

**Supplementary information**

**Supplementary Table 1.** Site-wise species richness and associated environmental and geographic variables used for statistical analyses

Site	Species richness	Altitude (m)	Altitudinal Zone	Mean temperature (°C)	Precipitation (mm)	Latitude	Longitude
Dhotrey	66	2600	High	11	2577	27.04932	88.11036
Kurseong	109	1500	Medium	18	4000	26.88311	88.28176
Relling	109	1483	Medium	19	2500	27.04498	88.14908
Bijanbari	94	760	Low	20	2500	27.06696	88.18953
Tonglu	40	3070	High	7	2800	27.03	88.09
Takdah	94	1219	Medium	17	2800	27.03942	88.36065
Sonada	83	1873	Medium	14	3250	26.96355	88.26736
Maneybhanjang	43	2150	High	12	2900	26.98789	88.12174
Rimbick	63	2280	High	13	2800	27.11677	88.10931
Teesta Valley	99	900	Low	19	2637	27.00669	88.40105
Mirik	88	1495	Medium	16.5	3373	26.88606	88.18395
Upper Langurdang	55	1532	Medium	16.7	3092	27.02884	88.1426
Chota Hatta	46	1855	High	17	1800	27.08327	88.1076
Mungpoo	78	1100	Medium	17	2200	26.97613	88.36527
Bara Hatta	70	1700	Medium	16.8	3558	27.07777	88.09394
Upper Relling	62	1500	Medium	16.7	3092	27.04307	88.14322
Bichgaon	45	2250	Medium	16.8	3558	27.0083	88.256
Lamahatta	56	2070	Medium	15	3820	27.05458	88.35242

**Supplementary Table 2.** Species-wise frequency and relative frequency of vascular plants recorded during the floristic survey of the Darjeeling Himalaya

Species name	Frequency	Relative frequency	Species name	Frequency	Relative frequency
<i>Cynodon dactylon</i>	18	1.38	<i>Aconitum heterophylloides</i>	2	0.15
<i>Drymaria cordata</i>	18	1.38	<i>Aeginetia indica</i>	2	0.15
<i>Equisetum diffusum</i>	18	1.38	<i>Andrographis paniculata</i>	2	0.15
<i>Gonostegia hirta</i>	18	1.38	<i>Argostemma sarmentosum</i>	2	0.15
<i>Plantago asiatica</i>	18	1.38	<i>Berberis hookeri</i>	2	0.15
<i>Rumex nepalensis</i>	18	1.38	<i>Bistorta amplexicaulis</i>	2	0.15
<i>Ageratina adenophora</i>	17	1.31	<i>Cirsium eriophoroides</i>	2	0.15
<i>Artemisia vulgaris</i>	17	1.31	<i>Crepidium acuminatum</i>	2	0.15
<i>Hydrocotyle himalaica</i>	17	1.31	<i>Curcuma zedoaria</i>	2	0.15
<i>Kaempferia rotunda</i>	17	1.31	<i>Dicliptera chinensis</i>	2	0.15
<i>Nephrolepis cordifolia</i>	17	1.31	<i>Elsholtzia blanda</i>	2	0.15
<i>Anthogonium gracile</i>	16	1.23	<i>Habenaria arietina</i>	2	0.15
<i>Astilbe rivularis</i>	16	1.23	<i>Ipomoea triloba</i>	2	0.15
<i>Girardinia diversifolia</i>	16	1.23	<i>Leucas lavandulifolia</i>	2	0.15
<i>Hydrangea robusta</i>	16	1.23	<i>Lobelia nummularia</i>	2	0.15
<i>Ocimum tenuiflorum</i>	16	1.23	<i>Luculia pinceana</i>	2	0.15
<i>Schima wallichii</i>	16	1.23	<i>Mimosa rubicaulis</i>	2	0.15
<i>Solanum nigrum</i>	16	1.23	<i>Monotropa uniflora</i>	2	0.15
<i>Achyranthes bidentata</i>	15	1.15	<i>Ototropis conferta</i>	2	0.15
<i>Commelina caroliniana</i>	15	1.15	<i>Phanera vahlii</i>	2	0.15
<i>Curcuma caesia</i>	15	1.15	<i>Reinwardtia Indica</i>	2	0.15
<i>Houttuynia cordata</i>	15	1.15	<i>Rosa sericea</i>	2	0.15
<i>Hydrangea febrifuga</i>	15	1.15	<i>Rubia sikkimensis</i>	2	0.15
<i>Mussaenda frondosa</i>	15	1.15	<i>Rubus calycinooides</i>	2	0.15
<i>Ocimum gratissimum</i>	15	1.15	<i>Rubus ellipticus</i>	2	0.15
<i>Oxalis latifolia</i>	15	1.15	<i>Abutilon indicum</i>	1	0.08
<i>Oxyropa paniculata</i>	15	1.15	<i>Aeschynanthus bracteatus</i>	1	0.08
<i>Persicaria capitata</i>	15	1.15	<i>Ajuga integrifolia</i>	1	0.08
<i>Urtica ardens</i>	15	1.15	<i>Apium graveolens</i>	1	0.08
<i>Bergenia ciliata</i>	14	1.08	<i>Arisaema concinnum</i>	1	0.08
<i>Carica papaya</i>	14	1.08	<i>Arisaema jacquemontii</i>	1	0.08
<i>Catharanthus roseus</i>	14	1.08	<i>Artocarpus lacucha</i>	1	0.08
<i>Equisetum debile</i>	13	1	<i>Bambusa bambos</i>	1	0.08
<i>Nyctanthes arbor-tristis</i>	13	1	<i>Barleria prionitis</i>	1	0.08
<i>Ophiorrhiza fasciculata</i>	13	1	<i>Begonia cathcartii</i>	1	0.08
<i>Pilea anisophylla</i>	13	1	<i>Begonia flaviflora</i>	1	0.08
<i>Sonchus oleraceus</i>	13	1	<i>Begonia hatacoa</i>	1	0.08
<i>Centella asiatica</i>	12	0.92	<i>Begonia palmata</i>	1	0.08
<i>Desmodium confertum</i>	12	0.92	<i>Begonia picta</i>	1	0.08
<i>Neillia thyrsoiflora</i>	12	0.92	<i>Begonia sikkimensis</i>	1	0.08
<i>Berberis napaulensis</i>	11	0.85	<i>Berberis angulosa</i>	1	0.08
<i>Brugmansia suaveolens</i>	11	0.85	<i>Calanthe puberula</i>	1	0.08

<i>Geranium nepalense</i>	11	0.85	<i>Callicarpa macrophylla</i>	1	0.08
<i>Achyranthes aspera</i>	10	0.77	<i>Campanula latifolia</i>	1	0.08
<i>Cannabis sativa</i>	10	0.77	<i>Cautleya spicata</i>	1	0.08
<i>Hibiscus rosa-sinensis</i>	10	0.77	<i>Ceropegia pubescens</i>	1	0.08
<i>Oroxylum indicum</i>	10	0.77	<i>Cinchona pubescens</i>	1	0.08
<i>Persicaria posumbu</i>	10	0.77	<i>Cissampelos pareira</i>	1	0.08
<i>Phytolacca acinosa</i>	10	0.77	<i>Cissus quadrangularis</i>	1	0.08
<i>Pouzolzia sanguinea</i>	10	0.77	<i>Clematis buchananiana</i>	1	0.08
<i>Rubia cordifolia</i>	10	0.77	<i>Clematis tongluensis</i>	1	0.08
<i>Viola pilosa</i>	10	0.77	<i>Clerodendrum japonicum</i>	1	0.08
<i>Zingiber officinale</i>	10	0.77	<i>Clinopodium umbrosum</i>	1	0.08
<i>Codonopsis viridis</i>	9	0.69	<i>Coffea arabica</i>	1	0.08
<i>Evodia fraxinifolia</i>	9	0.69	<i>Cotoneaster microphyllus</i>	1	0.08
<i>Moringa oleifera</i>	9	0.69	<i>Crepidium khasianum</i>	1	0.08
<i>Potentilla anserina</i>	9	0.69	<i>Crepidium purpureum</i>	1	0.08
<i>Psidium guajava</i>	9	0.69	<i>Crotalaria alata</i>	1	0.08
<i>Vigna umbellata</i>	9	0.69	<i>Cyrtosia lindleyana</i>	1	0.08
<i>Arundina graminifolia</i>	8	0.62	<i>Daphne bholua</i>	1	0.08
<i>Commelina diffusa</i>	8	0.62	<i>Didymocarpus albicalyx</i>	1	0.08
<i>Curcuma longa</i>	8	0.62	<i>Didymocarpus aurantiacus</i>	1	0.08
<i>Elatostema sessile</i>	8	0.62	<i>Didymocarpus mortonii</i>	1	0.08
<i>Isodon repens</i>	8	0.62	<i>Didymocarpus pedicellatus</i>	1	0.08
<i>Isodon scrophularioides</i>	8	0.62	<i>Engelhardia spicata</i>	1	0.08
<i>Pilea umbrosa</i>	8	0.62	<i>Erythranthe nepalensis</i>	1	0.08
<i>Thysanolaena latifolia</i>	8	0.62	<i>Fraxinus floribunda</i>	1	0.08
<i>Tropaeolum majus</i>	8	0.62	<i>Galium hirtiflorum</i>	1	0.08
<i>Bidens pilosa</i>	7	0.54	<i>Halenia elliptica</i>	1	0.08
<i>Chlorophytum nepalense</i>	7	0.54	<i>Hedychium coccineum</i>	1	0.08
<i>Cuscuta reflexa</i>	7	0.54	<i>Hedychium gracile</i>	1	0.08
<i>Debregeasia longifolia</i>	7	0.54	<i>Helwingia himalaica</i>	1	0.08
<i>Globba clarkei</i>	7	0.54	<i>Hemiphragma heterophyllum</i>	1	0.08
<i>Litsea cubeba</i>	7	0.54	<i>Herminium clavigerum</i>	1	0.08
<i>Melastoma malabathricum</i>	7	0.54	<i>Herminium edgeworthii</i>	1	0.08
<i>Mimosa pudica</i>	7	0.54	<i>Herminium lanceum</i>	1	0.08
<i>Scutellaria discolor</i>	7	0.54	<i>Herminium latilabris</i>	1	0.08
<i>Acemella oleracea</i>	6	0.46	<i>Herminium mackinsonii</i>	1	0.08
<i>Amaranthus viridis</i>	6	0.46	<i>Hypericum hookerianum</i>	1	0.08
<i>Asparagus racemosus</i>	6	0.46	<i>Hypericum uralum</i>	1	0.08
<i>Barleria cristata</i>	6	0.46	<i>Iris clarkei</i>	1	0.08
<i>Commelina paludosa</i>	6	0.46	<i>Jacobaea raphanifolia</i>	1	0.08
<i>Hellenia speciosa</i>	6	0.46	<i>Kalanchoe ceratophylla</i>	1	0.08
<i>Hypoestes phyllostachya</i>	6	0.46	<i>Lithospermum officinale</i>	1	0.08
<i>Agrimonia eupatoria</i>	5	0.38	<i>Lobelia pyramidalis</i>	1	0.08
<i>Boehmeria virgata</i>	5	0.38	<i>Lycopodium clavatum</i>	1	0.08
<i>Calotropis gigantea</i>	5	0.38	<i>Lycopodium japonicum</i>	1	0.08

<i>Hypericum himalaicum</i>	5	0.38	<i>Lysimachia laxa</i>	1	0.08
<i>Lobelia montana</i>	5	0.38	<i>Maianthemum oleraceum</i>	1	0.08
<i>Ophiorrhiza thomsonii</i>	5	0.38	<i>Neohymenopogon parasiticus</i>	1	0.08
<i>Pteris biaurita</i>	5	0.38	<i>Oenanthe thomsonii</i>	1	0.08
<i>Scutellaria repens</i>	5	0.38	<i>Ophiopogon clarkei</i>	1	0.08
<i>Urena lobata</i>	5	0.38	<i>Ophiopogon intermedius</i>	1	0.08
<i>Abroma augustum</i>	4	0.31	<i>Panax pseudoginseng</i>	1	0.08
<i>Amaranthus tricolor</i>	4	0.31	<i>Paris polyphylla</i>	1	0.08
<i>Azadirachta indica</i>	4	0.31	<i>Pedicularis diffusa</i>	1	0.08
<i>Berberis aristata</i>	4	0.31	<i>Piptanthus nepalensis</i>	1	0.08
<i>Buddleja asiatica</i>	4	0.31	<i>Prunella vulgaris</i>	1	0.08
<i>Crotalaria prostrata</i>	4	0.31	<i>Prunus cerasoides</i>	1	0.08
<i>Cymbopogon flexuosus</i>	4	0.31	<i>Quercus lamellosa</i>	1	0.08
<i>Datura metel</i>	4	0.31	<i>Rheum acuminatum</i>	1	0.08
<i>Dobinea vulgaris</i>	4	0.31	<i>Rheum australe</i>	1	0.08
<i>Mentha spicata</i>	4	0.31	<i>Richardia scabra</i>	1	0.08
<i>Phlomooides hamosa</i>	4	0.31	<i>Rosa macrophylla</i>	1	0.08
<i>Physalis peruviana</i>	4	0.31	<i>Rubus gothicus</i>	1	0.08
<i>Pleione hookeriana</i>	4	0.31	<i>Rubus kumaonensis</i>	1	0.08
<i>Plumbago zeylanica</i>	4	0.31	<i>Rubus paniculatus</i>	1	0.08
<i>Ricinus communis</i>	4	0.31	<i>Rubus splendidissimus</i>	1	0.08
<i>Synotis cappa</i>	4	0.31	<i>Rubus treutleri</i>	1	0.08
<i>Triumfetta rhomboidea</i>	4	0.31	<i>Sarcopyramis napalensis</i>	1	0.08
<i>Ainsliaea latifolia</i>	3	0.23	<i>Satyrium nepalense</i>	1	0.08
<i>Alstonia scholaris</i>	3	0.23	<i>Schisandra grandiflora</i>	1	0.08
<i>Begonia josephi</i>	3	0.23	<i>Solanum laxum</i>	1	0.08
<i>Bulbophyllum leopardinum</i>	3	0.23	<i>Streptolirion volubile</i>	1	0.08
<i>Citrus maxima</i>	3	0.23	<i>Swertia angustifolia</i>	1	0.08
<i>Desmodium gangeticum</i>	3	0.23	<i>Swertia chirayita</i>	1	0.08
<i>Dimetia scandens</i>	3	0.23	<i>Taxus wallichiana</i>	1	0.08
<i>Exbucklandia populnea</i>	3	0.23	<i>Tetrataenium nepalense</i>	1	0.08
<i>Goodyera hemsleyana</i>	3	0.23	<i>Thalictrum chelidonii</i>	1	0.08
<i>Ipomoea purpurea</i>	3	0.23	<i>Thalictrum foliolosum</i>	1	0.08
<i>Mimosa diplotricha</i>	3	0.23	<i>Thunbergia coccinea</i>	1	0.08
<i>Nicandra physalodes</i>	3	0.23	<i>Thunbergia fragrans</i>	1	0.08
<i>Rungia pectinata</i>	3	0.23	<i>Thunbergia lutea</i>	1	0.08
<i>Sida cordifolia</i>	3	0.23	<i>Torenia bicolor</i>	1	0.08
<i>Sohmaea laxiflora</i>	3	0.23	<i>Tripterospermum volubile</i>	1	0.08
<i>Swertia bimaculata</i>	3	0.23	<i>Tupistra nutans</i>	1	0.08
<i>Tabernaemontana divaricata</i>	3	0.23	<i>Utricularia striatula</i>	1	0.08
<i>Urtica parviflora</i>	3	0.23	<i>Viburnum nervosum</i>	1	0.08
<i>Aconitum arunii</i>	2	0.15	<i>Viscum articulatum</i>	1	0.08

**Supplementary Table 3.** Pairwise Jaccard dissimilarity index among study sites

Site	Dhotrey	Kurseong	Relling	Bijanbari	Tonglu	Takdah	Sonada	Maneybhanjang	Rimbick	Teesta Valley	Mirik	Upper Langurdang	Chota Hatta	Mungpoo	Bara Hatta	Upper Relling	Bichgaon	Lamahatta
Kurseong	0.785	-																
Relling	0.741	0.443	-															
Bijanbari	0.824	0.438	0.474	-														
Tonglu	0.795	0.912	0.920	0.919	-													
Takdah	0.667	0.580	0.529	0.657	0.883	-												
Sonada	0.658	0.588	0.545	0.638	0.882	0.487	-											
Maneybhanjang	0.687	0.803	0.784	0.839	0.797	0.708	0.714	-										
Rimbick	0.670	0.735	0.667	0.744	0.892	0.546	0.540	0.691	-									
Teesta Valley	0.813	0.412	0.448	0.292	0.931	0.601	0.611	0.817	0.724	-								
Mirik	0.778	0.358	0.424	0.375	0.933	0.578	0.575	0.798	0.709	0.284	-							
Upper Langurdang	0.740	0.622	0.586	0.620	0.908	0.594	0.547	0.711	0.644	0.600	0.526	-						
Chota Hatta	0.682	0.675	0.664	0.704	0.911	0.586	0.500	0.652	0.547	0.670	0.604	0.470	-					
Mungpoo	0.748	0.480	0.504	0.422	0.937	0.555	0.523	0.778	0.670	0.420	0.323	0.506	0.541	-				
Bara Hatta	0.692	0.568	0.533	0.633	0.900	0.509	0.470	0.701	0.554	0.556	0.509	0.438	0.474	0.490	-			
Upper Relling	0.733	0.526	0.575	0.569	0.891	0.569	0.505	0.704	0.626	0.536	0.438	0.440	0.435	0.427	0.390	-		
Bichgaon	0.753	0.600	0.649	0.596	0.896	0.650	0.578	0.743	0.714	0.588	0.506	0.462	0.483	0.481	0.506	0.328	-	
Lamahatta	0.688	0.565	0.553	0.611	0.909	0.515	0.505	0.680	0.566	0.538	0.452	0.437	0.381	0.460	0.385	0.314	0.344	-

**Supplementary Table 4.** Species turnover component ( $\beta_{jtu}$ ) of Jaccard beta diversity

Site	Dhotrey	Kurseong	Relling	Bijanbari	Tonglu	Takdah	Sonada	Maneybhanjang	Rimbick	Teesta Valley	Mirik	Upper Langurdang	Chota Hatta	Mungpoo	Bara Hatta	Upper Relling	Bichgaon	Lamahatta
<b>Kurseong</b>	0.693	-																
<b>Relling</b>	0.625	0.443	-															
<b>Bijanbari</b>	0.778	0.365	0.407	-														
<b>Tonglu</b>	0.710	0.824	0.841	0.857	-													
<b>Takdah</b>	0.565	0.531	0.472	0.657	0.788	-												
<b>Sonada</b>	0.596	0.491	0.434	0.605	0.806	0.434	-											
<b>Maneybhanjang</b>	0.567	0.590	0.542	0.716	0.788	0.436	0.517	-										
<b>Rimbick</b>	0.660	0.600	0.482	0.660	0.857	0.364	0.425	0.590	-									
<b>Teesta Valley</b>	0.755	0.364	0.403	0.259	0.873	0.586	0.557	0.656	0.615	-								
<b>Mirik</b>	0.731	0.222	0.308	0.340	0.889	0.557	0.557	0.656	0.630	0.204	-							
<b>Upper Langurdang</b>	0.706	0.308	0.226	0.406	0.889	0.358	0.358	0.656	0.608	0.333	0.281	-						
<b>Chota Hatta</b>	0.585	0.296	0.264	0.467	0.904	0.196	0.122	0.635	0.414	0.357	0.296	0.386	-					
<b>Mungpoo</b>	0.718	0.304	0.340	0.323	0.904	0.485	0.500	0.656	0.615	0.286	0.247	0.333	0.264	-				
<b>Bara Hatta</b>	0.680	0.372	0.313	0.542	0.857	0.372	0.391	0.567	0.518	0.409	0.409	0.308	0.231	0.444	-			
<b>Upper Relling</b>	0.722	0.203	0.301	0.390	0.857	0.390	0.368	0.613	0.622	0.301	0.229	0.382	0.264	0.301	0.324	-		
<b>Bichgaon</b>	0.676	0.043	0.200	0.200	0.889	0.333	0.269	0.735	0.636	0.125	0.043	0.364	0.475	0.125	0.269	0.085	-	
<b>Lamahatta</b>	0.651	0.194	0.164	0.400	0.889	0.222	0.303	0.613	0.526	0.222	0.164	0.429	0.264	0.277	0.250	0.250	0.200	-

**Supplementary Table 5.** Nestedness component ( $\beta_{jne}$ ) of Jaccard beta diversity

Site	Dhotrey	Kurseong	Relling	Bijanbari	Tonglu	Takdah	Sonada	Maneybhanjang	Rimbick	Teesta Valley	Mirik	Upper Langurdang	Chota Hatta	Mungpoo	Bara Hatta	Upper Relling	Bichgaon	Lamahatta
Kurseong	0.092	-																
Relling	0.116	0.000	-															
Bijanbari	0.046	0.073	0.067	-														
Tonglu	0.086	0.089	0.080	0.062	-													
Takdah	0.101	0.049	0.057	0.000	0.095	-												
Sonada	0.062	0.097	0.111	0.033	0.076	0.053	-											
Maneybhanjang	0.120	0.213	0.242	0.123	0.009	0.271	0.197	-										
Rimbick	0.011	0.135	0.185	0.084	0.035	0.183	0.115	0.101	-									
Teesta Valley	0.058	0.049	0.045	0.033	0.058	0.015	0.054	0.160	0.109	-								
Mirik	0.047	0.136	0.116	0.035	0.044	0.021	0.018	0.142	0.079	0.080	-							
Upper Langurdang	0.034	0.314	0.360	0.215	0.019	0.236	0.189	0.054	0.036	0.267	0.245	-						
Chota Hatta	0.098	0.379	0.400	0.237	0.007	0.390	0.378	0.017	0.133	0.313	0.308	0.084	-					
Mungpoo	0.029	0.175	0.164	0.099	0.033	0.069	0.023	0.122	0.054	0.134	0.076	0.172	0.277	-				
Bara Hatta	0.012	0.196	0.220	0.092	0.043	0.137	0.079	0.134	0.037	0.146	0.100	0.130	0.243	0.045	-			
Upper Relling	0.011	0.323	0.274	0.179	0.034	0.179	0.137	0.091	0.004	0.235	0.209	0.058	0.171	0.126	0.066	-		
Bichgaon	0.076	0.557	0.449	0.396	0.007	0.317	0.309	0.008	0.078	0.463	0.462	0.098	0.009	0.356	0.237	0.243	-	
Lamahatta	0.038	0.372	0.389	0.211	0.020	0.293	0.202	0.067	0.040	0.316	0.288	0.008	0.117	0.183	0.135	0.064	0.144	-

**Supplementary Table 6.** Site contribution to beta diversity (SCBD) based on Hellinger transformation

Site	SCBD	Site	SCBD
Dhotrey	0.1036	Rimbick	0.0531
Tonglu	0.1005	Bara Hatta	0.0401
Kurseong	0.0937	Mirik	0.0389
Takdah	0.0809	Mungpoo	0.0375
Relling	0.0803	Upper Langurdang	0.0327
Sonada	0.0691	Upper Relling	0.0306
Bijanbari	0.0653	Chota Hatta	0.0216
Maneybhanjang	0.0605	Lamahatta	0.0196
Teesta Valley	0.0573	Bichgaon	0.0147

**Supplementary Table 7.** Sørensen's similarity coefficient matrix of the study sites

Site	Dhotrey	Kurseong	Relling	Bijanbari	Tonglu	Takdah	Sonada	Mane Bhanjan	Rimbick	Teesta Valley	Mirik	Upper Langurdang	Chota Hatta	Mungpoo	Bara Hatta	Upper Relling	Bich Gaon	Lamahatta
Dhotrey	1	0.354	0.411	0.3	0.34	0.5	0.51	0.477	0.496	0.315	0.364	0.413	0.482	0.403	0.471	0.422	0.396	0.475
Kurseong	0.354	1	0.716	0.719	0.161	0.591	0.583	0.329	0.419	0.74	0.782	0.549	0.49	0.684	0.603	0.643	0.571	0.606
Relling	0.411	0.716	1	0.69	0.148	0.64	0.625	0.355	0.5	0.712	0.731	0.585	0.503	0.663	0.637	0.596	0.519	0.618
Bijanbari	0.3	0.719	0.69	1	0.149	0.511	0.531	0.277	0.408	0.829	0.769	0.55	0.457	0.733	0.537	0.603	0.576	0.56
Tonglu	0.34	0.161	0.148	0.149	1	0.209	0.211	0.337	0.194	0.129	0.125	0.168	0.163	0.119	0.182	0.196	0.188	0.167
Takdah	0.5	0.591	0.64	0.511	0.209	1	0.678	0.453	0.624	0.57	0.593	0.577	0.586	0.616	0.659	0.603	0.518	0.653
Sonada	0.51	0.583	0.625	0.531	0.211	0.678	1	0.444	0.63	0.56	0.596	0.623	0.667	0.646	0.693	0.662	0.594	0.662
Maneybhanjang	0.477	0.329	0.355	0.277	0.337	0.453	0.444	1	0.472	0.31	0.336	0.449	0.517	0.364	0.46	0.457	0.409	0.485
Rimbick	0.496	0.419	0.5	0.408	0.194	0.624	0.63	0.472	1	0.432	0.45	0.525	0.624	0.496	0.617	0.544	0.444	0.605
Teesta Valley	0.315	0.74	0.712	0.829	0.129	0.57	0.56	0.31	0.432	1	0.834	0.571	0.497	0.734	0.615	0.634	0.583	0.632
Mirik	0.364	0.782	0.731	0.769	0.125	0.593	0.596	0.336	0.45	0.834	1	0.643	0.567	0.807	0.658	0.72	0.662	0.708
Upper Langurdang	0.413	0.549	0.585	0.55	0.168	0.577	0.623	0.449	0.525	0.571	0.643	1	0.693	0.662	0.72	0.718	0.7	0.721
Chota Hatta	0.482	0.49	0.503	0.457	0.163	0.586	0.667	0.517	0.624	0.497	0.567	0.693	1	0.629	0.69	0.722	0.681	0.765
Mungpoo	0.403	0.684	0.663	0.733	0.119	0.616	0.646	0.364	0.496	0.734	0.807	0.662	0.629	1	0.676	0.729	0.683	0.701
Bara Hatta	0.471	0.603	0.637	0.537	0.182	0.659	0.693	0.46	0.617	0.615	0.658	0.72	0.69	0.676	1	0.758	0.661	0.762
Upper Relling	0.422	0.643	0.596	0.603	0.196	0.603	0.662	0.457	0.544	0.634	0.72	0.718	0.722	0.729	0.758	1	0.804	0.814
Bichgaon	0.396	0.571	0.519	0.576	0.188	0.518	0.594	0.409	0.444	0.583	0.662	0.7	0.681	0.683	0.661	0.804	1	0.792
Lamahatta	0.475	0.606	0.618	0.56	0.167	0.653	0.662	0.485	0.605	0.632	0.708	0.721	0.765	0.701	0.762	0.814	0.792	1

**Supplementary Table 8.** Non-metric multidimensional scaling environmental vector fitting results

Environmental variable	NMDS1	NMDS2	$r^2$	$p$ -value	Significance
Altitude (m)	-0.753	-0.658	0.784	0.001	***
Mean temperature (°C)	0.614	0.789	0.896	0.001	***
Precipitation (mm)	0.244	0.970	0.033	0.779	NS

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ ; NS = not significant.

**Supplementary Table 9.** Permutational multivariate analysis of variance results for differences in species composition among altitude zones

Source	Df	Sum of squares	$R^2$	$F$ -value	$p$ -value	Significance
Altitude zone	2	0.6623	0.316	3.468	0.001	**
Residual	15	1.4325	0.684	—	—	—
Total	17	2.0948	1.000	—	—	—

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ .

**Supplementary Table 10.** Permutational multivariate analysis of variance results using continuous environmental variables

Source	Df	Sum of squares	$R^2$	$F$ -value	$p$ -value	Significance
Environmental variables (Altitude, Temperature, Precipitation)	3	0.8101	0.387	2.943	0.002	**
Residual	14	1.2847	0.613	—	—	—
Total	17	2.0948	1.000	—	—	—

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ .

**Supplementary Table 11.** Test of homogeneity of multivariate dispersion (betadisper)

Source	Df	Sum of squares	Mean square	$F$ -value	$p$ -value	Significance
Altitude zone	2	0.0849	0.0424	10.945	0.001	**
Residual	15	0.0582	0.0039	—	—	—

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ .

**Supplementary Table 12.** Pearson correlation coefficients among species richness and environmental variables

Variable	Species richness	Altitude (m)	Mean temperature (°C)	Precipitation (mm)
Species richness	1.000	-0.697	0.619	0.047
Altitude (m)	-0.697	1.000	-0.885	0.142
Mean temperature (°C)	0.619	-0.885	1.000	-0.007
Precipitation (mm)	0.047	0.142	-0.007	1.000

**Supplementary Table 13.** Spearman rank correlation coefficients among species richness and environmental variables

Variable	Species richness	Altitude (m)	Mean temperature (°C)	Precipitation (mm)
Species richness	1.000	-0.733	0.659	-0.089
Altitude (m)	-0.733	1.000	-0.837	0.265
Mean temperature (°C)	0.659	-0.837	1.000	-0.261
Precipitation (mm)	-0.089	0.265	-0.261	1.000

**Supplementary Table 14.** Simple linear regression results showing relationships between species richness and individual environmental variables

Predictor	Intercept (Estimate $\pm$ SE)	Slope (Estimate $\pm$ SE)	<i>t</i> -value	<i>p</i> -value	<i>R</i> <sup>2</sup>	Significance
Altitude (m)	118.89 $\pm$ 12.65	-0.0268 $\pm$ 0.0069	-3.89	0.001	0.486	**
Mean temperature (°C)	3.55 $\pm$ 22.21	4.38 $\pm$ 1.39	3.15	0.006	0.383	**
Precipitation (mm)	66.61 $\pm$ 30.20	0.0019 $\pm$ 0.0100	0.19	0.853	0.002	NS

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ;  $p < 0.05$ ; NS = not significant

**Supplementary Table 15.** Multiple linear regression results for species richness using environmental predictors

**Full model: Altitude + Mean temperature + Precipitation**

Predictor	Estimate $\pm$ SE	<i>t</i> -value	<i>p</i> -value	Significance
Intercept	114.60 $\pm$ 69.88	1.64	0.123	NS
Altitude (m)	-0.0303 $\pm$ 0.0162	-1.87	0.083	.
Mean temperature (°C)	-0.542 $\pm$ 2.947	-0.18	0.857	NS
Precipitation (mm)	0.0064 $\pm$ 0.0079	0.81	0.432	NS
Model statistics				
$R^2$	Adjusted $R^2$	<i>F</i>	<i>p</i>	
0.509	0.403	4.83	0.016	

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ ; NS = not significant

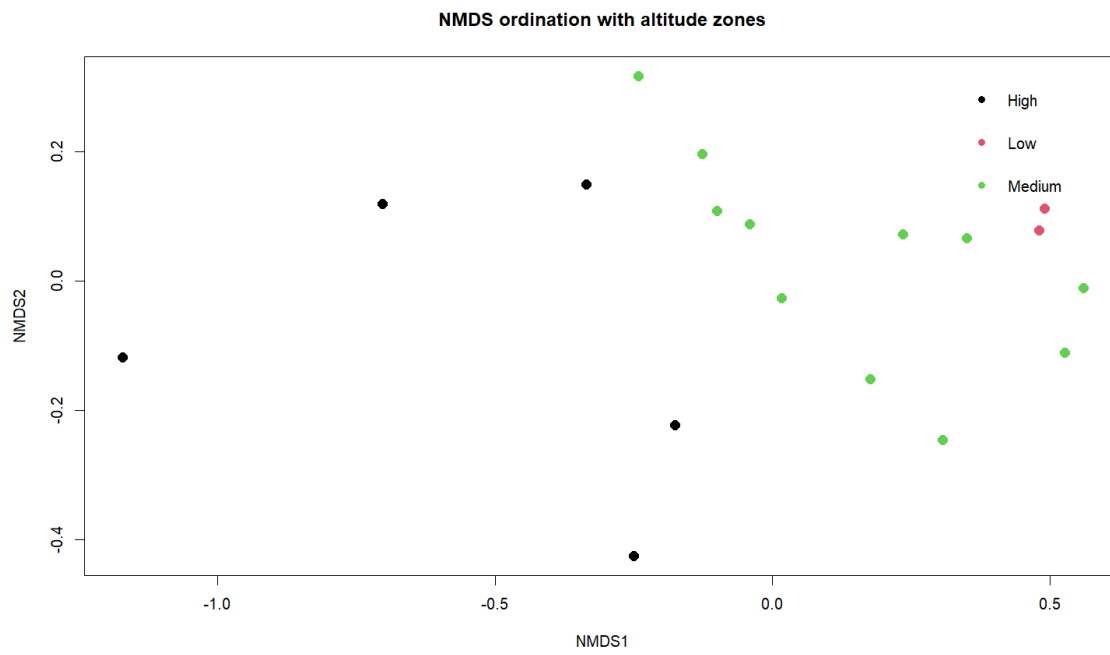
**Supplementary Table 16.** Final multiple linear regression model after removing collinear predictors**Reduced model: Altitude + Precipitation**

Predictor	Estimate $\pm$ SE	<i>t</i> -value	<i>p</i> -value	Significance
Intercept	114.60 $\pm$ 69.88	1.64	0.123	NS
Altitude (m)	-0.0303 $\pm$ 0.0162	-1.87	0.083	.
Mean temperature (°C)	-0.542 $\pm$ 2.947	-0.18	0.857	NS
Precipitation (mm)	0.0064 $\pm$ 0.0079	0.81	0.432	NS
Model statistics				
$R^2$	Adjusted $R^2$	<i>F</i>	<i>p</i>	
0.509	0.403	4.83	0.016	

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ;  $p < 0.05$ ; NS = not significant

**Supplementary Table 17.** Variance Inflation Factor (VIF) values

Predictor	VIF
Altitude (m)	<b>5.05</b>
Mean temperature (°C)	<b>4.95</b>
Precipitation (mm)	<b>1.09</b>



**Supplementary Fig. 1.** Non-metric multidimensional scaling ordination of study sites based on Jaccard dissimilarity derived from species presence-absence data. Sites are colour-coded according to altitude zones: green = low altitude, orange = mid altitude and purple = high altitude.