

Supplementary materials

Table S1. Policy reference for scenario setting.

Policy	Objectives	Sources
For economic development	The city becomes the “National demonstration city of high-end leisure and tourism”.	[1]
	The city’s urbanization rate reaches to 75% in 2030.	[2]
	The regional GDP will reach 160 billion yuan by 2025, and will reach 340 billion yuan by 2035.	[3]
For ecological protection	Focus on the goal of ecological innovation and become a 'Yangtze River Delta eco-innovation demonstration city'.	[1]
	It is necessary to follow the ecological redline, strengthen the restoration of ecologically damaged areas, and reasonably guide the development and utilization of ecological resources.	[2,3]

1. Liyang introduces the "14th Five-Year" Territorial Tourism Development Plan. Available online: <http://www.liyang.gov.cn/index.php?c=phone&a=show&id=168037&catid=40409> (accessed on 4 April 2023).
2. Notice of Liyang government office on printing and issuing the “Special planning work plan for Liyang Master Plan (2016-2030)”. http://www.liyang.gov.cn/html/czly/2018/OPEHQFEM_0216/5690.html (accessed on 4 April 2023).
3. Liyang Territorial Spatial Master Plan (2021-2035) (Draft) Public Notice. http://www.liyang.gov.cn/html/czly/2022/NDKMAMKM_1221/30553.html (accessed on 4 April 2023).

Table S2. Correlation matrix of driving factors.

Driving factors	DEM	Aspect	Slope	Precipitation	Temperature	Soil salinity	Soil water	Distance to major rivers	Distance to main traffic	Distance to township centers	Population density	Per capita GDP	Fixed assets investment	Nighttime light
DEM	1.0000													
Aspect	0.0014	1.0000												
Slope	0.5451	0.0040	1.0000											
Precipitation	0.1385	0.0004	0.1052	1.0000										
Temperature	0.0018	0.0006	0.0183	0.5154	1.0000									
Soil salinity	0.0113	0.0000	0.0070	0.0006	0.0024	1.0000								
Soil water	0.2344	0.0004	0.1147	0.0191	0.0553	0.8096*	1.0000							
Distance to major rivers	0.4526	0.0007	0.1761	0.0318	0.0001	0.0156	0.0771	1.0000						
Distance to main traffic	0.1646	0.0000	0.0615	0.0052	0.0283	0.0062	0.1026	0.1432	1.0000					
Distance to township centers	0.3289	0.0002	0.1434	0.0439	0.0027	0.0066	0.0497	0.3354	0.2551	1.0000				
Population density	0.0175	0.0009	0.0137	0.0133	0.0021	0.0025	0.0096	0.0218	0.0298	0.0846	1.0000			
Per capita GDP	0.0508	0.0004	0.0328	0.0042	0.0105	0.0062	0.0829	0.0484	0.0690	0.0521	0.0543	1.0000		
Fixed assets investment	0.0383	0.0007	0.0289	0.0054	0.0009	0.0034	0.0183	0.0206	0.0582	0.0334	0.0917	0.8547*	1.0000	
Nighttime light	0.0404	0.0008	0.0262	0.0188	0.0055	0.0013	0.0084	0.0499	0.0897	0.2222	0.4568	0.2211	0.2681	1.0000

‘*’ indicates that the correlation coefficient between two factors is greater than the threshold of 0.8.

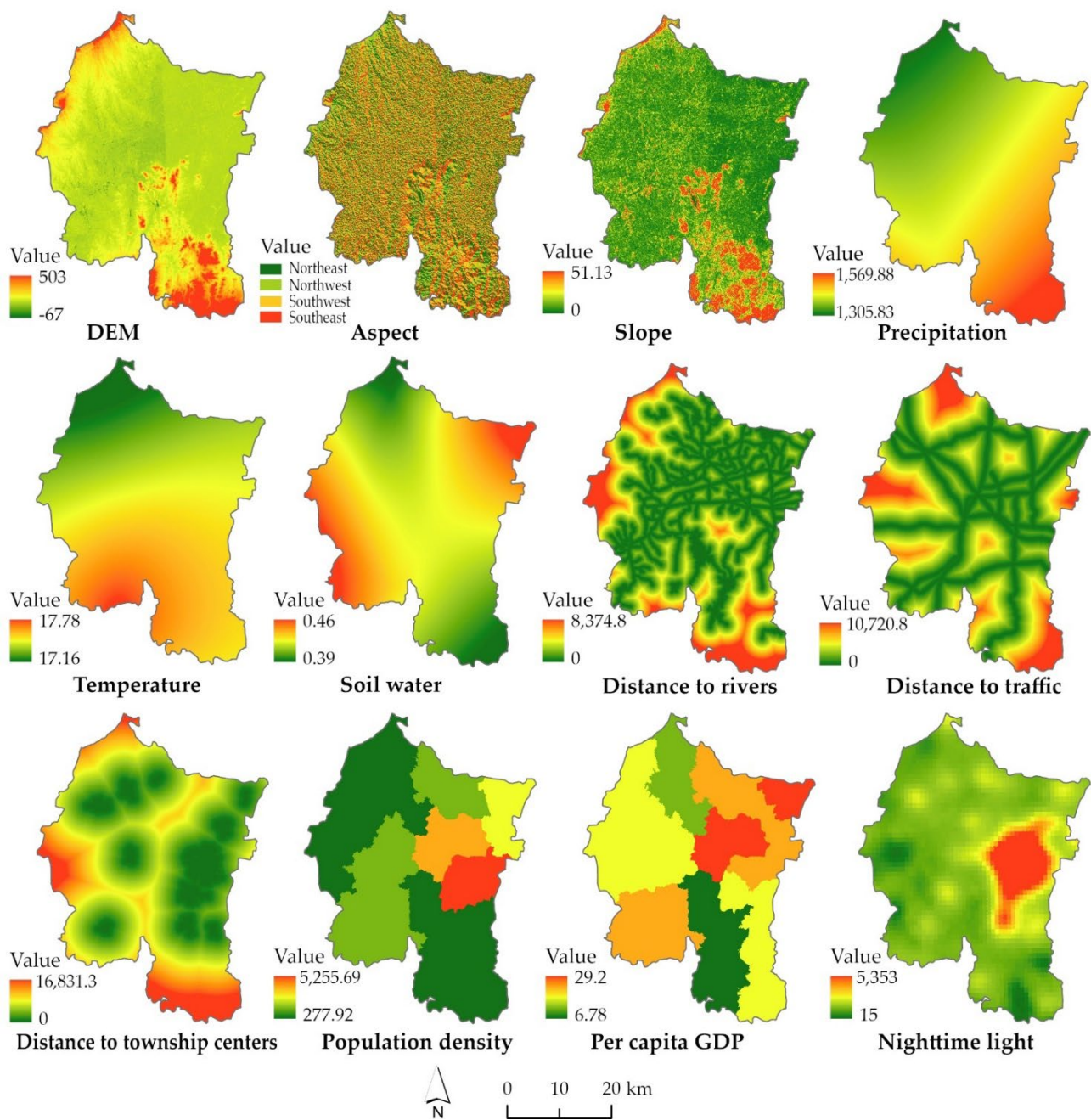


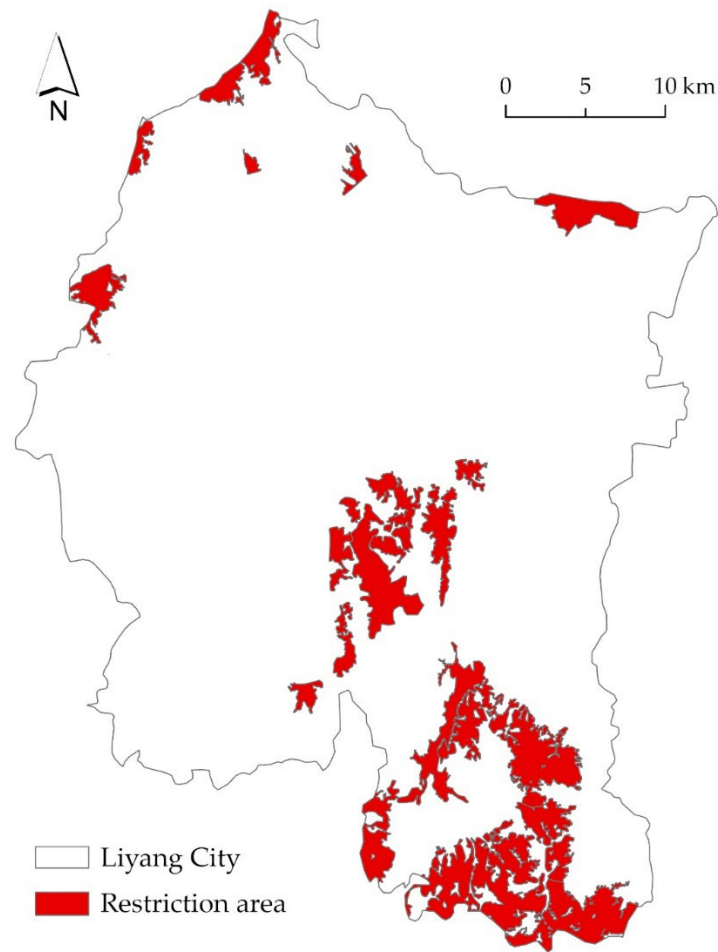
Figure S1. Driving factors of land use change.

Table S3. Regression analysis.

Land use types	AUC	Constant	DEM	Aspect	Slope	Precipitation	Temperature	Soil water	Distance to major rivers	Distance to main traffic	Distance to township centers	Population density	Per capita GDP	Nighttime light
Cultivated land	0.9001	8.1847	-0.032	0	0.0324	-0.00467	0.0057	0	0	0	0	0	0	-0.00062
Forest land	0.9088	-10.7151	0.0366	0	-0.0368	0.00558	-0.0064	0	0	0	0	0	0	0
Grassland	0.743	-2.9345	0.0057	0	-0.0054	0	0	0	0	0	0	0	0	0
Water area	0.8372	-2.0023	0	0	0	0	0	-0.00025	-0.0011	0	0	0	0	0
Rural settlements	0.6006	-3.0169	-0.012	0	0.0119	0	0	0	0	0	0.00004	0	0.02526	0
Unused land	0.7326	-90.4526	0.0105	0	0	-0.01769	6.3127	0	0	0	0	-0.00032	0	0.0007
Urban and other construction land	0.9096	-1.5901	-0.033	0	0.0347	0	0	0	0	-0.00051	-0.00046	0	0	0.00055

Table S4. Change rate of demand for land use services under different scenarios.

Scenarios \ Change rate	Crop production (%/year)	Area of woodland (%/year)	Area of grassland (%/year)	Area of water (%/year)	Area of Rural settlements (%/year)	Area of urban and other construction land (%/year)
NGS	-0.311	-	-	-	0.361	0.691
EDS	-0.311	-	-	-	0.374	1.022
EPS	-0.311	1	1	1	-	-

**Figure S2.** Spatial restrictions for land use simulation.**Table S5.** Conversion resistance of land use types under different scenarios.

Land-use type \ Scenario	NGS	EDS	EPS
Cultivated land	0.7	0.7	0.7
Woodland	0.85	0.85	0.95
Grassland	0.65	0.6	0.9
Water area	0.85	0.85	0.95
Rural settlements	0.65	0.65	0.65

Unused land	0.5	0.4	0.5
Urban and other construction land	0.9	0.9	0.9

Table S6. Conversion matrix under different scenarios.

NGS & EDS	Cultivated land	Woodland	Grassland	Water area	Rural settlements	Unused land	Urban and other construction land
Cultivated land	1	1	1	0	1	1	1
Woodland	1	1	0	0	0	0	1
Grassland	0	1	1	1	1	0	1
Water area	1	0	0	1	0	0	1
Rural settlements	0	0	0	0	1	0	1
Unused land	1	1	1	1	1	1	1
Urban and other construction land	0	0	0	0	0	0	1
EPS							
Cultivated land	1	1	1	0	1	1	1
Woodland	0	1	0	0	0	0	1
Grassland	0	1	1	0	0	0	1
Water area	0	0	0	1	0	0	1
Rural settlements	0	0	0	0	1	0	1
Unused land	1	1	1	1	1	1	1
Urban and other construction land	0	0	0	0	0	0	1

Table S7. Kappa coefficients of simulation validation.

Coefficient	Overall	Cultivated land	Woodland	Grassland	Water area	Rural settlements	Unused land	Urban and other construction land
Kappa	0.765	0.778	0.778	0.640	0.895	0.866	0.230	0.753
Kloc	0.805	0.799	0.833	0.728	0.959	0.869	0.347	0.757
Khisto	0.950	0.973	0.933	0.878	0.933	0.997	0.663	0.995