

**Table S1.** The area of paddy field and dryland under different TPI in China in 1990 and 2020. (unit: km<sup>2</sup>)

Time	Dryland			Paddy field		
	<0.4	0.4–0.8	>0.8	<0.4	0.4–0.8	>0.8
1990	992,721	263,854	41,352	409,152	57,526	3958
1995	982,509	258,103	41,794	402,420	61,961	5308
2000	1,011,813	268,441	44,939	405,184	61,919	5223
2005	1,015,819	265,882	44,326	397,377	61,627	5202
2010	1,012,319	265,053	44,080	396,801	61,437	5198
2015	1,011,533	264,223	43,938	397,170	60,952	5173
2020	995,802	277,637	46,504	388,314	63,969	5068

**Table S2.** Change in the elevations of paddy field and dryland. (unit: km<sup>2</sup>)

Elevation	Type	1990	1995	2000	2005	2010	2015	2020
0–200m	paddy field	304,594	300,143	303,161	296,348	296,442	298,099	295,482
	dryland	553,835	547,394	556,627	554,462	548,880	541,016	519,806
200–500m	paddy field	83,865	85,501	84,978	84,549	84,069	83,241	84,219
	dryland	242,980	244,889	258,091	259,111	259,654	260,445	266,480
500–1000m	paddy field	41,897	43,176	42,887	42,571	42,435	42,015	40,296
	dryland	166,032	164,179	169,087	171,502	171,783	174,292	184,052
1000–1500m	paddy field	20,383	21,480	21,353	21,169	21,113	20,812	19,594
	dryland	187,463	182,112	190,148	191,058	191,608	194,907	198,133
1500–2500m	paddy field	12,915	12,982	13,264	13,189	13,111	12,951	11,995
	dryland	120,534	117,950	123,370	122,078	121,775	121,403	121,456
2500–3500m	paddy field	272	335	334	334	334	333	316
	dryland	18,679	18,654	19,438	19,223	19,197	19,122	19,128
>3500m	paddy field	15	14	16	16	16	16	46
	dryland	4935	3824	4974	4959	4952	4925	7081

**Table S3.** Change in the slopes of paddy field and dryland. (unit: km<sup>2</sup>)

Slope	Type	1990	1995	2000	2005	2010	2015	2020
0–2°	paddy field	328,132	322,495	325,599	318,515	318,394	319,671	309,286
	dryland	811,464	802,707	822,115	827,093	824,091	823,839	811,297
2–6°	paddy field	79,969	78,155	77,787	77,122	76,683	75,786	75,048
	dryland	254,597	248,947	261,300	259,447	258,844	258,011	252,870
6–15°	paddy field	49,579	53,060	53,148	52,843	52,662	52,235	55,899
	dryland	175,719	173,645	181,095	179,440	178,786	178,295	190,745
15–25°	paddy field	11,473	13,876	13,737	13,637	13,647	13,566	14,870
	dryland	45,331	45,172	48,174	47,697	47,462	47,333	51,789
>25°	paddy field	1540	2160	2104	2097	2093	2084	2284
	dryland	10,902	11,982	12,553	12,396	12,314	12,260	13,316

**Table S4.** Change in slope aspects of paddy field and dryland. (unit: km<sup>2</sup>)

Aspect	Type	1990	1995	2000	2005	2010	2015	2020
North	paddy field	48,706	49,591	50,582	49,635	49,586	49,641	56,259
	dryland	152,839	152,597	157,503	158,028	157,706	157,912	166,982
Northeast	paddy field	46,657	60,840	62,114	61,075	60,885	60,951	52,098
	dryland	159,812	166,679	172,884	173,313	173,017	172,988	169,391
East	paddy field	55,423	77,120	77,355	76,211	76,010	75,837	54,416
	dryland	174,039	181,842	187,859	187,786	187,100	186,849	171,114
Southeast	paddy field	61,468	75,321	75,992	74,743	74,534	74,343	53,144
	dryland	173,963	177,818	183,964	183,881	183,145	182,567	165,926
South	paddy field	63,521	62,148	62,137	61,073	60,973	60,893	52,675
	dryland	167,034	163,274	167,927	168,086	167,388	167,010	160,486
Southwest	paddy field	65,946	51,269	50,710	49,768	49,681	49,628	57,941
	dryland	158,430	148,890	154,273	154,212	153,668	153,548	157,360
West	paddy field	68,311	46,930	46,481	45,612	45,583	45,621	65,458
	dryland	155,783	143,618	149,110	148,943	148,269	147,952	161,994
Northwest	paddy field	58,567	44,398	44,753	43,932	43,965	44,088	63,021
	dryland	151,027	142,470	146,548	146,556	146,008	145,734	161,696

**Table S5.** Land use transformation matrices for paddy field, dryland, and other land among the 32 provinces. (unit: km<sup>2</sup>)

Province	Paddy field to Dryland	Dryland to Paddy field	Dryland to Other land	Other land to Dryland	Paddy field to Other land	Other land to Paddy field
Beijing	48	0	3556	1206	122	0
Tianjin	563	247	2006	1240	639	124
Hebei	2536	321	31,969	24,009	1449	355
Shanxi	20	24	27,765	24,534	25	5
Inner Mongolia	116	328	50,701	59,622	236	727
Liaoning	5819	2418	22,969	22,311	3755	2520
Jilin	3541	3452	20,527	24,892	2621	3723
Heilongjiang	4761	19,241	29,562	48,406	2776	15,318
Shanghai	58	117	175	137	2145	430
Jiangsu	2074	3400	6693	4646	14,135	6496
Zhejiang	818	774	2392	1672	12,377	7691
Anhui	2256	2265	8306	7100	14,348	11,886
Fujian	956	877	5450	4839	11,044	9640
Jiangxi	3094	3017	7395	6909	18,998	18,220
Shandong	832	342	28,764	25,608	579	305
Henan	2507	5199	25,449	19,601	1790	1791
Hubei	7816	7635	12,570	11,358	14,397	12,332
Hunan	3800	3922	10,164	9204	23,675	22,117
Guangdong	2058	2031	10,648	8703	17,645	14,546
Guangxi	3241	2946	15,130	20,685	15,248	14,629
Hainan	701	708	3010	2598	1735	1626
Chongqing	4544	4155	11,093	10,697	3702	3022
Sichuan	15,905	15,310	28,339	26,177	12,345	9848
Guizhou	2378	2005	22,425	22,334	9976	8729

Yunnan	3231	2673	34,099	33,510	9117	7782
Tibet	12	35	3628	6300	156	347
Shaanxi	1089	602	32,021	27,939	4845	3898
Gansu	91	70	33,488	32,453	97	86
Qinghai	0	0	4217	4729	1	0
Ningxia	142	116	6281	7018	1488	1764
Xinjiang	326	44	13,235	46,404	108	84
Taiwan	120	125	342	322	2586	2371

**Table S6.** Landscape indices of paddy field in different elevations.

Elevation	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISION	SPLIT
0–200m	1990	25,175	0.0827	18.15	232.71	20.04	57.93	0.9540	21.72
	2020	24,544	0.0831	20.81	230.80	21.89	57.61	0.9510	20.41
200–500m	1990	24,301	0.29	2.28	195.57	4.00	32.48	0.9976	410.14
	2020	27,459	0.33	1.79	204.88	3.44	29.43	0.9984	624.07
500–1000m	1990	15,132	0.36	9.21	142.35	3.34	30.50	0.9899	99.01
	2020	16,649	0.41	7.82	147.93	3.13	26.34	0.9925	133.11
1000–1500m	1990	6571	0.32	16.13	92.04	3.97	35.68	0.9721	35.81
	2020	7022	0.36	18.1	92.93	3.95	33.84	0.9659	29.33
1500–2500m	1990	3750	0.29	2.21	73.55	2.36	35.39	0.9965	281.90
	2020	3898	0.325	1.78	73.35	2.06	33.04	0.9974	386.89
2500–3500m	1990	101	0.37	18.38	11.52	1.8	32.09	0.9398	16.61
	2020	151	0.48	12.66	13.06	1.44	27.18	0.9694	32.68
>3500m	1990	1	0.07	100	1.25	1.25	90.91	0	1
	2020	26	0.57	30.43	4.86	1.12	30.77	0.8828	8.53

**Table S7.** Landscape indices of paddy field in different slopes.

Slope	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISIO N	SPLIT
0–2°	1990	37,009	0.113	16.54	245.91	16.49	57.16	0.9620	26.34
	2020	34,381	0.111	16.48	239.91	15.88	56.93	0.9677	30.99
2–6°	1990	49,760	0.622	0.12	248.33	1.24	12.16	1	25,087.15
	2020	46,335	0.617	0.07	240.29	1.24	12.32	1	24,934.49
6–15°	1990	34,098	0.69	0.28	200.28	1.19	9.96	0.9999	16,933.92
	2020	37,836	0.68	0.10	211.89	1.17	10.40	1	22,701.80
15–25°	1990	9395	0.819	0.14	101.07	1.09	5.35	0.9999	7042.41
	2020	12,124	0.815	0.10	144.75	1.07	5.91	0.9999	9318.03
>25°	1990	1386	0.90	0.32	37.95	1.042	2.73	0.9992	1217.45
	2020	2033	0.89	0.31	45.90	1.035	3.62	0.9994	1769.56

**Table S8.** Landscape indices of paddy field in different slope aspects.

Aspect	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISION	SPLIT
North	1990	36,035	0.74	0.09	203.04	1.13	7.91	1	24,361.50
	2020	42,153	0.75	0.04	218.93	1.11	7.61	1	30,292.73
Northeast	1990	34,265	0.73	0.06	198.49	1.13	7.93	1	23,553.40
	2020	39,080	0.75	0.04	211.31	1.12	7.35	1	27,755.98
East	1990	39,186	0.71	0.20	213.62	1.17	9.27	1	21,025.71
	2020	39,150	0.72	0.21	212.78	1.16	8.73	1	22,318.96
Southeast	1990	43,497	0.71	0.33	226.20	1.20	8.77	0.9999	17,989.41
	2020	38,462	0.72	0.20	211.19	1.17	8.24	1	20,048.59
South	1990	48,288	0.73	0.09	230.69	1.14	8.33	1	29,869.03
	2020	39,657	0.75	0.16	212.55	1.13	7.23	1	25,364.57
Southwest	1990	47,798	0.72	0.05	236.13	1.14	8.01	1	32,359.14
	2020	42,737	0.74	0.04	222.10	1.13	7.65	1	29,424.76
West	1990	48,768	0.71	0.04	237.20	1.14	9.23	1	32,036.42
	2020	46,987	0.72	0.05	232.38	1.13	9.15	1	31,149.13
Northwest	1990	42,703	0.729	0.04	222.52	1.14	7.90	1	29,238.32
	2020	45,736	0.726	0.05	229.73	1.13	8.36	1	31,317.93

**Table S9.** Landscape indices of dryland in different elevations.

Elevation	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISION	SPLIT
0–200m	1990	27,144	0.049	50.47	226.34	58.39	69.67	0.7396	3.84
	2020	26546	0.051	50.88	229.60	65.69	68.25	0.7304	3.71
200–500m	1990	28,945	0.119	14.77	224.48	20.60	54.56	0.9650	28.57
	2020	31,390	0.118	14.20	231.22	23.40	55.29	0.9549	22.19
500–1000m	1990	30,399	0.183	2.87	216.35	6.41	47.016	0.9942	171.26
	2020	33,425	0.182	2.88	224.38	6.70	47.75	0.9943	175.17
1000–1500m	1990	28,418	0.152	8.08	231.99	12.92	46.52	0.9856	69.22
	2020	30,267	0.153	6.98	231.32	10.16	48.10	0.9891	91.36
1500–2500m	1990	21,794	0.18	10.97	203.79	10.81	41.37	0.9842	63.13
	2020	22,771	0.19	8.66	205.48	9.41	41.08	0.9880	83.26
2500–3500m	1990	5087	0.27	3.96	84.88	2.79	38.02	0.9948	191.51
	2020	5029	0.26	2.90	84.39	2.54	39.18	0.9958	237.34
>3500m	1990	1819	0.37	11.55	47.85	2.39	32.10	0.9828	58.30
	2020	2213	0.31	4.52	55.50	2.16	34.18	0.9944	177.09

**Table S10.** Landscape indices of dryland in different slopes.

Slope	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISION	SPLIT
0–2°	1990	66,655	0.082	33.36	319.45	42.63	64.60	0.8833	8.57
	2020	65,618	0.081	30.90	324.21	47.76	64.07	0.8918	9.24
2–6°	1990	98,622	0.3874	0.67	386.46	2.38	23.39	0.9998	5445.66
	2020	97,839	0.3869	0.63	384.19	2.26	23.63	0.9998	6413.97
6–15°	1990	85,007	0.48	0.67	343.96	1.84	17.93	0.9999	8040.86
	2020	90,363	0.47	1.33	355.44	2.02	18.61	0.9997	3857.67
15–25°	1990	31,247	0.69	0.08	191.99	1.18	9.83	0.9999	18,383.59
	2020	35,149	0.68	0.16	203.55	1.21	10.43	0.9999	16,923.59
>25°	1990	8354	0.77	0.20	96.56	1.11	7.51	0.9998	5697.68
	2020	10,129	0.76	0.22	106.40	1.12	7.78	0.9999	6742.05

**Table S11.** Landscape indices of dryland in different slope aspects.

Aspect	Time	NP	PD	LPI	LSI	AWMSI	AI	DIVISION	SPLIT
North	1990	97,142	0.64	0.47	343.43	1.34	12.43	0.9999	16,673.19
	2020	104,938	0.63	0.70	355.38	1.43	12.99	0.9999	10,220.74
Northeast	1990	101,700	0.636	0.15	351.64	1.28	12.02	1	32,028.46
	2020	107,189	0.633	0.12	360.43	1.30	12.36	1	31,316.13
East	1990	109,638	0.63	0.07	366.34	1.242	12.15	1	49,897.41
	2020	109,461	0.64	0.08	364.85	1.237	11.75	1	50,233.15
Southeast	1990	109,655	0.63	0.22	365.95	1.283	12.20	1	35,557.87
	2020	105,587	0.64	0.20	358.78	1.279	11.92	1	34,698.91
South	1990	107,203	0.64	0.38	360.17	1.29	11.84	1	25,571.70
	2020	104,166	0.65	0.32	353.96	1.28	11.59	1	27,587.57
Southwest	1990	104,549	0.660	0.43	354.27	1.25	10.92	1	24,822.70
	2020	104,352	0.663	0.46	353.03	1.27	10.96	1	21,374.37
West	1990	102,949	0.661	0.06	350.63	1.21	11.12	1	51,126.23
	2020	107,562	0.664	0.07	358.65	1.20	10.91	1	54,757.88
Northwest	1990	97,985	0.649	0.11	344.39	1.25	11.32	1	39,541.63
	2020	105,544	0.653	0.08	356.6	1.246	11.26	1	43,009.13