

## Supplementary Material

**Table S1.** Biogeographic domains and ecoregions included in this study, their surfaces and centroids. Number of ecoregions within each biogeographic domain in parentheses.

Biogeographic domain/Ecoregion	Surface (km <sup>2</sup> )	Centroided X	Centroided Y
<b>Afrotropic (n = 23)</b>			
<i>Angolan Miombo Woodlands</i>	690,767	18.1260	-12.4747
<i>Angolan Mopane Woodlands</i>	146,990	15.4562	-17.9383
<i>Central Zambezian Miombo Woodlands</i>	1,216,745	28.6362	-9.5779
<i>East Sudanian Savanna</i>	935,406	25.0921	8.4321
<i>Eastern Miombo Woodlands</i>	505,945	37.2378	-12.2385
<i>Guinean Forest-Savanna Mosaic</i>	687,746	-1.4409	8.8744
<i>Itigi-Sumbu Thicket</i>	7,937	32.1708	-7.1458
<i>Kalahari Acacia-Baikiaea Woodlands</i>	384,289	22.9014	-21.0716
<i>Madagascar Dry Deciduous Forests</i>	165,736	46.3538	-16.9212
<i>Mandara Plateau Mosaic</i>	7,735	13.7002	10.5155
<i>Northern Acacia-Commiphora Bushlands and Thickets</i>	325,257	36.8838	0.6593
<i>Northern Congolian Forest-Savanna Mosaic</i>	711,853	22.0592	5.4963
<i>Sahelian Acacia Savanna</i>	3,258,413	14.8427	14.8427
<i>Somali Acacia-Commiphora Bushlands and Thickets</i>	1,063,581	43.4991	5.8965
<i>Southern Acacia-Commiphora Bushlands and Thickets</i>	228,394	35.3313	-4.4023
<i>Southern Africa Bushveld</i>	261,206	28.5114	-22.6068
<i>Southern Congolian Forest-Savanna Mosaic</i>	573,357	21.9466	-5.7231
<i>Southern Miombo Woodlands</i>	448,286	31.3375	-17.5322
<i>West Sudanian Savanna</i>	1,705,016	-0.9302	11.8560
<i>Western Congolian Forest-Savanna Mosaic</i>	416,006	15.0456	-5.3282

<i>Zambezeian And Mopane Woodlands</i>	530,736	31.0127	31.0127
<i>Zambezeian Baikiaea Woodlands</i>	289,048	21.2278	-17.2735
<i>Zambezeian Cryptosepalum Dry Forests</i>	40,419	23.6269	-13.9103
Total	14,600,868		
<b>Australasia (<i>n</i> = 4)</b>			
<i>Lesser Sundas Deciduous Forests</i>	40,171	119.6750	-8.5723
<i>New Caledonia Dry Forests</i>	5,078	165.2656	-21.3263
<i>Sumba Deciduous Forests</i>	11,037	119.9495	-9.7607
<i>Timor and Wetar Deciduous Forest</i>	34,262	125.0775	-9.2090
Total	90,548		
<b>Indo-Malayan (<i>n</i> = 12)</b>			
<i>Central Deccan Plateau Dry Deciduous Forests</i>	267,321	78.4078	18.8029
<i>Central Indochina Dry Forests</i>	343,625	103.3078	15.4735
<i>Chhota-Nagpur Dry Deciduous Forests</i>	145,384	85.4464	23.6245
<i>East Deccan Dry-Evergreen Forests</i>	26,570	79.6699	11.9025
<i>Irrawaddy Dry Forests</i>	39,996	95.5034	20.7242
<i>Khathiar-Gir Dry Deciduous Forests</i>	321,576	75.2392	24.4865
<i>Narmada Valley Dry Deciduous Forests</i>	199,313	77.9374	22.7605
<i>Northern Dry Deciduous Forests</i>	66,246	83.2940	20.4873
<i>South Deccan Plateau Dry Deciduous Forests</i>	85,460	77.6871	11.6999
<i>Southeastern Indochina Dry Evergreen Forests</i>	130,631	106.1723	13.2054
<i>Southern Vietnam Lowland Dry Forests</i>	36,953	108.5678	13.5358
<i>Sri Lanka Dry-Zone Dry Evergreen Forests</i>	49,122	80.8066	7.7860
Total	1,712,197		
<b>Neotropic (<i>n</i> = 34)</b>			
<i>Apure-Villavicencio Dry Forests</i>	69,342	-70.9928	7.0125
<i>Atlantic Dry Forests</i>	120,431	-43.2759	-12.4547
<i>Bajio Dry Forests</i>	42,558	-102.0617	20.4620
<i>Balsas Dry Forests</i>	69,149	-100.1565	18.4628
<i>Bolivian Montane Dry Forests</i>	81,285	-65.3952	-18.8621

<i>Caatinga</i>	750,198	-39.8611	-8.6512
<i>Cauca Valley Dry Forests</i>	7,367	-76.0523	4.7661
<i>Central American Dry Forests</i>	71,562	-87.4874	13.2731
<i>Cerrado</i>	2,060,259	78.4078	18.8029
<i>Chiapas Depression Dry Forests</i>	15,155	-92.7963	16.2560
<i>Chiquitano Dry Forests</i>	249,035	-60.5090	-16.1166
<i>Cuban Dry Forests</i>	76,074	-78.8727	21.6632
<i>Dry Chaco</i>	965,297	-62.7380	-25.1395
<i>Ecuadorian Dry Forests</i>	21,204	-80.2332	-1.3603
<i>Hispaniolan Dry Forests</i>	17,244	-71.7766	18.8807
<i>Jalisco Dry Forests</i>	29,331	-104.2313	19.5750
<i>Jamaican Dry Forests</i>	2,553	-77.4184	18.0427
<i>La Costa Xeric Shrublands</i>	70,180	-66.1586	9.7250
<i>Lara-Falcon Dry Forests</i>	17,494	-69.1874	10.9102
<i>Lesser Antillean Dry Forests</i>	960	-61.3909	13.3826
<i>Magdalena Valley Dry Forests</i>	165,736	46.3538	-16.9212
<i>Maracaibo Dry Forests</i>	31,031	-71.4197	-71.4197
<i>Maranon Dry Forests</i>	11,465	-78.2976	-78.2976
<i>Panamanian Dry Forests</i>	5,192	-80.2900	8.1613
<i>Patia Valley Dry Forests</i>	2,263	-77.1909	1.8907
<i>Puerto Rican Dry Forests</i>	1,405	-66.5322	18.0330
<i>Sierra De La Laguna Dry Forests</i>	4,726	-109.9019	23.5623
<i>Sinai Valley Dry Forests</i>	93,173	-74.0584	10.0899
<i>Sinaloa Dry Forests</i>	25,666	-106.5990	24.3006
<i>Sonoran-Sinaloa Transition Subtropical Dry Forests</i>	62,547	-109.5851	27.9847
<i>Southern Pacific Dry Forests</i>	46,037	-97.4684	-97.4684
<i>Tumbes-Piura Dry Forests</i>	41,450	-80.1856	-5.1743
<i>Veracruz Dry Forests</i>	7,400	-96.4209	19.0561
<i>Yucatan Dry Forests</i>	56,488	-89.2165	20.4516
<b>Total</b>	<b>5,291,257</b>		

**Oceania (*n* = 2)**

<i>Hawaiian High Islands:</i>	5,751	-156.2946	20.1273
<i>Hawaii Tropical Dry Forests</i>			
<i>Fiji Tropical Dry Forests</i>	7,557	170.1973	-17.3244
Total	13,308		

Pantropical total (*n* = 75)

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**Table S2.** Statistic metrics of climate and soil variables selected for this study.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	29.2	12.5	26.6	28.9	31.5	10.7- 43
Minimum temperature of the coldest month (°C)	24.4	11.5	22.9	24.4	25.9	7.7- 41.2
Maximum temperature of the hottest month (°C)	35.2	16.3	30.6	35.3	40.0	14.3- 45
Mean annual precipitation (mm)	1143.7	46.8	760.9	1093.2	1492.0	9.7- 4182.2
Minimum precipitation in the driest month (mm)	11.7	151.6	1.0	4.4	14.9	0.0- 165.6
Maximum precipitation in the wettest month (mm)	241.6	45.4	162.7	227.5	307.5	6.3- 840
Total precipitation in the rainy season (mm)	916.4	62.6	501.5	904.8	1290.4	0.0- 4129.1
Dry months (< 100 mm of precipitation per month) (number)	7.4	32.7	6.0	7.0	9.0	0.0- 12.0
Months under hydric stress (number)	4.4	62.8	2.0	5.0	6.0	0.0- 12.0
Lang aridity index	41.0	53.3	25.4	38.1	53.3	0.3- 151.8
<i>Soil</i>						
Depth (m)	2.1	60.0	1.3	1.8	2.6	0.1- 8.0
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.5	9.3	1.4	1.5	1.5	0-1- 2.0
Coarse fragments <sup>1</sup> (%)	13.8	69.6	7.0	12.0	19.0	0.0- 61.0
Clay content <sup>1</sup> (%)	35.5	23.3	31.0	37.0	41.0	2.0- 63.0
Field capacity <sup>1</sup> (mm)	409.3	9.6	392.6	413.8	430.3	100.0-807.4

Wilting point	513.8	23.2	156.3	177.8	777.0	20.0- 286.3
Water holding capacity <sup>1</sup> (mm)	360.7	52.2	234.0	330.0	418.0	20.0- 650.0
pH <sup>1</sup> (H <sub>2</sub> O)	6.4	12.4	5.8	6.3	6.9	4.6- 9.0
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	18.7	41.7	13.5	18.4	22.8	2.2- 64.3
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	73.6	87.5	38.4	58.7	78.5	2.2- 690.8
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	914.6	66.3	289.6	921.3	1348.8	1.6- 3388.8
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	437.8	69.1	272.4	321.9	503.8	45.0-1576.8

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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. [Temperature and precipitation variables \(\*n\* = 7497\)](#), [soil depth \(\*n\* = 6659\)](#), [soil bulk density \(\*n\* = 7272\)](#), [soil coarse fragments \(\*n\* = 7273\)](#), [soil clay content \(\*n\* = 7387\)](#), [soil field capacity and soil wilting point \(\*n\* = 7270\)](#), [soil water holding capacity \(\*n\* = 6659\)](#), [soil pH \(\*n\* = 7183\)](#), [soil cation exchange capacity \(\*n\* = 7278\)](#), [soil organic carbon \(\*n\* = 7448\)](#), [soil total nitrogen \(\*n\* = 7269\)](#) and [soil total phosphorus \(\*n\* = 6353\)](#).

**Table S3.** Statistic metrics of climate and soil variables selected for Afrotropic domain.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	30.4	13.4	27.0	30.7	33.2	16.3- 43.3
Minimum temperature of the coldest month (°C)	24.7	13.1	22.4	24.0	26.4	14.7- 41.
Maximum temperature of the hottest month (°C)	37.5	14.2	34.0	39.0	41.7	18.4- 45.0
Mean annual precipitation (mm)	915.2	49.1	563.4	890.7	1231.8	47.4-2663.5
Minimum precipitation in the driest month (mm)	2.8	209.9	0.036	0.35	2.51	0.0- 63.8
month (mm)						
Maximum precipitation in the wettest month (mm)	211.0	49.6	563.4	207.0	256.3	22.4- 840.1
Total precipitation in the rainy season (mm)	807.3	56.5	443.0	825.2	1151.2	100.2-2586.2
Dry months (< 100 mm of precipitation per month) (number)	8	29.7	7	8	10	3- 12
Months under hydric stress (number)	6	36.7	5	6	7	0-12
Lang aridity index	32.1	58.3	17.4	46.3	28.2	1.2- 114.3
<i>Soil</i>						
Depth (m)	2.5	56.2	1.8	2.0	3.6	0.1- 8
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.5	8.0	1.4	1.5	1.6	0.9- 2.0
Coarse fragments <sup>1</sup> (%)	11.9	76.8	5	10.0	16	0.0- 51.0
Clay content <sup>1</sup> (%)	30.0	31.4	24	311.0	37	2.0- 62.0

Field capacity <sup>1</sup> (mm)	399.7	11.7	370.5	407.6	428.4	215.5-508.0
Wilting point	160.3	31.8	116.6	169.9	199.9	20.0- 271.7
Water holding capacity <sup>1</sup> (mm)	334.0	39.3	319	330.0	330	20.0- 650.0
pH <sup>1</sup> (H <sub>2</sub> O)	6.3	14.5	5.6	6.1	6.8	4.7- 9.0
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	13.5	50.0	8.6	11.8	16.7	3.0- 45.9
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	62.5	64.7	38.1	56.6	75.3	13.6-2698.5
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	750.0	60.9	419.2	733.8	991.3	13.6-2698.5
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	384.9	69.2	209.7	321.9	503.9	45.0-1576.8

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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. Temperature and precipitation variables ( $n = 2299$ ), and soil depth ( $n = 2284$ ), bulk density ( $n = 2274$ ), coarse fragments ( $n = 2259$ ), clay content ( $n = 2279$ ), field capacity and wilting point ( $n = 2274$ ), water holding capacity ( $n = 2284$ ), pH ( $n = 2075$ ), cation exchange capacity ( $n = 2277$ ), organic carbon ( $n = 2267$ ), total nitrogen ( $n = 2271$ ) and total phosphorus ( $n = 2162$ ).



**Table S4.** Statistic metrics of climate and soil variables selected for Australasia domain.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	26.1	7.6	24.9	26.1	27.9	21.1-31.2
Minimum temperature of the coldest month (°C)	22.8	8.3	21.4	22.8	24.2	18.2-28.0
Maximum temperature of the hottest month (°C)	30.8	10.1	28.4	30.5	33.0	23.1-38.3
Mean annual precipitation (mm)	1589.1	27.6	1270.5	1544.0	1843.5	818.3-3490.1
Minimum precipitation in the driest month (mm)	20.5	80.6	7.7	14.7	14.7	0.5-64.3
Maximum precipitation in the wettest month (mm)	313.6	29.9	252.6	308.9	367.9	129.2-752.4
Total precipitation in the rainy season (mm)	1311.2	36.7	992.4	1261.1	1585.2	129.2-3200.9
Dry months (< 100 mm of precipitation per month) (number)	6.1	25.3	5.0	6.0	7.0	3.0-11.0
Months under hydric stress (number)	1.8	85.2	0.0	1.6	3.0	0.0-6.0
Lang aridity index	61.0	31.5	46.9	58.2	72.1	27.7-151.8
<i>Soil</i>						
Depth (m)	1.6	79.2	0.8	1.4	1.8	0.1- 3.6
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.4	11.1	1.4	1.5	1.5	1.0-1.7
Coarse fragments <sup>1</sup> (%)	8.9	45.3	6.0	8.0	11.0	2.0-29.0
Clay content <sup>1</sup> (%)	36.6	14.1	33.0	36.6	40.0	20.0-53.0
Field capacity <sup>1</sup> (mm)	418.6	5.6	404.1	423.1	428.6	378.8-492.9

Wilting point	179.8	15.0	169.6	174.2	169.6	115.4-267.6
Water holding capacity <sup>1</sup> (mm)	480.6	22.3	418.0	418.0	650.0	89.0-650.0
pH <sup>1</sup> (H <sub>2</sub> O)	5.7	5.3	5.4	5.6	5.9	5.1-7.0
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	18.1	20.5	15.3	18.1	21.0	10.1-27.1
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	100.9	74.4	912.0	78.6	100.2	37.9-328.2
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	1106.2	58.7	912.0	1186.3	1356.2	74.3-2269.2
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	352.6	51.1	297.1	297.1	321.9	69.0-867.7

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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. Temperature and precipitation variables ( $n = 400$ ), and soil depth ( $n = 217$ ), bulk density ( $n = 366$ ), coarse fragments ( $n = 384$ ), clay content ( $n = 389$ ), field capacity and wilting point ( $n = 366$ ), water holding capacity ( $n = 217$ ), pH ( $n = 386$ ), cation exchange capacity ( $n = 379$ ), organic carbon ( $n = 395$ ), total nitrogen ( $n = 366$ ) and total phosphorus ( $n = 117$ ).

**Table S5.** Statistic metrics of climate and soil variables selected for Indo-Malayan domain.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	30.4	10.3	28.1	30.6	32.7	21.9-38.8
Minimum temperature of the coldest month (°C)	24.8	8.0	23.6	24.9	26.2	17.4-31.4
Maximum temperature of the hottest month (°C)	37.5	15.1	33.0	38.0	42.7	23.8-45.0
Mean annual precipitation (mm)	1414.5	10.3	1061.4	1338.1	1633.0	580.0-3299.0
Minimum precipitation in the driest month (mm)	7.2	154.9	2.1	3.7	6.8	0.0-101.2
Maximum precipitation in the wettest month (mm)	356.4	28.6	281.2	353.1	429.7	137.3-835.7
Total precipitation in the rainy season (mm)	1225.7	38.0	906.0	1142.5	1423.5	246.0-3207.6
Dry months (< 100 mm of precipitation per month) (number)	7.0	21.1	6.0	7.0	8.0	0.0-10.0
Months under hydric stress (number)	4.8	48.6	3.0	5.0	7.0	0.0-9.0
Lang aridity index	48.4	43.6	32.6	44.0	58.7	16.4-133.7
<i>Soil</i>						
Depth (m)	1.8	40.5	1.6	1.8	2.0	0.1-3.6
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.5	6.2	1.5	1.5	1.6	1.2-1.8
Coarse fragments <sup>1</sup> (%)	18.6	42.2	13.0	18.0	23.0	3.0-56.0
Clay content <sup>1</sup> (%)	38.8	14.0	35.0	39.0	41.0	14.0-56.0
Field capacity <sup>1</sup> (mm)	416.3	4.6	402.9	419.9	429.8	322.6-470.0

Wilting point	192.7	14.2	174.0	189.3	189.3	65.3-253.4
Water holding capacity <sup>1</sup> (mm)	387.2	36.9	234.0	418.0	418.0	89.0-650.0
pH <sup>1</sup> (H <sub>2</sub> O)	6.6	11.4	6.0	6.5	6.6	5.0-8.2
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	25.0	34.0	18.3	22.8	30.2	7.6-52.4
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	67.1	25.1	59.3	62.6	73.3	14.4-295.6
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	746.0	69.0	131.3	877.7	1229.2	1.9-1843.9
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	432.6	50.2	297.1	394.2	503.8	69.0-1323.8

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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. Temperature and precipitation variables ( $n = 1200$ ), and soil depth ( $n = 1125$ ), bulk density ( $n = 1187$ ), coarse fragments ( $n = 1118$ ), clay content ( $n = 1181$ ), field capacity and wilting point ( $n = 1187$ ), water holding capacity ( $n = 1125$ ), pH ( $n = 1181$ ), cation exchange capacity ( $n = 1159$ ), organic carbon ( $n = 1197$ ), total nitrogen ( $n = 1186$ ) and total phosphorus ( $n = 1153$ ).

**Table S6.** Statistic metrics of climate and soil variables selected for Neotropic domain.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	28.4	11.3	26.5	28.3	30.2	10.7-40.1
Minimum temperature of the coldest month (°C)	24.3	11.6	23.3	24.7	25.9	7.7-36.6
Maximum temperature of the hottest month (°C)	33.7	15.7	29.7	33.5	37.4	14.3-45.0
Mean annual precipitation (mm)	1130.0	47.2	769.3	1062.7	1480.3	9.7-4181.2
Minimum precipitation in the driest month (mm)	16.6	122.5	3.1	8.2	22.7	0.0-165.6
Maximum precipitation in the wettest month (mm)	214.4	40.5	153.9	204.8	270.3	6.3-596.7
Total precipitation in the rainy season (mm)	881.1	66.4	450.0	881.1	1275.9	0.0-4129.1
Dry months (< 100 mm of precipitation per month) (number)	7.2	35.8	5.0	7.0	9.0	0.0-12.0
Months under hydric stress (number)	3.8	75.5	1.0	4.0	6.0	0.0-12.0
Lang aridity index	41.1	51.4	26.9	38.0	52.8	0.3-150.3
<i>Soil</i>						
Depth (m)	1.9	62.2	1.1	1.7	2.5	0-1-6.0
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.4	8.8	1.4	1.5	1.5	0.1-1.8
Coarse fragments <sup>1</sup> (%)	14.5	69.4	7.0	12.0	19.0	1.0-61.0
Clay content <sup>1</sup> (%)	38.2	16.2	35.0	38.2	42.0	4.0-58.0
Field capacity <sup>1</sup> (mm)	412.6	9.1	396.2	412.4	432.4	219.1-807.4

Wilting point	177.8	18.9	157.7	176.9	198.8	59.1-286.3
Water holding capacity <sup>1</sup> (mm)	364.6	65.4	89.0	330.0	650.0	89.0-650.0
pH <sup>1</sup> (H <sub>2</sub> O)	6.6	11.1	6.0	6.4	7.0	4.7-8.4
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	20.0	30.7	16.9	20.0	23.5	4.6-48.3
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	75.3	107.1	32.6	47.1	74.9	3.3-384.5
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	1017.2	60.2	529.5	1229.7	1473.3	1.6-3284.0
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	473.6	74.1	297.1	321.9	545.8	45.0-1323.8

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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. Temperature and precipitation variables ( $n = 3398$ ), and soil depth ( $n = 2968$ ), bulk density ( $n = 3260$ ), coarse fragments ( $n = 3316$ ), clay content ( $n = 3345$ ), field capacity and wilting point ( $n = 3258$ ), water holding capacity ( $n = 2968$ ), pH ( $n = 3345$ ), cation exchange capacity ( $n = 3272$ ), organic carbon ( $n = 3390$ ), total nitrogen ( $n = 3260$ ) and total phosphorus ( $n = 2825$ ).

**Table S7.** Statistic metrics of climate and soil variables selected for Oceania domain.

	Mean	CV (%)	Qu. (0.25)	Median	Qu. (0.75)	Range
<i>Climate</i>						
Mean annual temperature (°C)	26.3	11.5	24.2	25.2	27.8	21.1-34.4
Minimum temperature of the coldest month (°C)	24.1	10.5	22.6	23.4	25.1	18.6-31.4
Maximum temperature of the hottest month (°C)	231.7	45.6	130.6	293.6	327.7	44.0-352.5
Mean annual precipitation (mm)	1516.2	42.1	1037.6	1802.1	2034.3	216.1-2585.4
Minimum precipitation in the driest month (mm)	36.5	76.5	5.9	33.0	62.2	2.8-91.3
Maximum precipitation in the wettest month (mm)	231.7	45.6	130.6	293.6	327.7	44.0-352.5
Total precipitation in the rainy season (mm)	1148.7	68.1	266.3	1481.1	1823.1	0.0-2451.0
Dry months (< 100 mm of precipitation per month) (number)	6.2	57.1	3.0	5.0	10.0	1.0-12.0
Months under hydric stress (number)	1.1	183.1	0.0	0.0	1.0	0.0-9.0
Lang aridity index	59.6	47.2	34.2	70.0	83.7	7.9-118.2
<i>Soil</i>						
Depth (m)	0.2	167.6	0.1	0.1	0.1	0.1-1.4
Bulk density <sup>1</sup> (g cm <sup>-3</sup> )	1.2	19.2	0.9	1.3	1.4	0.8-1.6
Coarse fragments <sup>1</sup> (%)	12.8	75.3	5.0	9.0	22.0	1.0-42.0
Clay content <sup>1</sup> (%)	35.0	28.8	26.0	37.0	43.0	9.0-54.0
Field capacity <sup>1</sup> (mm)	404.6	14.9	390.5	401.5	447.1	290.6-493.0

Wilting point	174.7	22.9	165.8	174.7	201.8	100.4-236.9
Water holding capacity <sup>1</sup> (mm)	354.6	29.2	319.0	319.0	319.0	319.0-650.0
pH <sup>1</sup> (H <sub>2</sub> O)	6.0	10.6	5.5	5.8	6.5	4.9-7.7
Cation exchange capacity <sup>1</sup> (cmol <sub>c</sub> kg <sup>-1</sup> )	20.8	18.5	17.4	21.1	23.6	11.5-29.3
Organic carbon <sup>1</sup> (Mg ha <sup>-1</sup> )	132.1	46.4	89.8	107.3	219.6	43.1-242.8
Total nitrogen <sup>1</sup> (g m <sup>-2</sup> )	1815.9	51.4	1419.8	1517.8	2579.8	158.3-3388.8
Total phosphorus <sup>2</sup> (g m <sup>-2</sup> )	867.7	0.0	867.7	867.7	867.7	867.7

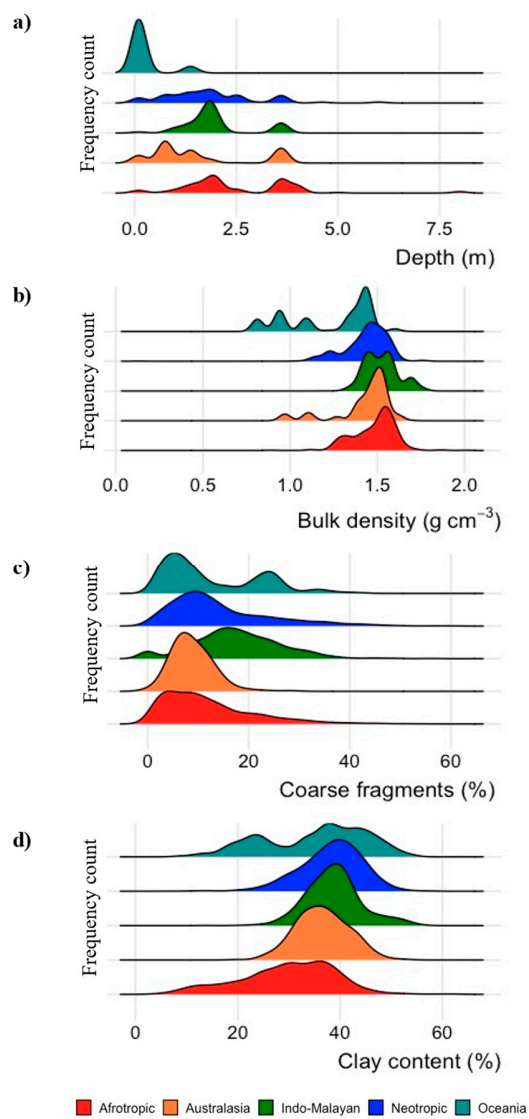
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Note. <sup>1</sup>, soil depth 0-1.0 m; <sup>2</sup>, soil depth 0-0.5 m. Temperature and precipitation variables ( $n = 200$ ), and soil depth ( $n = 65$ ), bulk density ( $n = 185$ ), coarse fragments ( $n = 196$ ), clay content ( $n = 196$ ), field capacity and wilting point ( $n = 185$ ), water holding capacity ( $n = 65$ ), pH ( $n = 196$ ), cation exchange capacity ( $n = 192$ ), organic carbon ( $n = 199$ ), total nitrogen ( $n = 185$ ) and total phosphorus ( $n = 96$ )

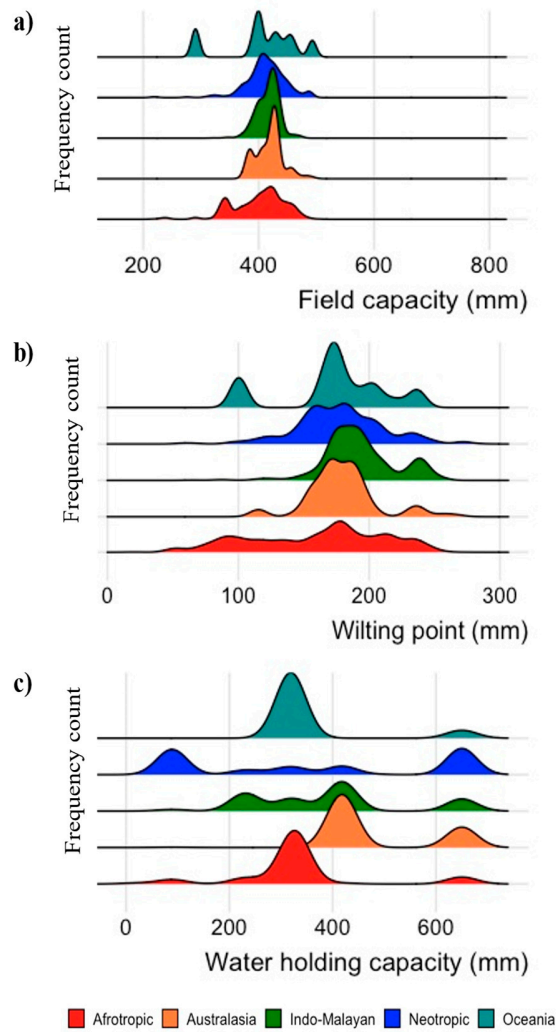


**Table S8.** Correlates of spatial variation in soil fertility properties with climate in tropical dry forest ecoregions.

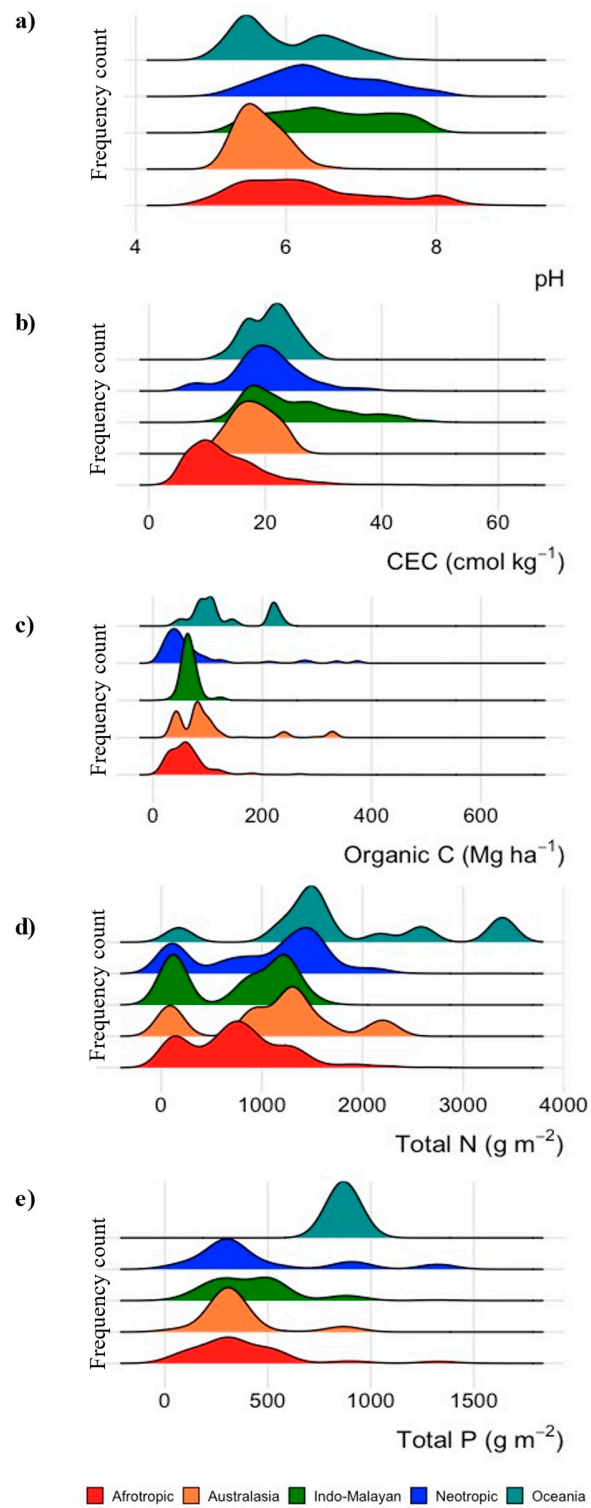
Climate metric	Soil properties	<i>r</i> value	<i>p</i> value
Minimum temperature	pH	0.363	< 0.001
	CEC	0.172	< 0.001
	Organic C	-0.048	< 0.001
	Total N	-0.013	0.279
	Total P	0.143	< 0.001
Maximum temperature	pH	0.417	< 0.001
	CEC	0.120	< 0.001
	Organic C	-0.189	< 0.001
	Total N	-0.091	< 0.001
	Total P	0.070	< 0.001
Precipitation in the driest month	pH	-0.177	< 0.001
	CEC	0.113	< 0.001
	Organic C	0.424	< 0.001
	Total N	0.275	< 0.001
	Total P	0.215	< 0.001
Precipitation in the wettest month	pH	-0.349	< 0.001
	CEC	0.108	< 0.001
	Organic C	0.127	< 0.001
	Total N	0.069	< 0.001
	Total P	0.067	< 0.001
Total precipitation in the rainy season	pH	-0.557	< 0.001
	CEC	-0.037	0.002
	Organic C	0.279	< 0.001
	Total N	0.123	< 0.001
	Total P	0.055	< 0.001



**Figure S1.** Variation in soil physical properties within and amongst biogeographic domains.



**Figure S2.** Variation in soil water retention properties within and amongst biogeographic domains.



**Figure S3.** Variation in soil fertility properties within and amongst biogeographic domains.