

Supplementary Table 1. List of tropical countries and their covid-19-related and solar index variables data

Tropical Country/Territory /Area	Total Number of Confirmed Cases Per 100 000 Population (N)	Total Number of Mortality Per 100 000 Population (N)	Capital	Specific photo-voltaic power output, PVOUT specific (kWh/kWp)	Direct normal irradiation, DNI (kWh/m ²)	Global horizontal irradiation, GHI (kWh,m ²)	Diffuse horizontal irradiation DIF (kWh/m ²)	Global tilted irradiation at optimum angle, GTI opto (kWh/m ²)
Niger	39.1	1.3	Niamey	1678.5	1544.7	2126.5	995.9	2199
Chad	46.6	1.2	Chad	1818	1773.8	2277.7	1001.2	2389.8
United Republic of Tanzania	70.5	1.4	Dodoma	1832.1	2187.2	2311.3	754.6	2333.4
Sierra Leone	97.3	1.6	Freetown	1507.9	1135.6	1860.2	996.5	1885.3
Burkina Faso	103.5	1.9	Ouagadougou	1668.9	1511.6	2106.6	998.6	2169.4
Nigeria	129.2	1.5	Abuja	1506.6	1114.2	1885.9	1050.7	1924.6
Sudan	145.2	11.4	Khartoum	1800.2	1839.7	2252.2	937.1	2360.9
Liberia	159.0	5.8	Monrovia	1684.6	1803.3	2059	830.5	2127.1
Mali	161.8	3.7	Bamako	1439.5	1051.4	1787.9	989.6	1803.6
Somalia	171.7	8.6	Mogadishu	1790.2	1894.8	2264.5	852.3	2270.5
Benin	230.8	1.3	Porto-Novo	1385.9	892.6	1732.1	1057.2	1741.3
Nicaragua	231.1	3.7	Managua	1653.6	1821.5	2075.5	810.7	2135.8
Madagascar	244.2	5.1	Antananarivo	1733.2	2008.5	2068.2	709.8	2175
Eritrea	287.3	2.9	Asmara	1964.2	2350.1	2322.5	720.2	2449.9
Guinea	290.8	3.5	Conakry	1584.3	1264	1949.5	994.3	1983.9
Haiti	297.1	7.5	Port-au-Prince	1729.5	2045.7	2113.2	734.6	2230.7
Central African Republic	317.0	2.3	Bangui	1554.9	1311.5	1971.5	977	1984
Angola	319.3	5.9	Luanda	1433.2	1159.7	1770.3	946.1	1794.7
Côte d'Ivoire	333.3	3.1	Yamoussoukro	1415.3	959.2	1782.3	1062.7	1797
Uganda	371.0	7.9	Kampala	1547.3	1436.6	1926.5	882	1916.1
Ethiopia	430.8	6.6	Addis Ababa	1679.7	1691.4	2041.1	857.3	2103.9
Burundi	432.9	0.1	Gitega	1545.5	1350.6	1914.2	934.4	1924.5
Congo	449.0	7.0	Kinshasa	1398.1	993	1763.8	998.7	1760.4
Guinea-Bissau	449.6	8.9	Bissau	1656.9	1454.6	2061.1	986.8	2115.5
Malawi	460.7	14.0	Lilongwe	1708.8	1871.1	2071.5	780.5	2154
Cameroon	467.1	7.4	Yaoundé	1415	975.3	1760.5	1035.6	1768.9
Togo	475.2	3.5	Lomé	1513.6	1143.7	1899.8	1030.6	1909.9
Gambia	520.8	15.4	Banjul	1702.9	1483.1	2086	993	2145.8
Senegal	530.9	11.8	Dakar	1751.1	1519.5	2114.4	999.3	2183.9
Kenya	636.2	10.6	Nairobi	1540.9	1439.1	1927.3	848.8	1897.3
Mozambique	738.5	7.1	Maputo	1574	1678.5	1799.8	710.9	1968.6
Cambodia	827.9	18.3	Phnom Penh	1566.6	1458.1	1959.4	897.1	2005.1
Rwanda	1025.4	11.3	Kigali	1512.7	1234.4	1866.6	931.9	1871.7
Comoros	1032.5	18.4	Moroni	1451.1	1356.8	1785.5	845.9	1819.1
Myanmar	1164.4	35.8	Nay Pyi Taw	1592.7	1542.9	1887.4	823	2045.6
Equatorial Guinea	1218.0	13.0	Malabo	1332.6	868.2	1658.9	1005.4	1658.7
Mauritania	1364.0	21.4	Nouakchott	1783.8	1636.7	2162.3	986	2272.1
Djibouti	1588.1	19.1	Djibouti	1648.8	1620.1	2097.6	900.8	2146.7

Timor-Leste	1773.7	10.5	Dili (east timor)	1771.4	2101.7	2211.7	707.2	2252.8
Zambia	1815.4	21.9	Lusaka	1773.5	2021.7	2116.4	740.8	2229.3
Venezuela	1931.4	20.5	Caracas	1603.9	1607.8	1982.1	870.4	2019.9
Gabon	2200.3	13.7	Libreville	1416.3	1022.6	1766.6	984.3	1758.5
Indonesia	2453.8	58.7	Jakarta	1340.6	928.7	1682.7	994.3	1699
Sao Tome and Principe	2865.0	35.1	São Tomé	1439.2	1101.8	1798.3	981	1785.3
Lao People's Democratic Republic	2988.9	10.4	Vientiane	1505.6	1334.9	1813.4	877.4	1912.8
El Salvador	3111.0	65.2	San Salvador	1748	2020.7	2139.1	764.7	2225.8
India	3237.4	38.5	New Delhi	1465.2	1158.1	1713.9	927.4	1861.8
Philippines	3702.4	59.4	Manila	1377.5	1268.3	1713.6	826.8	1746.4
Honduras	4667.9	111.7	Tegucigalpa	1618.3	1699.3	1992.7	818.3	2053.7
Jamaica	5155.7	115.9	Kingston	1714.2	1964.1	2080.7	739.7	2175.5
Mexico	5575.7	256.6	Mexico City	1825.7	2071.6	2156.3	750.2	2294.7
Ecuador	5809.2	203.6	Quito	1634.9	1707.2	2004.2	823.8	1995.6
Dominican Republic	6043.0	40.4	Santo Domingo	1673.9	1853	2018.3	770.1	2118.5
Guatemala	6613.0	111.5	Guatemala City	1763.9	2005.7	2122.1	758	2207.3
Thailand	6760.6	48.0	Bangkok	1449.5	1196.9	1798.1	932.6	1853.9
Saint Vincent and the Grenadines	8563.2	104.6	Kingstown	1754.9	1940.1	2143.3	779.4	2204.8
Guyana	9123.0	163.4	Georgetown	1591.4	1600.6	1989.2	857.2	2006.2
Antigua and Barbuda	9298.6	149.1	Saint John's	1688.6	1793.9	2034.2	832.4	2119.6
Bahamas	9533.8	211.8	Nassau	1674.4	1900	1944.6	723.5	2093.6
Bolivia	9702.3	190.8	Sucre	1973	2487.6	2282.9	632	2453.2
Cuba	9814.9	75.3	Havana	1661.1	1917.2	1969.2	704.8	2100.9
Paraguay	10097.4	275.6	Asunción	1585.7	1827.3	1867.6	673.5	1999
Viet Nam	11838.2	44.4	Hanoi	1076.6	631	1321.6	848.5	1345
Saint Kitts and Nevis	12332.7	86.5	Basseterre	1755.9	1963.3	2114.7	764.8	2207.6
Colombia	12441.1	279.1	Bogotá	1416.7	1227.9	1723.9	911.9	1731.9
Trinidad and Tobago	13269.7	305.2	Port of Spain	1576.7	1619.4	1947.3	834.8	1980.4
Peru	13393.2	660.8	Lima	1415.8	1098.4	1722.3	902.8	1738.4
Suriname	13906.7	237.5	Paramaribo	1545.5	1504	1943.1	873.8	1955.3
Mayotte	15366.1	68.5	Mamoudzou	1662.5	1758.1	2019.6	796.6	2082.2
Malaysia	15505.7	113.7	Kuala Lumpur	1307.7	914.1	1662.3	953.2	1656.1
Saint Lucia	16193.7	222.7	Castries	1652.3	1745.9	2045.6	832.9	2102.6
Turks and Caicos Islands	16692.5	93.0	Cockburn Town	1789.8	2105.1	2120.4	707.2	2250.6
Brazil	16890.3	325.5	Brasília	1698.4	1944.9	2026.2	727.2	2142
Belize	17447.5	173.0	Belmopan	1520.3	1499.3	1877.1	836.7	1938.1
Grenada	17457.8	211.5	Saint George's	1774	1941.2	2144.4	788.9	2196.3
Dominica	21891.6	102.8	Roseau	1711.3	1867.2	2076.2	786.1	2147
Mauritius	22645.6	81.6	Port Louis	1605.4	1688.7	1910.8	792.1	2010.1
United States Virgin Islands	22688.1	121.6	Charlotte Amalie	1719.5	1889.9	2054	786.2	2150.2
Costa Rica	22702.6	177.8	San José	1461	1402.4	1810.9	841.8	1838
Panama	23662.0	198.2	Panama City	1436.7	1230.4	1787	910.2	1812.7
British Virgin Islands	24159.1	211.7	Road Town	1679.9	1742.2	2014.9	785.6	2101.3
Anguilla	26023.2	80.0	The Valley	1809	2132.7	2173.3	719.7	2283

Montserrat	28065.6	160.0	Montserrat	1605.6	1476.3	1904.3	853.6	1971.8
Saint Martin	31309.7	119.0	Saint Martin	1736	1840	2069	805.3	2159.7
French Guiana	32652.1	137.6	French Guiana	1496.2	1352.3	1894.4	902.1	1899.4
Puerto Rico	36314.6	191.3	San Juan	1652.6	1860.7	2005.9	755.5	2100.2
Barbados	36334.4	197.3	Bridgetown	1746.4	1911.2	2132.8	807.2	2189.2
Aruba	40924.1	262.3	Oranjestad	1764.5	1883.5	2165.8	859.4	2218.1
Cayman Islands	47716.1	54.8	George Town	1670.7	1819.7	2010.2	787	2103
Guadeloupe	49636.6	249.2	Basse-Terre	1742.4	1969.5	2113.7	765.3	2195.6
Seychelles	51201.4	174.9	Victoria	1548.4	1405.1	1907.9	879.4	1918.5
Réunion	54141.6	101.1	Saint-Denis	1634	1810	1942.8	717.4	2055.4
Martinique	59911.3	286.7	Fort-de-France	1684.6	1803.3	2059	830.5	2127.1
Brunei	60990.1	33.4	Bandar Seri	1445.5	1216.7	1818	910.4	1818.7
Darussalam			Begawan					

Supplementary Table 2. List of non-tropical countries and their covid-19-related and solar index variables data

Tropical Country/ Territory/Area	Total Number of Con- firmed Cases Per 100 000 Popula- tion (N)	Total Number of Mortality Per 100 000 Popula- tion (N)	Capital	Specific photo- voltaic power output, PVOUT specific (kWh/kWp)	Direct normal irradiation, DNI (kWh/m ²)	Global horizon- tal irradia- tion, GHI (kWh,m ²)	Diffuse horizontal irradiati- on, DIF (kWh/m ²)	Global tilted irradia- tion at optimum angle, GTI opto (kWh/m ²)
Afghanistan	532.0	20.2	Kabul	1852.1	2195	2037.6	673.1	2320.8
Albania	11555.8	124.9	Tirana	1478	1598.8	1575.7	625.4	1820.8
Algeria	618.4	15.7	Algiers	1569.8	1635.5	1717.1	697.1	1939.1
Andorra	61613.9	204.5	Andorra la Vella	1414.9	1619.8	1488.6	515.4	1770.6
Argentina	21748.1	287.8	Buenos Aires	1621.5	1951.8	1722.3	575.2	1982.9
Armenia	15047.1	294.0	Yerevan	1570.4	1703.2	1687.7	654.6	1952.8
Australia	42894.7	61.6	Canberra	1652.5	2092.2	1756	540	2021.2
Austria	63492.7	239.5	Vienna	1184.2	1105.8	1206.9	593.5	1416.8
Azerbaijan	8140.9	98.6	Baku	1406.3	1323.4	1515.3	692.4	1704.3
Bahrain	40939.4	90.3	Manama	1799.6	1851.6	2118	863.9	2292
Bangladesh	1236.9	17.9	Dhaka	1389.7	980	1641.9	951.6	1747.3
Belarus	10519.7	75.3	Minsk	1054.1	967.9	1054.5	544.5	1245.7
Belgium	40481.7	288.2	Brussels	1054.3	933	1070.3	577.1	1250.5
Bermuda	29799.4	244.1	Hamilton	1545.1	1643.6	1734.2	691.5	1900.6
Bhutan	8103.1	2.7	Thimphu	1479.9	1262.5	1615.2	783.9	1790.5
Bonaire	46445.1	148.2	Kralendijk (Netherland)	1790.1	1932.2	2195.8	838.7	2246.3
Bosnia and Herzegovina	12216.8	494.4	Sarajevo	1272.6	1256.8	1339.1	603.9	1543.3
Botswana	13925.3	118.5	Gaborone	1837.4	2346.4	2111.2	610.5	2334.9
Bulgaria	18564.0	547.8	Sofia	1354.7	1353.7	1421.6	631.8	1642.3
Cabo Verde	11354.6	74.1	Praia	1750.9	1611.4	2134.1	958.8	2197.3
Canada	11810.0	128.9	Ottawa	1376.6	1454.6	1351.5	562.2	1621.1
Chile	26081.0	329.1	Santiago	1760.1	2344.2	2033.3	562.2	2259.4
China	685.7	2.1	Beijing	1350.4	1137.5	1393.6	728	1630.6
Croatia	31033.9	430.3	Zagreb	1229	1175.7	1282.9	614.5	1495.4
Curaçao	27831.2	181.6	Willemstad (Netherland)	1728.4	1809.9	2131.8	860.1	2175.8
Cyprus	70445.8	140.8	Nicosia	1725.7	2162.9	1926.6	597.7	2179.2
Denmark	57951.7	131.6	Copenhagen	1048.2	1003.2	1025	523.9	1233
Egypt	503.7	24.2	Cairo	1799.4	2035.6	2102.9	756.1	2300.1
Estonia	45997.1	213.5	Tallinn	1048.5	1067.9	999	475.2	1228
Eswatini	6375.1	122.6	Mbabane	1594.4	1728.6	1774.7	665.3	1973.7
Falkland Islands (Malvinas)	55211.0	0.0	Stanley	1135.5	1054.6	1094.5	564.3	1318.9
Fiji	7655.2	97.9	Suva	1245.9	1059	1515.3	751	1561.8
France	58141.5	241.4	Paris	1136.6	1047.9	160	593.3	1357.2

French Polynesia	27685.9	231.0	Papeete	1680	1925.3	2019.8	703.5	2109.6
Georgia	45324.8	423.5	Georgia	1577.9	1750.6	1743.6	670.2	1959.1
Germany	44532.1	192.4	Berlin	1065.5	970.7	1065.7	562	1264
Ghana	550.4	4.7	Accra	1530.6	1158.5	1914.2	1031.4	1924.6
Gibraltar	60111.0	326.5	Gibraltar	1542.7	1515	1608.4	600.8	1795.1
Greece	51319.7	322.9	Athens	1592.6	1805.8	1749.5	645	1984.7
Guam	29510.9	243.5	Hagåtña	1642.6	1827.3	2018.1	767.7	2064.2
Guernsey	51884.7	102.4	Saint Peter Port	1162.5	1077.3	1191.6	584.7	1379.7
Holy See	3213.8	0.0	Vatican City	1513.7	1675.5	1598.3	618.6	1859.8
Hungary	22275.9	495.2	Budapest	1237.8	1128.8	1252.3	600	1457.6
Iran	9001.4	172.2	Tehran	1741.4	1902.3	1921.7	739.9	2196.8
Iraq	6128.4	63.1	Baghdad	1684	1808	1953.1	793.7	2188
Ireland	33935.7	166.6	Dublin	957.1	762.4	953.9	574.9	1120.7
Isle of Man	44698.5	136.4	Douglas	997.2	844.4	999.1	554.7	1162.2
Israel	54881.2	138.3	Jerusalem	1830.7	2338.4	2081.3	588.3	2296.8
Italy	41722.7	307.1	Rome	1521.5	1685.8	1601.1	620	1868
Japan	21496.0	42.3	Tokyo	1345.6	1236.9	1412.1	665.5	1617.5
Jersey	59664.6	133.6	Saint Helier	1179.5	1084.6	1193.2	588.6	1389
Jordan	17122.2	138.4	Amman	1881.2	2514.9	2139.4	547.7	2377.2
Kazakhstan	7940.0	101.5	Astana	1281.5	1319.9	1258.3	544.1	1515.1
Kosovo	15158.2	177.8	Pristina	1373.5	1405.2	1448.5	625.4	1674.6
Kuwait	15518.9	60.2	Kuwait City	1706.6	1821.6	2031	829.3	2217.6
Kyrgyzstan	3166.0	45.8	Bishkek	1473.3	1638.5	1554	586.5	1812.5
Latvia	50917.7	321.5	Riga	1056.8	1028.9	1026.2	509.2	1240.4
Lebanon	17899.1	157.4	Beirut	1693.8	2003.1	1924.4	646.3	2130.3
Lesotho	1610.0	33.0	Maseru	1850.9	2453.7	2049.3	554.6	2321.1
Libya	7380.2	93.7	Tripoli	1710.7	1874	1922	728	2131.4
Liechtenstein	54572.0	224.5	Vaduz	1163.8	986.4	1116.8	516.2	1327.5
Lithuania	45934.8	338.5	Vilnius	1020.2	927.5	1019.8	538	1206.1
Luxembourg	49626.7	187.7	Luxembourg	1079.7	976.2	1105.9	575.2	1284.8
Maldives	34348.0	57.5	Malé	1629.3	1601.6	2041	851.8	2048.8
Malta	22572.9	157.6	Valletta	1655.5	1808.5	1818.3	694.3	2026.1
Marshall Islands	26264.5	28.7	Majuro	1466.9	1410.8	1831.3	791	1842.1
Monaco	40429.1	165.6	Monaco	1494.5	1625.1	1532.5	610.6	1816.2
Mongolia	30724.3	65.1	Ulaanbaatar	1785.5	2179.6	1543.7	489.4	2051.6
Montenegro	45276.6	444.2	Podgorica	1470.2	1604.8	1540.1	610.3	1810.3
Morocco	3443.0	44.1	Rabat	1685.1	1801	1851.9	717.4	2086.3
Namibia	6687.7	160.6	Windhoek	1981.5	2860.3	2329.8	507.3	2550.8
Nepal	3435.4	41.3	Kathmandu	1568.4	1498.7	1771.9	795.9	1961.6
Netherlands	49151.7	131.8	Amsterdam	1043.4	914.5	1045.7	570.4	1227.8
New Caledonia	27453.8	110.0	Nouméa	1586.3	1780.6	1891.2	688.2	1991.6
New Zealand	42054.8	47.4	Wellington	1337.5	1438.8	1379.8	538.5	1592.8
North Macedonia	16569.1	460.7	Skopje	1377.4	1419.6	1478.4	634.4	1696.2
Northern Mariana Islands	22883.4	69.5	Saipan	1717.8	1931.1	2072.2	734.4	2134.8
Norway	27435.3	85.2	Oslo	1022.8	1022.9	951.2	473.2	1193

Occupied Palestinian Territory, including east Jerusalem	13785.0	111.9	Gaza	1823.1	2212.2	2063.9	638.7	2286
Oman	7815.7	90.6	Muscat	1813.4	1949.2	2182	854.7	2359.7
Pakistan	713.2	13.9	Islamabad	1549.6	1490.2	1756.8	792.6	1963.1
Papua New Guinea	520.4	7.5	Port Moresby	1602.6	1657.3	2006.4	798.9	2035
Poland	16762.2	312.0	Warsaw	1081.9	1001.6	1087.9	554	1282.8
Portugal	53936.5	249.5	Lisbon	1618.1	1889.1	1726.3	602.4	1975.7
Qatar	16892.2	23.8	Doha	1762.5	1816.2	2129.3	893.7	2292.8
Republic of Korea	55203.7	61.4	Seoul	1390	1229.8	1440.1	721.7	1663.5
Republic of Moldova	14777.0	295.7	Chişinău	1274.5	1264.7	1309.1	593.3	1532.2
Romania	17099.1	348.4	Bucharest	1321	1271.2	1374.4	629.6	1595
Russian Federation	14889.2	269.4	Moscow	1048.4	998.4	1036.5	526	1232.8
Saba	38127.3	103.5	The Bottom (Netherland)	1786.5	1929.7	2125.3	715.4	2219.7
Saint Barthélemy	54446.1	50.6	Gustavia	1805	2097.6	2167.3	728.1	2268.1
Saint Pierre and Miquelon	56497.0	17.3	Saint-Pierre	1144.2	1005.5	1153.2	574.5	1321
Samoa	8051.3	14.6	Apia	1588	1678.6	1936.7	734.5	1996.5
San Marino	67219.6	353.6	San Marino	1378.5	1475	1448.1	593.4	1678.1
Saudi Arabia	2374.3	27.3	Riyadh	1848.9	2078.6	2230.9	824.7	2418.9
Serbia	35161.1	252.3	Belgrade	1286.3	1239.2	1346.7	626.3	1561.7
Sint Eustatius	38547.3	159.3	Oranjestad	1764.5	1883.5	2165.8	859.4	2218.1
Sint Maarten	25567.8	207.5	Philipsburg (Netherland)	1790.9	2096.2	2166.6	722.8	2270.9
Slovakia	34045.0	380.9	Bratislava	1205.2	1128	1234	599	1446.2
Slovenia	61627.9	413.8	Ljubljana	1233.6	1168.8	1282.4	606.1	1482.3
Solomon Islands	3577.8	22.3	Honiara	1460.4	1484	1818.1	752	1842.1
South Africa	6820.7	172.9	Pretoria	1783.6	2131.5	2018.5	657.6	2242.4
South Sudan	164.1	1.2	Juba	1644.3	1609.4	2102	899.9	2121.5
Spain	28841.1	246.5	Madrid	1652.2	2026.6	1737	565.7	2041
Sri Lanka	3137.4	78.5	Sri Jayawardene-pura Kotte	1530.4	1283.8	1917.5	940.3	1937.2
Sweden	25675.9	206.9	Stockholm	1053.1	1083.7	992.6	485	1231
Switzerland	50283.7	159.2	Bern	1248.2	1257.6	1277.8	571	1497.8
Syrian Arab Republic	328.1	18.1	Damascus	1881.7	2558	2115.8	528.5	2377.5
Tajikistan	186.5	1.3	Dushanbe	1574.5	1666.7	1727.6	695.3	1973
The United Kingdom	35484.5	292.1	London	1021.6	873.9	1026	574.1	1206
Tunisia	9707.4	247.7	Tunis	1585.9	1716.4	1748.8	697.9	1975.9
Turkey	20162.3	120.3	Ankara	1532.5	1750.5	1657.2	609.7	1897.6
Ukraine	12234.0	253.1	Kyiv	1156.6	1096.6	1172.6	568.5	1375.4
United Arab Emirates	10578.2	23.7	Abu Dhabi	1820.5	1900.1	2173.3	876.5	2344.4
United States of America	29765.9	325.4	Washington DC	1470.6	1564.2	1531.2	624.3	1786.7
Uruguay	28873.5	217.4	Montevideo	1584.1	1859.5	1719.7	592.7	1932.1
Uzbekistan	743.8	4.9	Tashkent	1539	1649	1667.8	659.8	1914.4
Vanuatu	3900.8	4.6	Port Vila	1389.5	1275.3	1681.8	808.4	1729.7
Wallis and Futuna	30366.4	62.2	Matā'utu (France)	1543.5	1526.8	1889.7	770.4	1933.5
Yemen	40.0	7.2	Sana'a	1942.1	2311.3	2345.5	755.1	2473.5
Zimbabwe	1745.0	37.8	Harare	1776.3	2119.1	2094.4	687.5	2229.2