

Supplementary Materials

Table S1. The detail information for Landsat images used in this study

1990		2000		2015	
Acquire information	cloud cover	Acquire information	cloud cover	Acquire information	cloud cover
LT05_141032_19910717	10	LE07_141032_20000615	0	LC08_141032_20150719	0.4
LT05_141033_19910615	4	LE07_141032_20000615	3	LC08_141033_20150804	7.5
LT05_142032_19900603	0	LE07_142032_20000809	1	LC08_142032_20150608	3.3
LT05_142033_19900603	0	LE07_142033_20000606	2	LC08_142033_20150624	0.9
LT05_143031_19930821	5	LE07_143031_20000613	1	LC08_143031_20150717	6.2
LT05_143032_19930805	0	LE07_143032_20000613	0	LC08_143032_20150717	4.6
LT05_143033_19930821	10	LE07_143033_20000613	0	LC08_143033_20150717	0.3
LT05_143034_19920615	6	LE07_143034_20000613	3	LC08_143034_20150717	0.4
LT05_144031_19930828	1	LE07_144031_20000706	1	LC08_144031_20150708	3.2
LT05_144032_19930727	1	LE07_144032_20000620	1	LC08_144032_20150708	1.4
LT05_144034_19930828	0	LE07_144034_20000807	0	LC08_144034_20150708	0.7
LT05_145031_19940603	1	LE07_145031_20010801	5	LC08_145031_20150613	3.3
LT05_145032_19930718	9	LE07_145032_20000627	1	LC08_145032_20150613	2.4
LT05_145034_19940619	0	LE07_145034_20000627	0	LC08_145034_20150629	9.7
LT05_146031_19900802	4	LE07_146031_20000805	2	LC08_146031_20150604	9.2
LT05_146032_19900802	0	LE07_146032_20000805	0	LC08_146032_20150604	6.6
LT05_146033_19900802	0	LE07_146033_20000805	0	LC08_146033_20160708	2.2
LT05_146034_19900802	0	LE07_146034_20000805	0	LC08_146034_20150620	8.6
LT05_147031_19900606	3	LE07_147031_20000812	8	LC08_147031_20160629	4
LT05_147032_19920713	1	LE07_147032_20000625	5	LC08_147032_20150713	0.3
LT05_147034_19910828	0	LE07_147034_20000929	2	LC08_147034_20150611	2.4
LT05_148032_19910702	8	LE07_148032_20000819	1	LC08_148032_20150618	1.2
LT05_148033_19910702	5	LE07_148033_20000803	10	LC08_148033_20150618	0.4
LT05_148034_19910702	6	LE07_148034_20000616	6	LC08_148034_20150618	9.8
LT05_149032_19900807	3	LE07_149032_20000911	3	LC08_149032_20150711	0.4
LT05_149033_19900807	1	LE07_149033_20000911	4	LC08_149033_20150711	2

Table S2. Land cover classification system

Level 1		Level 2	
Code	Name	Code	Name
1	Cultivated land/Farmland		
		11	Paddy
		12	Dry farming
2	Forest land		
		21	Forest
		22	Shrub
		23	Woods
		24	Others
3	Grass land		
		31	Dense grass
		32	Moderate
		33	Sparse grass
4	Water body		
		41	Rivers
		42	Lakes
		43	Reservoir and ponds
		44	Permanent Ice and Snow
		45	Beach and Shore
		46	Bottomland
5	Industrial land		
		51	City built-up
		52	Rural settlements
		53	Others
6	Unused land		
		61	Sand
		62	Gobi
		63	Salina
		64	Wetland
		65	Bare Soil
		66	Bare Rock
		67	Others

Table S3: SPEI categories

Level	Drought category	SPEI value
1	No drought	(−0.5, 0)
2	Mild drought	(−1, −0.5]
3	Moderate drought	(−1.5, −1]
4	Severe drought	(−2, −1.5]
5	Extreme drought	(−∞, −2]

Table S4. Kappa index and consistency relationship

Kappa Index	Degree of consistency
$0 < \text{Kappa} \leq 0.2$	Slight
$0.2 < \text{Kappa} \leq 0.4$	Weak
$0.4 < \text{Kappa} \leq 0.6$	Moderate
$0.6 < \text{Kappa} \leq 0.8$	Substantial
$0.8 < \text{Kappa} \leq 1$	Almost perfect

Table S5: Changes in ecotone area for each basin in 1990, 2000 and 2015 (Unit:km²)

River basin	1990	2000	2015
Aksu	2200.84	2032.00	1491.09
Yarkand	7738.94	7682.16	5034.99
Hotan	8829.01	6994.05	6949.25
Keriya	11084.84	8891.74	5994.71
Qarqan	4731.00	5849.76	4631.19
Kaidu-Kongque	3326.17	3651.35	1102.62
Dina	3703.37	3236.95	2434.99
Weigan	3024.61	3352.25	1319.96
Kaxgar	2033.56	2352.08	1439.68
Tarim	20970.08	20043.81	16214.75

Table S6: Transfer matrix of land-use area between 1990 and 2015 in the Tarim River Basin (Unit:km²)

Land use types	Arable land	Forest land	Grass land	Water	Industrial land	Unused land	1990
Arable land	21506.94	340.72	1720.93	107.62	444.11	401.96	24522.28
Forest land	791.85	10478.37	507.66	80.49	5.73	190.65	12054.75
Grass land	7215.99	632.20	216368.70	1001.52	71.90	7328.28	232618.59
Water	124.27	75.47	1061.19	31448.05	0.61	2054.42	34764.01
Industrial land	496.12	4.89	32.39	1.92	1009.60	18.73	1563.64
Unused land	1512.23	530.45	4017.81	2409.78	98.17	332521	341089.82
2015	31647.40	12062.09	223708.69	35049.38	1630.12	342515	646613.09

Table S7 Area of land-use types in study area in 1990, 2000, 2015 and 2030

	1990	2000	2015	2030
Land-use types	Area (km ²)	Area (km ²)	Area (km ²)	Area (km ²)
Arable land	24522	26725	31648	34909
Forest land	12055	12688	12062	12219
Grass land	232629	226323	223718	220131
Water	34774	35508	35057	35064
Industrial land	1564	1497	1630	1636
Unused land	341125	343917	342544	342698