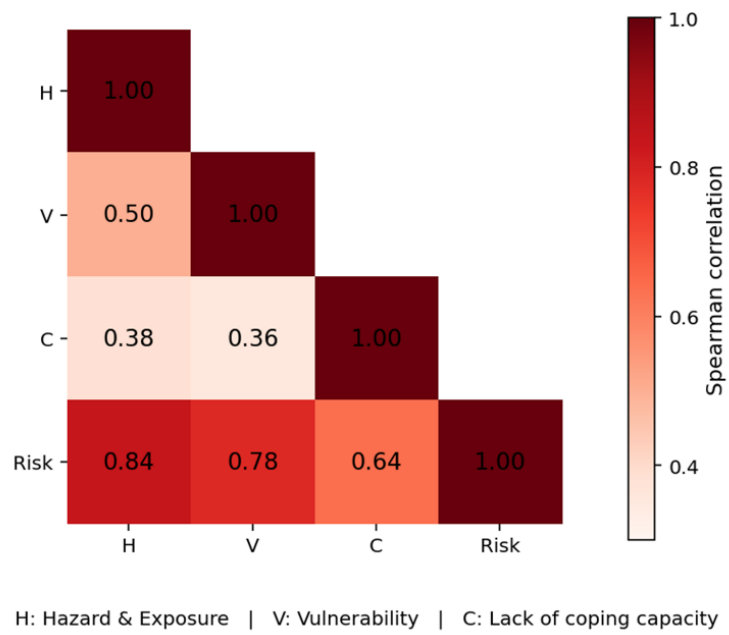


Figure S6.1 Spearman correlations among heat risk components and composite risk