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**Distribution pattern of poisonous plant species in arid grasslands: a case from Xinjiang, Northwestern China**

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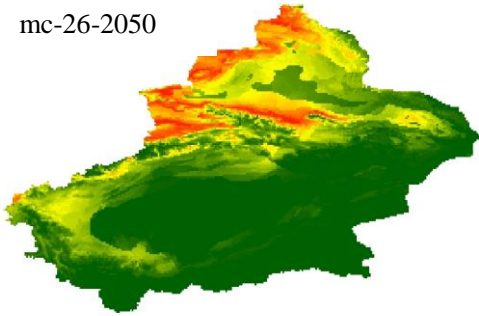
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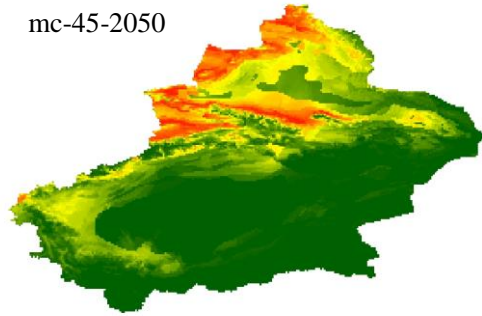
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## Supplementary Material Figures

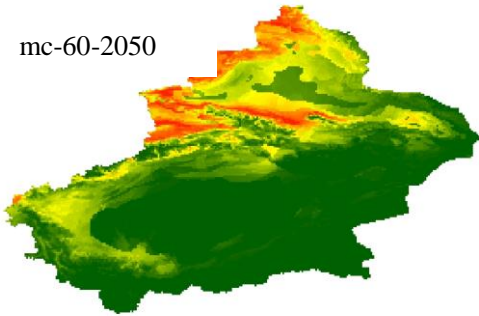
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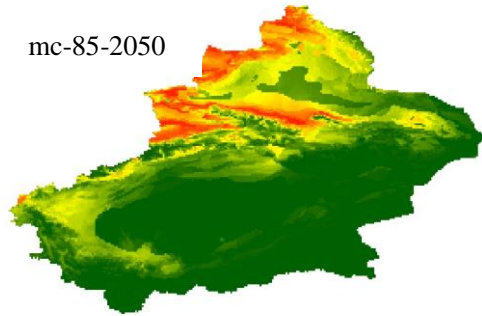
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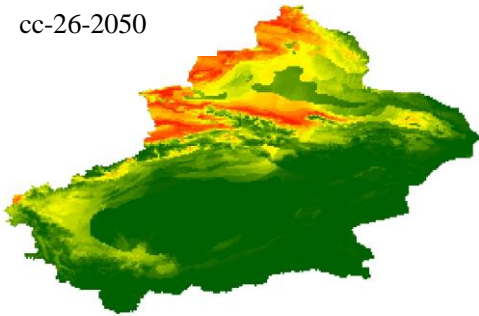
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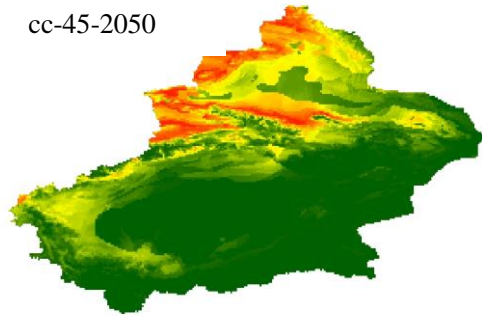
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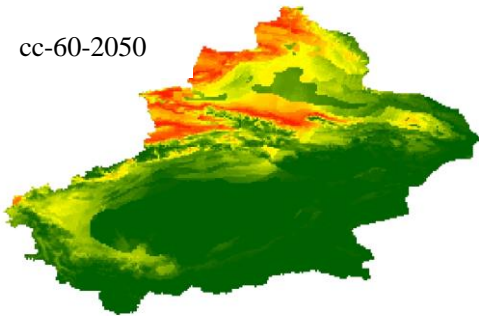
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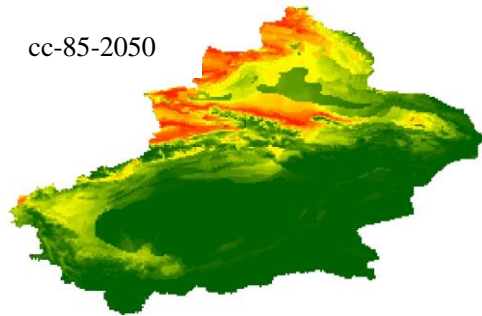
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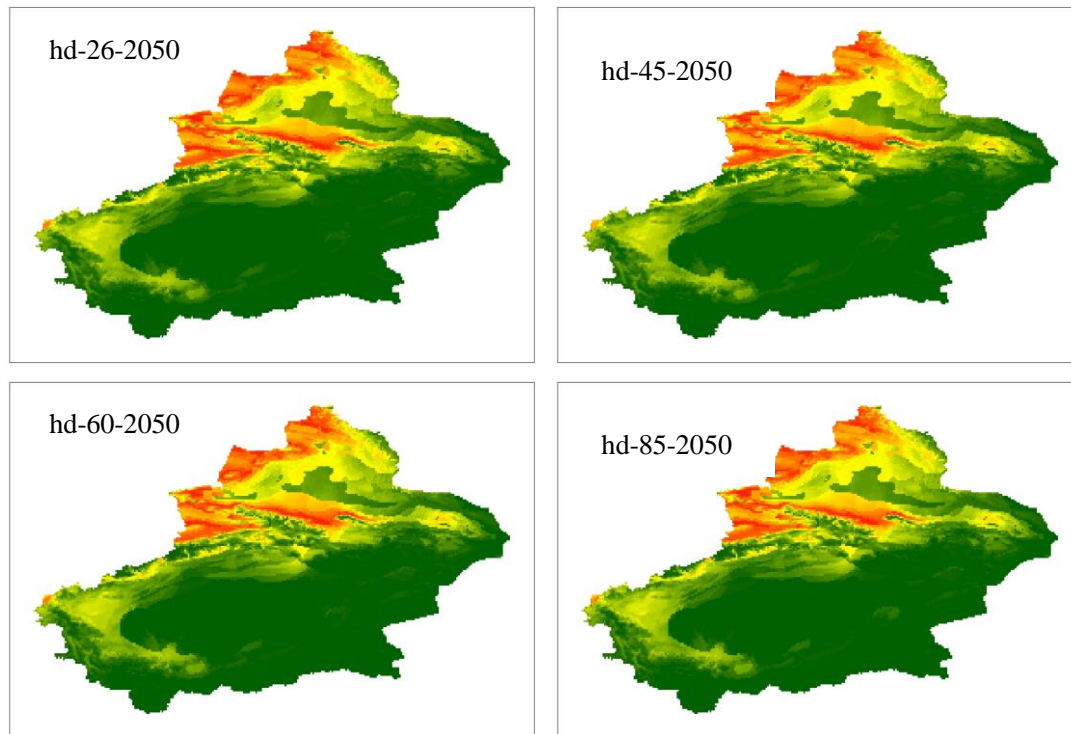


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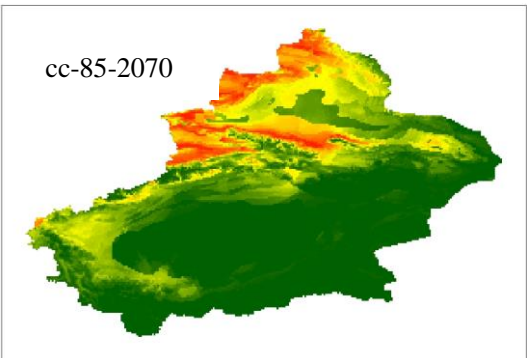
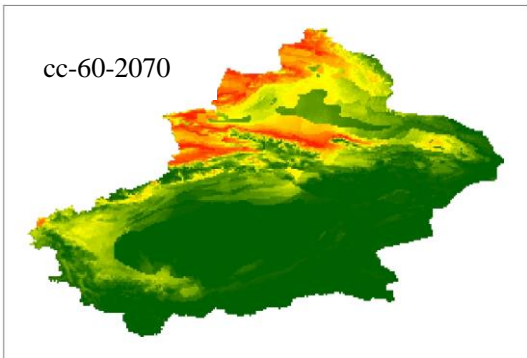
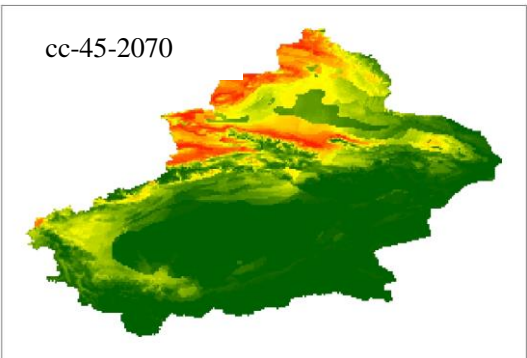
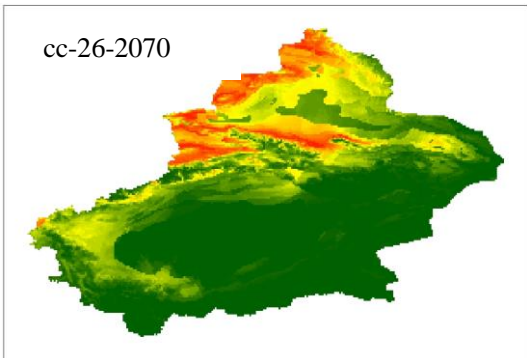
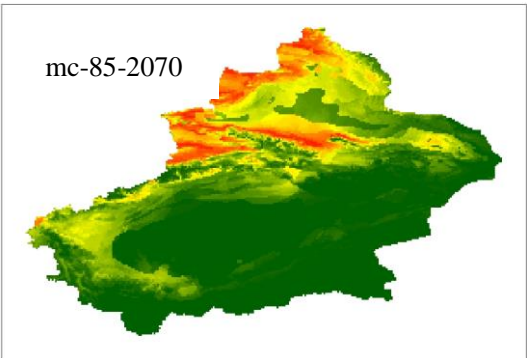
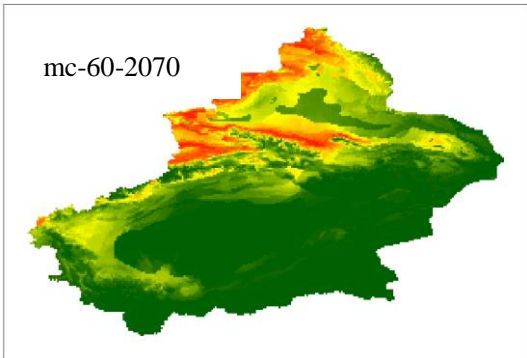
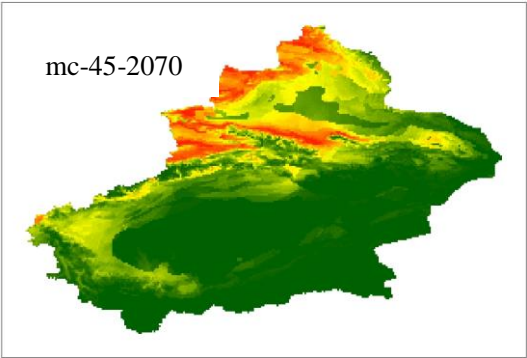
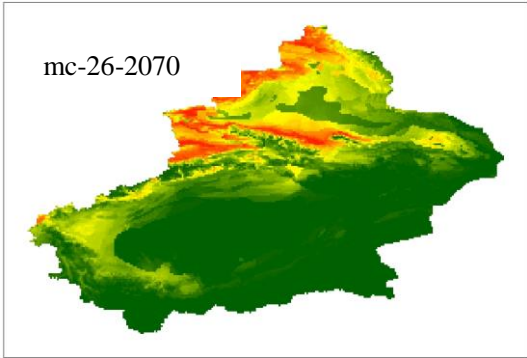


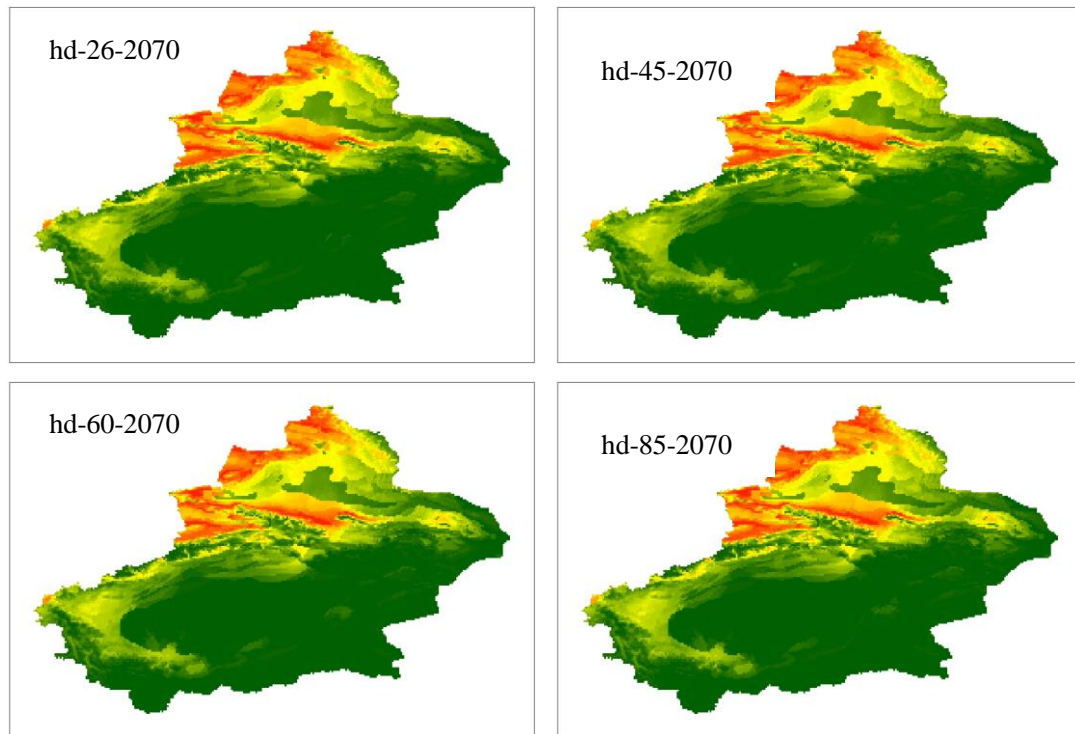
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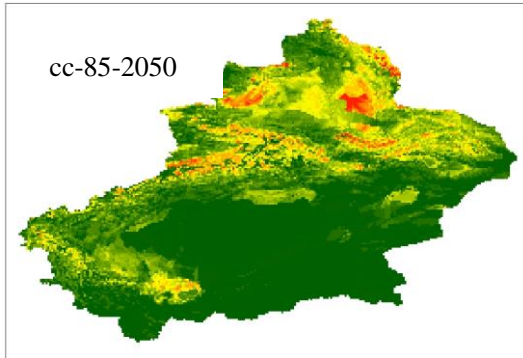
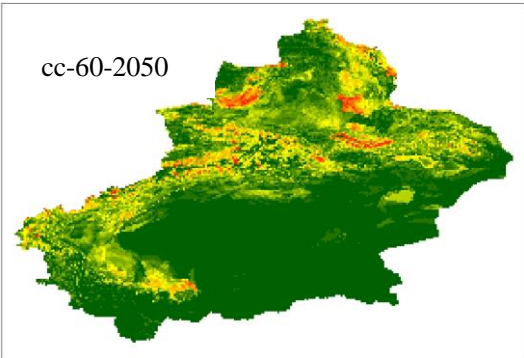
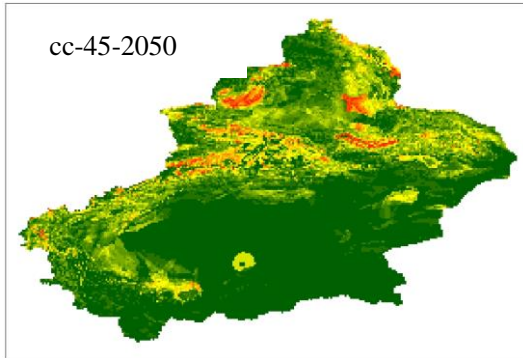
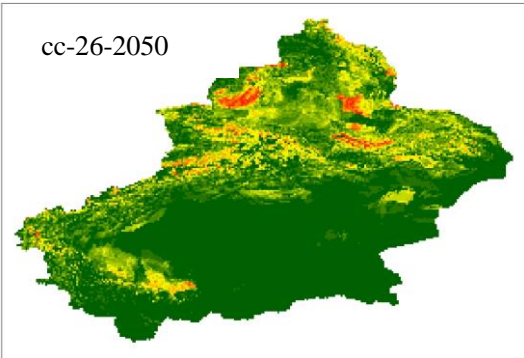
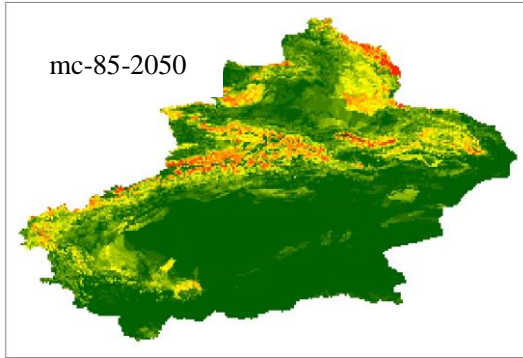
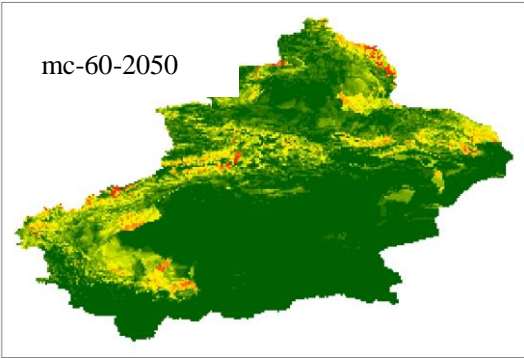
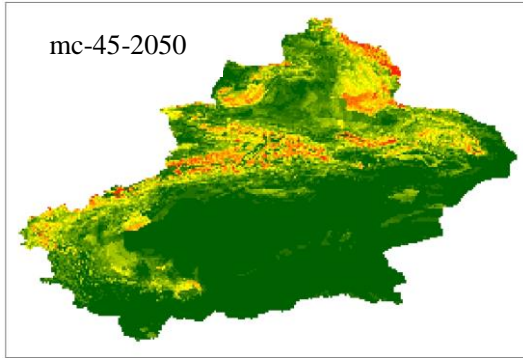
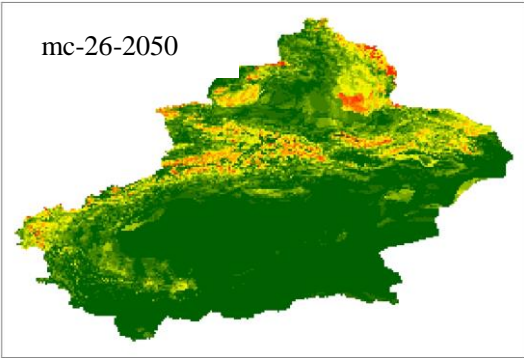
**Fig. S1.** The number of persistent species for poisonous plants during the 2050s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.

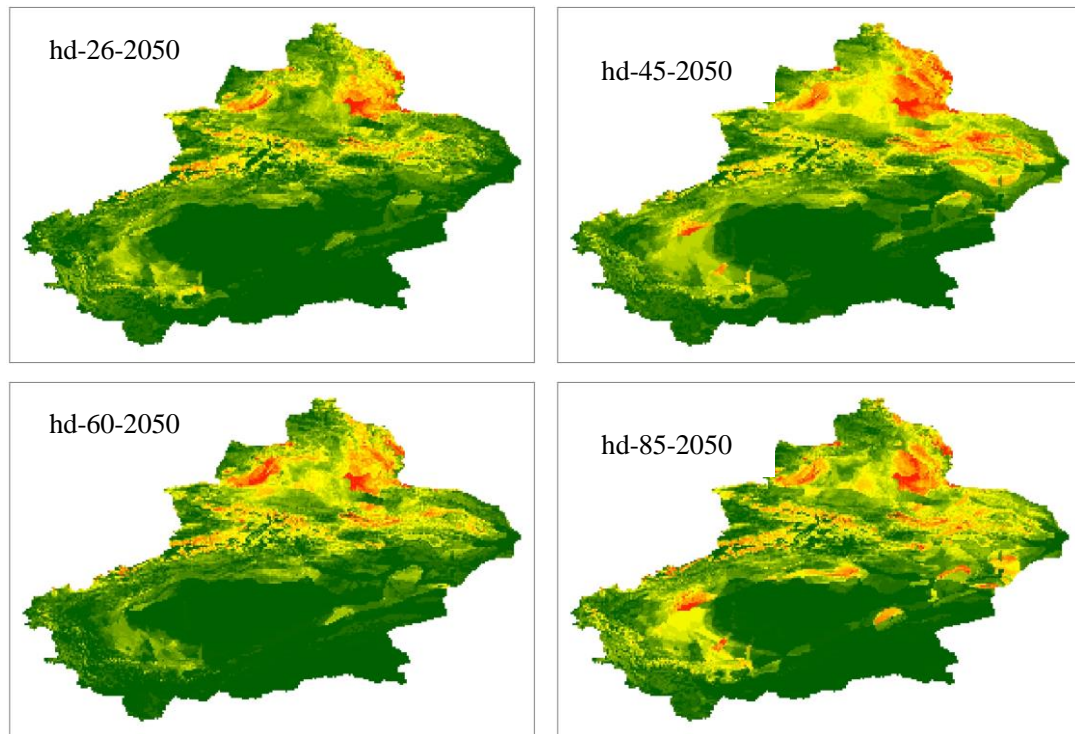




**Fig. S2.** The number of persistent species for poisonous plants during the 2070s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.

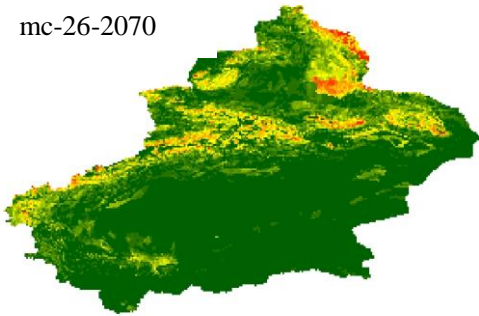




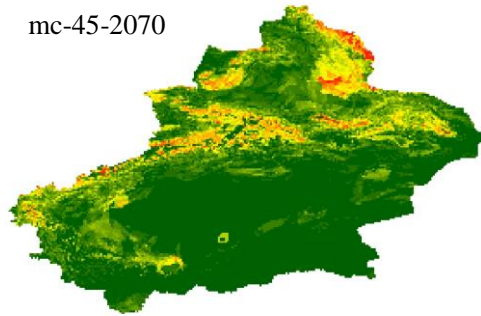


**Fig. S3.** The number of immigrants for poisonous plants during the 2050s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.

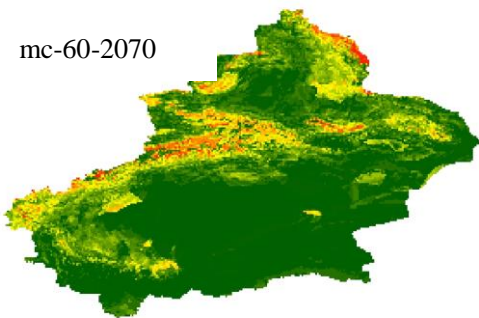
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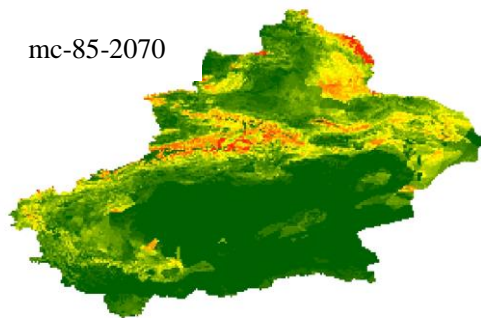
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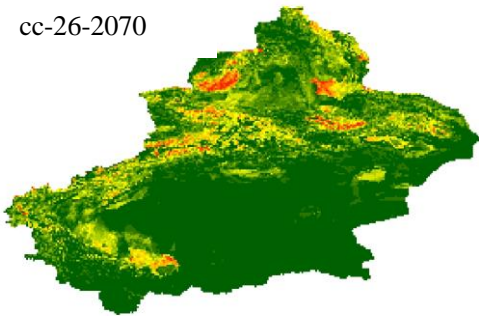
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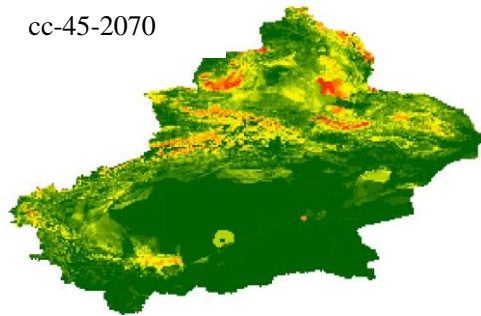
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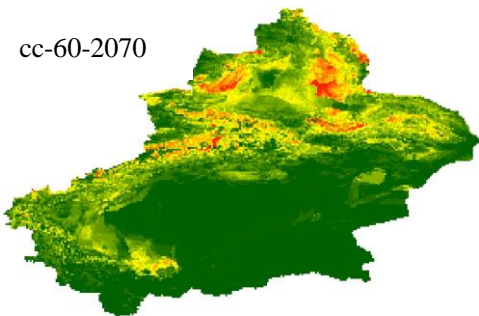
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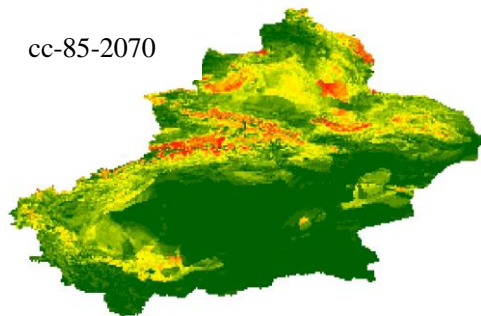
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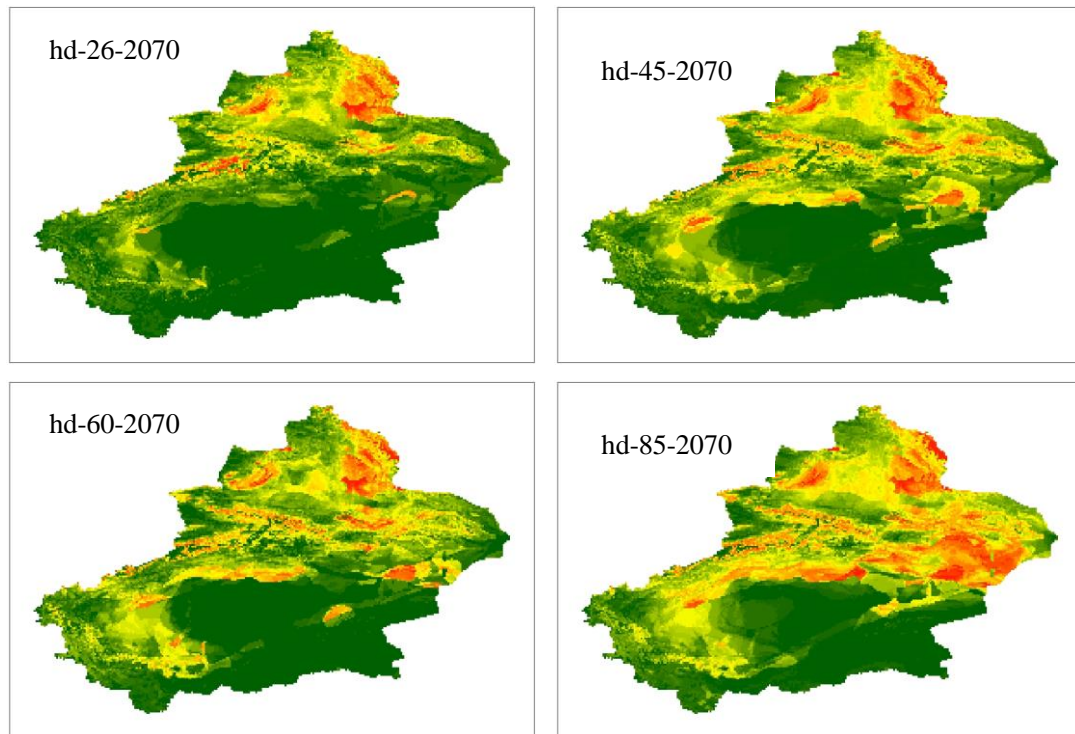
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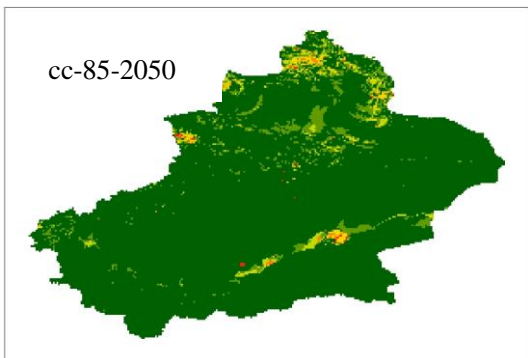
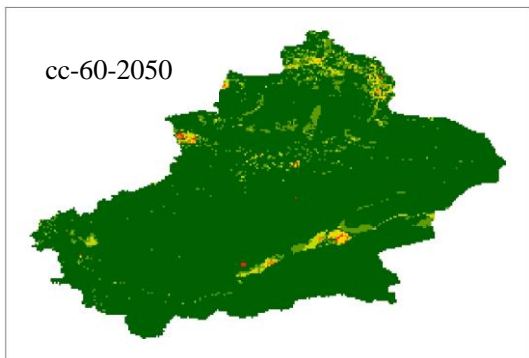
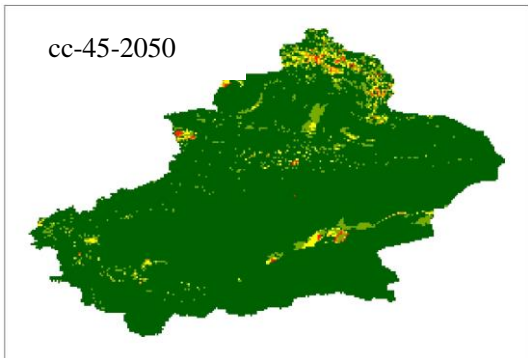
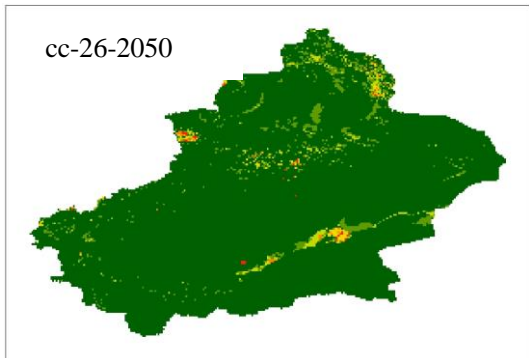
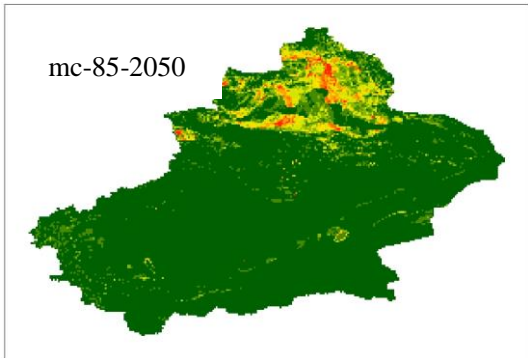
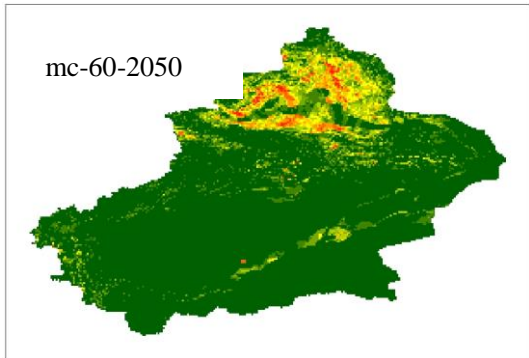
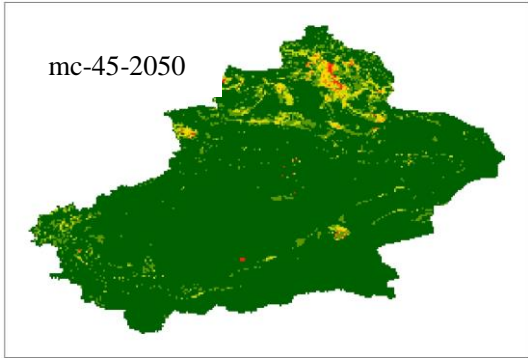
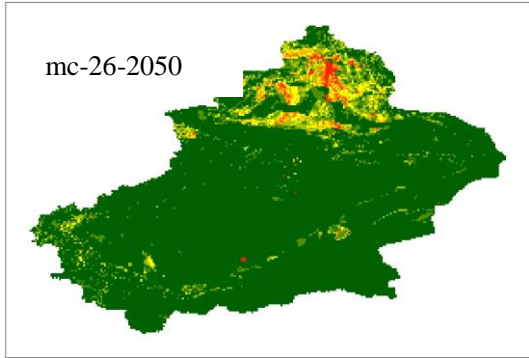
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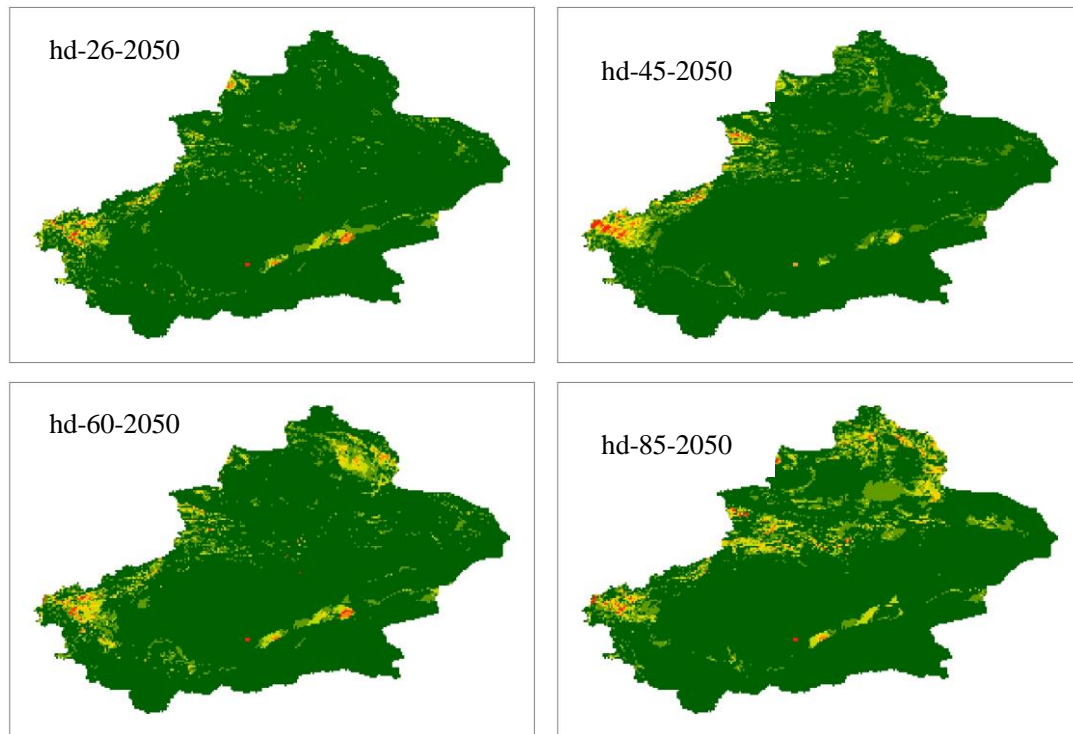




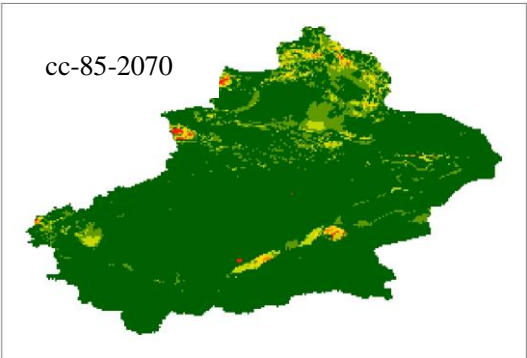
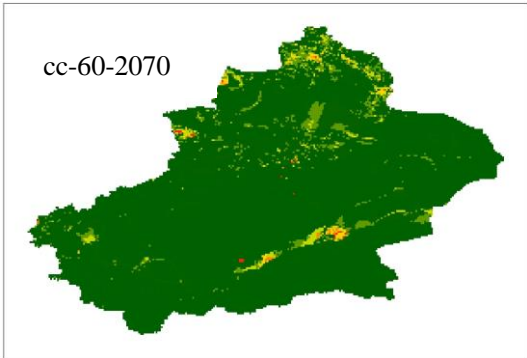
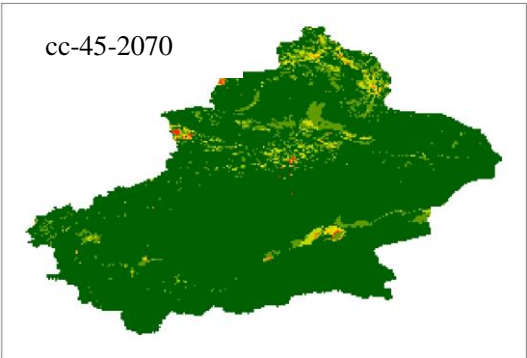
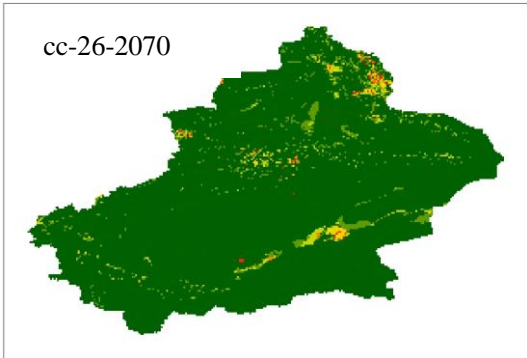
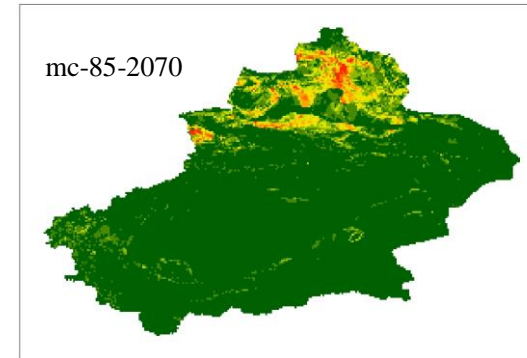
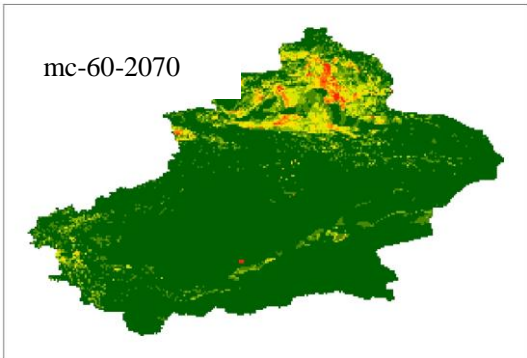
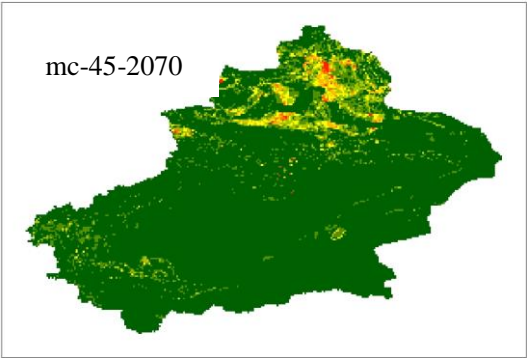
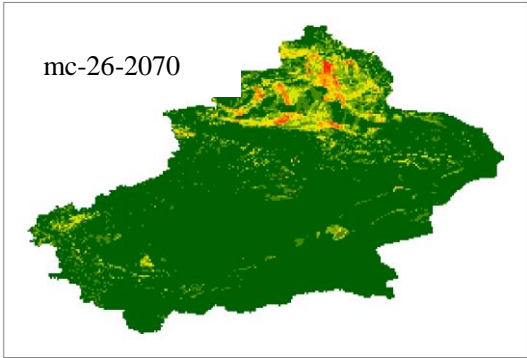


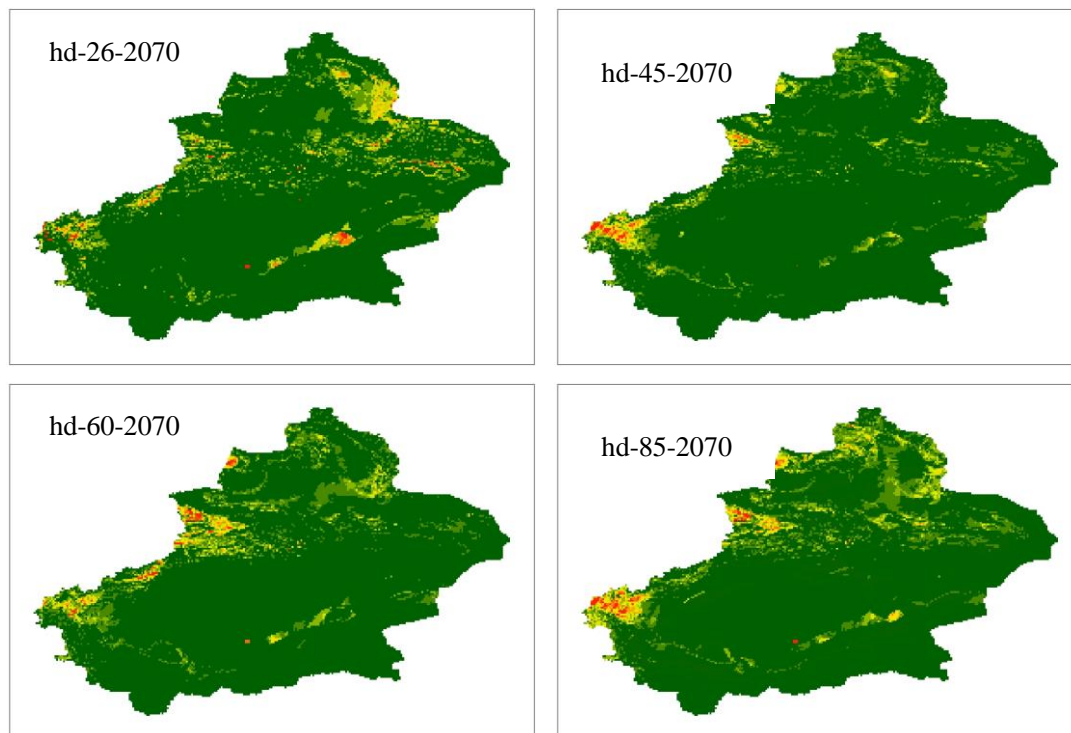
**Fig. S4.** The number of immigrants for poisonous plants during the 2070s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.





**Fig. S5.** The number of emigrants for poisonous plants during the 2050s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.





**Fig. S6.** The number of emigrants for poisonous plants during the 2070s based on three climate change models and four RCP scenarios. The change of colours represents the different levels of species richness: Green-Low; Yellow-Middle; Red-High. mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5.



## Supplementary Material Tables

**Table S1. The species names, number of points, AUC values and 95% C.I. AUC values for these 90 poisonous plants**

	Species name	Number of points	AUC values	95% C.I. AUC values
1	<i>Equisetum arvense</i> Rapp.	37	0.912	0.836
2	<i>Equisetum hyemale</i> L.	21	0.962	0.857
3	<i>Equisetum ramosissimum</i> (Desf.) Boerner	53	0.865	0.826
4	<i>Polygonum convolvulus</i> L.	21	0.943	0.857
5	<i>Zygophyllum fabago</i> L.	37	0.917	0.836
6	<i>Thalictrum foetidum</i> L.	39	0.92	0.829
7	<i>Corydalis glaucescens</i> Regel	13	0.967	0.754
8	<i>Glaucium fimbriigerum</i> Boiss.	11	0.94	0.754
9	<i>Hypecoum erectum</i> L.	11	0.82	0.754
10	<i>Echinops gmelinii</i> Turcz.	8	0.905	0.718
11	<i>Halerpestes ruthenica</i> (Jacq.) Ovcz.	24	0.914	0.855
12	<i>Galeopsis bifida</i> Boenn.	10	0.931	0.742
13	<i>Marrubium vulgare</i> L.	14	0.974	0.754
14	<i>Nepeta cataria</i> L.	13	0.926	0.754
15	<i>Clematis tangutica</i> (Maxim.) Korsh.	24	0.932	0.855
16	<i>Aquilegia glandulosa</i> Fisch. ex Link	14	0.931	0.754
17	<i>Thlaspi arvense</i> L.	28	0.954	0.843
18	<i>Triglochin palustre</i> L.	32	0.855	0.842
19	<i>Polygonatum roseum</i> (Ledeb.) Kunth	14	0.96	0.754
20	<i>Iris loczyi</i> Kanitz	15	0.943	0.839
21	<i>Hyoscyamus bohemicus</i> F. W. Schmidt	5	0.859	0.702
22	<i>Hyoscyamus niger</i> L.	30	0.958	0.837
23	<i>Datura stramonium</i> L.	13	0.817	0.754
24	<i>Calystegia hederacea</i> Wall.	6	0.874	0.71
25	<i>Thymus mongolicus</i> (Ronniger) Ronniger	7	0.938	0.752
26	<i>Mentha haplocalyx</i> Briq.	66	0.895	0.833
27	<i>Sium latifolium</i> L.	9	0.927	0.719
28	<i>Berula erecta</i> (Huds.) Coville	6	0.905	0.71
29	<i>Conium maculatum</i> L.	9	0.935	0.719
30	<i>Cicuta virosa</i> L.	20	0.938	0.838
31	<i>Hypericum perforatum</i> L.	23	0.981	0.838
32	<i>Euphorbia humifusa</i> Willd. ex Schldl.	27	0.93	0.842
33	<i>Euphorbia esula</i> L.	28	0.961	0.843
34	<i>Peganum harmala</i> L.	64	0.868	0.829
35	<i>Tribulus terrestris</i> L.	35	0.91	0.821
36	<i>Linum usitatissimum</i> L.	15	0.947	0.839

37	<i>Thermopsis alpine</i> (Pall.) Ledeb.	13	0.959	0.754
38	<i>Sphaerophysa salsula</i> (Pall.) DC.	48	0.872	0.84
39	<i>Achillea millefolium</i> L.	37	0.966	0.836
40	<i>Bidens tripartita</i> L.	25	0.939	0.844
41	<i>Senecio nemorensis</i> L.	47	0.95	0.836
42	<i>Tanacetum vulgare</i> L.	26	0.981	0.844
43	<i>Artemisia finita</i> Kitag.	12	0.948	0.73
44	<i>Xanthium sibiricum</i> Patr. ex Widder	45	0.912	0.825
45	<i>Solidago virgaurea</i> L.	42	0.959	0.838
46	<i>Arctous alpinus</i> (L.) Nied.	8	0.945	0.718
47	<i>Solanum nigrum</i> L.	33	0.924	0.834
48	<i>Lotus corniculatus</i> L.	11	0.914	0.754
49	<i>Vicia sativa</i> L.	13	0.851	0.754
50	<i>Trifolium pratense</i> L.	28	0.964	0.843
51	<i>Thermopsis lanceolata</i> R. Br.	12	0.869	0.73
52	<i>Sophora alopecuroides</i> L.	48	0.874	0.84
53	<i>Robinia pseudoacacia</i> L.	7	0.883	0.752
54	<i>Oxytropis falcata</i> Bunge	8	0.961	0.718
55	<i>Oxytropis glabra</i> (Lam.) DC.	51	0.884	0.836
56	<i>Melilotus suaveolens</i> Ledeb.	31	0.888	0.841
57	<i>Melilotus officinalis</i> (L.) Pall.	30	0.932	0.837
58	<i>Lepidium apetalum</i> Willd.	49	0.852	0.836
59	<i>Descurainia sophia</i> (L.) Webb ex Prantl	43	0.919	0.835
60	<i>Erysimum cheiranthoides</i> L.	30	0.937	0.837
61	<i>Papaver nudicaule</i> L.	27	0.945	0.842
62	<i>Chelidonium majus</i> L.	25	0.969	0.844
63	<i>Thalictrum simplex</i> L.	34	0.942	0.836
64	<i>Halerpestes ruthenica</i> (Jacq.) Ovcz.	25	0.891	0.844
65	<i>Ranunculus chinensis</i> Bunge	10	0.907	0.742
66	<i>Ranunculus sceleratus</i> L.	22	0.943	0.837
67	<i>Ranunculus japonicus</i> Thunb.	12	0.921	0.73
68	<i>Aconitum soongaricum</i> (Regel) Stapf	18	0.959	0.86
69	<i>Aconitum monticola</i> Steinb.	8	0.947	0.718
70	<i>Aconitum leucostomum</i> Vorosch.	24	0.967	0.855
71	<i>Aconitum karakolicum</i> Rapaics	14	0.949	0.754
72	<i>Aconitum anthoroideum</i> DC.	12	0.912	0.73
73	<i>Arenaria serpyllifolia</i> L.	18	0.968	0.86
74	<i>Halogeton glomeratus</i> (Bieb.) C. A. Mey.	65	0.872	0.83
75	<i>Salicornia europaea</i> L.	29	0.93	0.84
76	<i>Chenopodium album</i> L.	67	0.841	0.836
77	<i>Atriplex patens</i> (Litv.) Iljin	12	0.846	0.73
78	<i>Anabasis aphylla</i> L.	35	0.911	0.821
79	<i>Rumex crispus</i> L.	24	0.912	0.855
80	<i>Rumex acetosa</i> L.	19	0.965	0.844

81	<i>Polygonum hydropiper</i> L.	18	0.933	0.86
82	<i>Polygonum persicaria</i> L.	24	0.906	0.855
83	<i>Urtica cannabina</i> L.	31	0.959	0.841
84	<i>Cannabis sativa</i> L.	30	0.921	0.837
	<i>Achnatherum inebrians</i> (Hance) Keng ex			
85	Tzvelev	13	0.909	0.754
86	<i>Alisma plantago-aquatica</i> L.	17	0.93	0.859
87	<i>Triglochin palustre</i> L.	35	0.873	0.821
88	<i>Ephedra intermedia</i> Schrenk ex C. A. Mey.	44	0.866	0.834
89	<i>Ephedra equisetina</i> Bunge	34	0.892	0.836
90	<i>Dryopteris filix-mas</i> (L.) Schott	16	0.984	0.855

**Table S2. Spearman's rank correlation coefficients (r) for the 6 bioclimatic variables**

	bio2	bio4	bio9	bio12	bio15	bio19
bio2	1.000					
bio4	-0.022	1.000				
bio9	0.574	-0.051	1.000			
bio12	-0.522	-0.207	-0.672	1.000		
bio15	-0.119	-0.476	-0.245	0.008	1.000	
bio19	-0.267	0.206	-0.320	0.667	-0.665	1.000

**Table S3. Spearman's rank correlation coefficients (r) for the 4 soil variables**

	thermcap	soilcarb	fieldcap	bulkdens
thermcap	1.000			
soilcarb	0.066	1.000		
fieldcap	-0.179	0.311	1.000	
bulkdens	0.355	0.126	0.126	1.000

**Table S4. The land area of immigrants with high ( $\geq 11$  species), middle (6-10 species) and low (1-5 species) levels of species richness during the 2050s and the 2070s under three climate model and four RCP scenarios**

mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5

Climatic scenarios	Land area with low level ( $\times 10^4$ km <sup>2</sup> )	Land area with middle level ( $\times 10^4$ km <sup>2</sup> )	Land area with high level ( $\times 10^4$ km <sup>2</sup> )
cc-26-2050s	92.46	29.44	6.87
cc-45-2050s	96.52	32.22	9.90
cc-60-2050s	88.08	35.66	10.38
cc-85-2050s	79.22	41.47	24.36

hd-26-2050s	85.20	44.43	22.92
hd-45-2050s	68.35	40.38	61.13
hd-60-2050s	79.57	38.56	28.81
hd-85-2050s	70.13	46.81	42.33
mc-26-2050s	88.49	28.03	12.26
mc-45-2050s	79.47	33.54	18.16
mc-60-2050s	83.20	30.42	8.05
mc-85-2050s	88.43	31.06	16.95
cc-26-2070s	96.07	24.48	5.82
cc-45-2070s	89.76	35.99	15.87
cc-60-2070s	74.30	42.40	25.64
cc-85-2070s	70.46	47.00	36.60
hd-26-2070s	78.93	38.99	30.63
hd-45-2070s	64.86	43.81	65.33
hd-60-2070s	65.41	47.85	46.94
hd-85-2070s	56.64	37.45	90.98
mc-26-2070s	88.03	23.03	8.46
mc-45-2070s	93.32	26.77	16.01
mc-60-2070s	90.95	28.99	16.18
mc-85-2070s	72.45	41.27	35.24

**Table S5. The land area of emigrants with high ( $\geq 6$  species) and low (1-5 species) levels of species richness during the 2050s and the 2070s under three climate model and four RCP scenarios**

mc: MIROC5; cc: CCSM4; hd: HadGEM2AO. 26: RCP2.6; 45: RCP4.5; 60: RCP6.0; 85: RCP8.5

Climatic scenarios	Land area with low level ( $\times 10^4$ km <sup>2</sup> )	Land area with high level ( $\times 10^4$ km <sup>2</sup> )
cc-26-2050s	43.55	0.33
cc-45-2050s	50.97	0.21
cc-60-2050s	47.85	0.32
cc-85-2050s	51.35	0.32
hd-26-2050s	53.99	0.36
hd-45-2050s	67.72	1.69
hd-60-2050s	63.11	0.42
hd-85-2050s	70.75	0.55
mc-26-2050s	65.85	2.87
mc-45-2050s	61.51	0.44
mc-60-2050s	76.66	8.25
mc-85-2050s	69.26	4.30
cc-26-2070s	45.70	0.50
cc-45-2070s	54.23	0.32
cc-60-2070s	47.09	0.28

cc-85-2070s	60.11	0.45
hd-26-2070s	76.97	0.61
hd-45-2070s	70.03	1.35
hd-60-2070s	77.06	1.76
hd-85-2070s	84.34	2.29
mc-26-2070s	74.56	3.52
mc-45-2070s	67.93	1.11
mc-60-2070s	74.27	3.60
mc-85-2070s	70.18	4.58

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