Supplementary Material

Table S1. Sources of data used in this study.

Data application	Data category	Factors	Unit	Source
Land system delineation	Land use/cover	-	-	http://www.resdc.cn/(accessed on 25 December 2020)
	potential cropland production	-	-	http://www.resdc.cn/(accessed on 25 December 2020)
	forest canopy density	-	-	http://earthenginepartners.appspot.com/(accessed on 25 December 2020)
	vegetation cover density	-	-	http://www.dsac.cn/(accessed on 25 December 2020)
Suitability analysis of land systems	Climate factors	TEM	°C	http://www.resdc.cn/(accessed on 10 March 2021)
		PRE	mm	http://www.resdc.cn/(accessed on 10 March 2021)
	Topography factors	DEM	m	http://www.resdc.cn/(accessed on 10 March 2021)
		Slope	°	From DEM data
		Geomorphic types	1-8	http://www.resdc.cn/(accessed on 10 March 2021)
	Soil attribute factors	Sand	%	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		Silt	%	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		Clay	%	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		Drainage	1–7	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		PH	-log（H^+）	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		AWC	1–5	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
		Soil type	1–14	http://westdc.westgis.ac.cn(accessed on 10 March 2021)

		Soil texture	1–5	http://westdc.westgis.ac.cn(accessed on 10 March 2021)
	Socio-economic factors	Population density	10^4 persons/km^2	http://www.resdc.cn/(accessed on 10 March 2021)
		GDP	10^4 yuan/km^2	http://www.resdc.cn/(accessed on 10 March 2021)
	Other	Vegetation	（1–13）	http://www.resdc.cn/(accessed on 10 March 2021)
Scenarios setting	Crop production	-	10^4 t	https://data.cnki.net/Yearbook/(accessed on 20 March 2021)
	Livestock numbers	-	10^4 h	https://data.cnki.net/Yearbook/(accessed on 20 March 2021)

Table S2. Suitability analysis and AUC values of land systems (+: positive correlation, -: negative correlation).

Land systems	Climate factors		Topography factors			Soil attribute factors								Socio-economic factors		Other	AUC
	TEM（°C）	PRE（mm）	DEM（m）	Slope（°）	Geo-morphic types（1-8）	Sand（%）	Silt（%）	Clay（%）	Drain-age（1-7）	PH（-log（H^+））	AWC（1-5）	Soil type（1-14）	Soil tex-ture（1-5）	Population Density（10^4pop/km^2）	GDP（10^4yuan/km^2）	Vegeta-tion types（1-13）	
Exten-sive cropland			-		+				-							-	0.81
Medium extensive cropland			-		-			+			+					+	0.89
Intensive cropland			-			-	+		-	+	+					+	0.95
Sparse forest			+	+	+		-	-	-				+				0.79
Medium dense forest	+	-	+	+	-						-		+				0.77
Dense forest	-	+		+	+					-		+					0.87
Low-covered grass-land	-	+	+		+	+						+	-				0.89

Medium-covered grass-land	+	-	+		-			+			+	+				+	0.86
High-covered grass-land	-	+		+	+	-	+					+				-	0.75
Water			+		-				-	-						+	0.77
Built-up land													+	+			0.93
Unused land			+		-						-					+	0.90

Table S3. Order of conversion of land systems and services.

Land system	Crop production		Livestock		Built-up land		Forest land	
	order	t /pixel	order	h/pixel	order	km^2/pixel	order	km^2/pixel
Extensive cropland	1	80	0	0	0	0	0	0
Medium extensive cropland	2	350	0	0	0	0	0	0
Intensive cropland	3	550	0	0	0	0	0	0
Sparse forest	0	0	0	0	0	0	1	1
Medium dense forest	0	0	0	0	0	0	2	1
Dense forest	0	0	0	0	0	0	3	1
Low-covered grassland	0	0	1	180	0	0	0	0
Medium-covered grassland	0	0	2	320	0	0	0	0
High-covered grassland	0	0	3	440	0	0	0	0
Water	0	0	0	0	0	0	0	0
Built-up land	0	0	0	0	1	1	0	0
Unused land	0	0	0	0	0	0	0	0

Based on the land system data in 2010 and 2030 (TREND scenario, FOREST scenario, and CONSERVATION scenario), this study mapped the status of land conversion in different scenarios (Figure S1).

Figure S1. Land conversion under different future scenarios.

Table S4. Coefficient of simulation accuracy of different land systems.

Coefficient	**Overall**	**Extensive cropland**	**Medium extensive cropland**	**Intensive cropland**	**Sparse forest land**
Kappa simulation	0.835	0.880	0.782	0.848	0.805
Kappa transition location	0.890	0.895	0.798	0.887	0.919
Kappa transition	0.938	0.983	0.981	0.956	0.876
Coefficient	**Medium dense forest land**	**Dense forest land**	**Low-covered grassland**	**Medium-covered grassland**	**High-covered grassland**
Kappa simulation	0.753	0.879	0.804	0.823	0.847
Kappa transition location	0.833	0.936	0.855	0.867	0.901
Kappa transition	0.903	0.939	0.940	0.949	0.939
Coefficient	**Water**	**Built-up land**	**Unused land**		
Kappa simulation	0.877	0.767	0.851		

Kappa transition location	0.961	0.776	0.915		
Kappa transition	0.913	0.987	0.930		

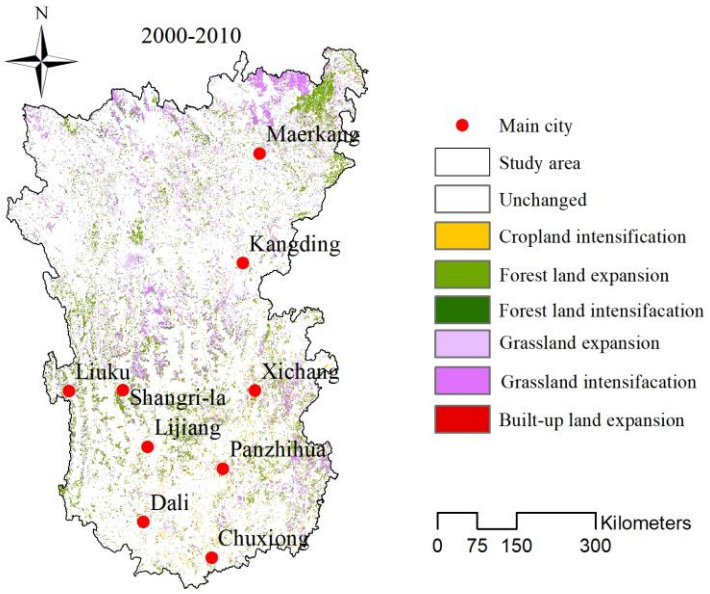

Figure S2. Spatial distribution of changes in land system from 2000 to 2010.