

Spatial-temporal Evolution and Coupling and Coordination of “Production-Life-Ecological” in Energy-Rich Area: A Perspective on Structure and Function

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Table A1 Weight of production-living-ecological function indicators.

Code	indicator	$\omega_{i,EW M}$	$\omega_{i,CV W}$	ω_i
X1	Total crop sown area	1.15	2.08	0.02
X2	Total power of agricultural machinery	1.18	2.29	0.02
X3	Output value of agriculture, forestry, animal husbandry, and fishery	2.42	3.42	0.03
X4	Per capita grain output	3.42	5.15	0.04
X5	Fertilizer usage	1.55	1.12	0.01
X6	Primary industry GDP share	0.17	0.84	0.01
X7	Secondary industry GDP share	0.65	1.60	0.01
X8	Tertiary industry GDP share	0.87	1.95	0.01
X9	Raw coal production	7.62	7.70	0.08
X10	Industrial water usage	1.90	1.23	0.02
X11	Electricity generation	3.22	4.15	0.04
X12	Energy consumption	5.06	0.76	0.03
X13	Industrial SO ₂ emissions	3.95	0.24	0.02
X14	Industrial dust emissions	8.53	0.22	0.04
X15	Per capita disposable income of urban residents	1.69	2.73	0.02
X16	Per capita net income of rural residents	5.59	6.82	0.06
X17	Number of health institution beds	2.09	3.45	0.03
X18	Total water supply	3.06	4.35	0.04
X19	Per capita green park area	4.76	5.63	0.05
X20	Per capita GDP	3.47	4.40	0.04
X21	Engel coefficient for urban households	0.84	1.05	0.01
X22	Engel coefficient for rural households	1.31	0.71	0.01

X23	Total retail sales of consumer goods	4.47	5.06	0.05
X24	Urbanization rate	1.31	2.36	0.02
X25	Proportion of ecological land area	1.30	2.28	0.02
X26	Ecological water usage	5.19	5.84	0.06
X27	Average annual precipitation per area	1.30	2.34	0.02
X28	NDVI	1.22	2.28	0.02
X29	Forest coverage rate	7.38	6.11	0.07
X30	Grassland area proportion	0.85	1.93	0.01
X31	Water area proportion	5.91	6.37	0.06
X32	Wastewater discharge volume	3.28	0.82	0.02
X33	CO ₂ emissions	2.52	1.36	0.02
X34	PM _{2.5}	0.79	1.35	0.01

Table A2 Classification of production-life-ecological function coupling coordination degree

Coupling coordination degree	Classification
[0, 0.2]	Severe disequilibrium
(0.2, 0.4]	Moderate disequilibrium
(0.4, 0.6]	Basic coordination
(0.6, 0.8]	Moderate coordination
(0.8, 1.0]	High coordination

Table A3 Criterion basis of interactive detector.

Criterion	Interactions
$q(X1 \cap X2) < \min(q(X1), q(X2))$	Nonlinear weakened
$\min(q(X1), q(X2)) < q(X1 \cap X2) < \max(q(X1), q(X2))$	Uni-weakened
$q(X1 \cap X2) > \max(q(X1), q(X2))$	Bi-enhanced
$q(X1 \cap X2) = q(X1) + q(X2)$	Independent
$q(X1 \cap X2) > q(X1) + q(X2)$	Nonlinear-enhanced

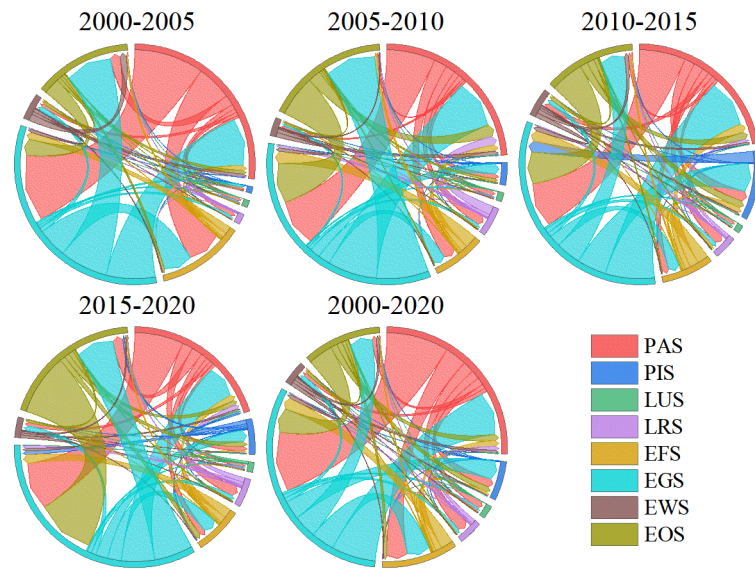


Figure A1 Production-living-ecological space transfer in ERA.

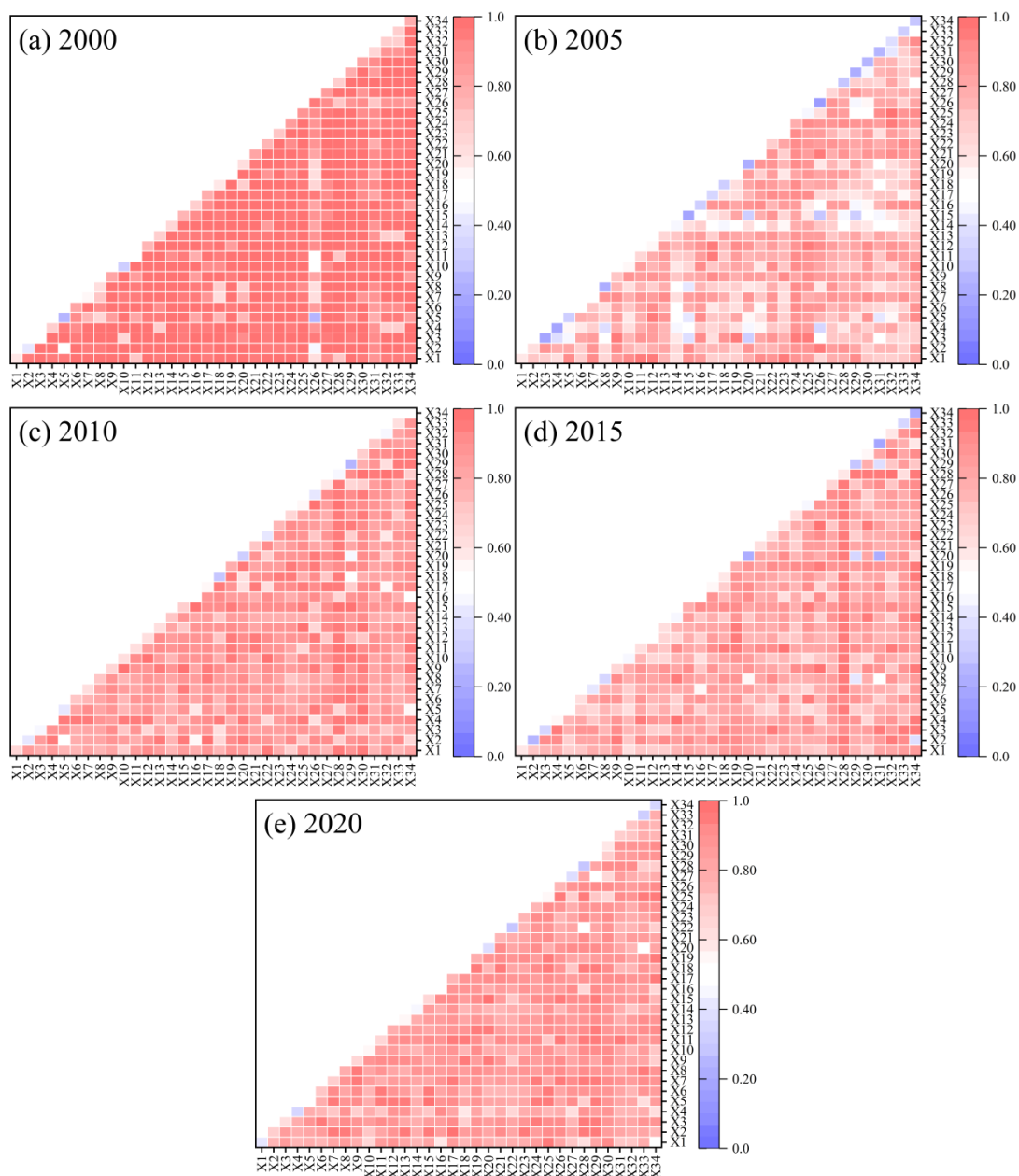


Figure A2 Interaction detection result for the CCD of production-living-ecological functions.