Table S1. Land-use transition matrix in Xinjiang from 2000 to 2020 (×10² km²).

Land-use type	Cultivated land	Forest	Grassland	Water	Construction land	Unused land	Sum	Outflow area
Cultivated land	700.23	0.55	7.83	0.60	8.23	0.41	717.85	17.62
Forest	8.30	271.28	0.83	0.50	0.18	0.14	281.23	272.93
Grassland	138.38	1.29	4794.15	6.81	9.66	4.28	4954.57	4816.20
Water	1.74	0.03	5.36	324.71	0.81	3.83	336.48	334.74
Construction land	0.01	---	---	0.02	58.41	---	58.44	58.44
Unused land	49.92	1.81	8.54	12.39	13.01	9863.46	9949.13	9899.21
Sum	898.57	3.13	4816.71	345.04	90.30	9872.12	16,025.88	---
Inflow area	198.34	2.59	4808.88	344.43	82.08	9871.71	---	15,579.86

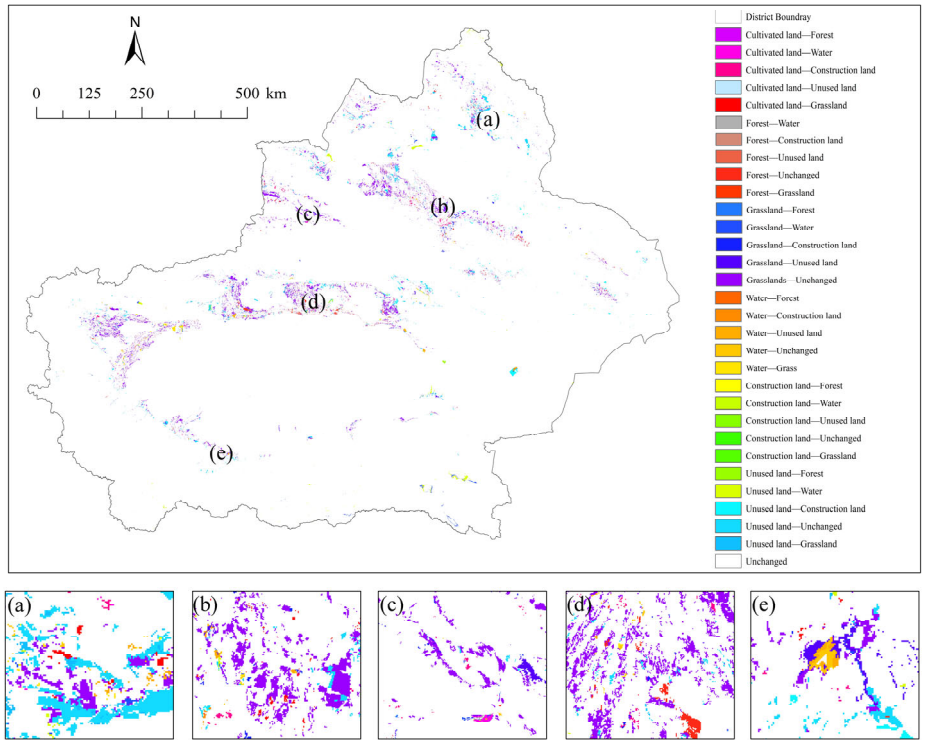


Figure S1. Analysis of the spatial dynamics of land-use changes in Xinjiang from 2000 to 2020: (a) Altai Mountains, (b) Tianshan Mountains, (c) Ili Valley, (d) Kunlun Mountains, and (e) Tarim Basin.

Table S2. ROC at different scales.

Land-use type	1000 m	2000 m	3000 m	4000 m	5000 m
Cultivated land	0.910	0.933	0.933	0.936	0.933
Forest	0.795	0.819	0.823	0.821	0.823
Grassland	0.796	0.765	0.766	0.765	0.764
Water	0.833	0.847	0.848	0.844	0.851
Construction land	0.873	0.903	0.902	0.896	0.902
Unused land	0.875	0.857	0.857	0.856	0.858

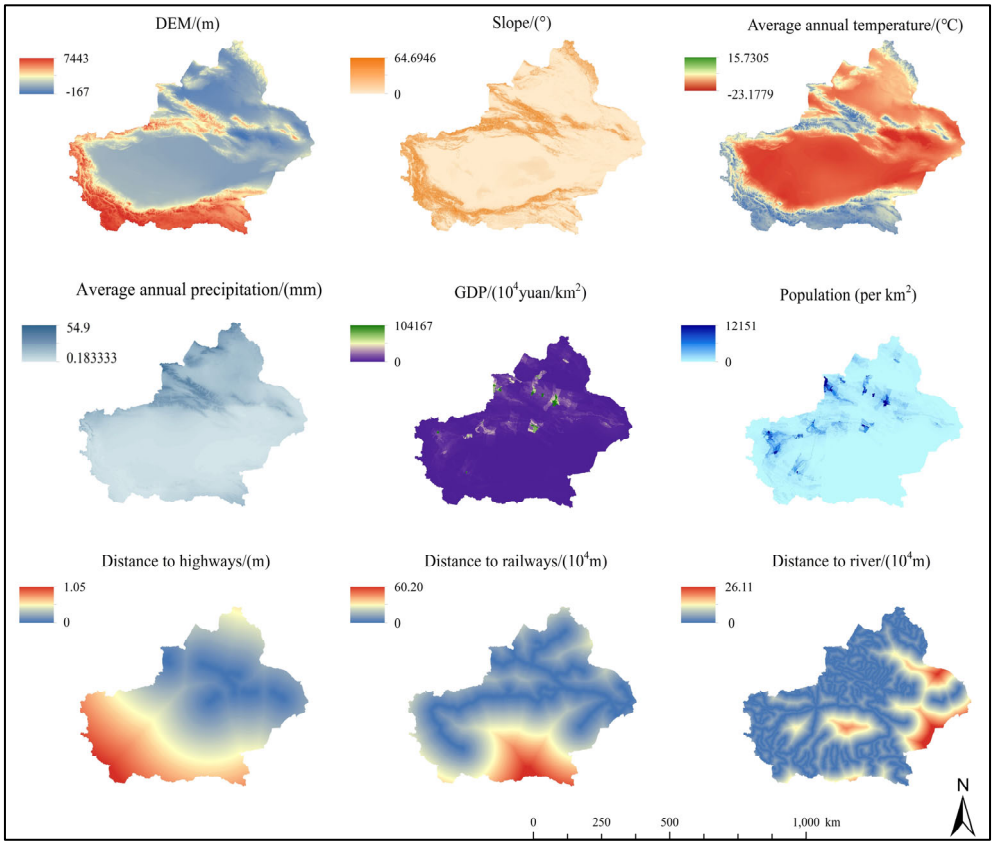


Figure S2. Spatial patterns of the LUCC drivers in Xinjiang.

Table S3. The outcome of the Markov prediction and corresponding deviation (×10⁴ km²).

Result	Cultivated land	Forest	Grassland	Water	Construction land	Unused land
2020 Actual value	99.84	30.60	535.02	38.18	10.07	1096.32
2020 Simulated value	95.87	30.41	538.61	39.08	10.01	1097.26
Relative error rate (%)	3.97	0.60	0.67	2.36	0.55	0.08