

Supplementary Materials for

Study on the Landscape Space of Typical Mining Areas in Xuzhou City from 2000 to 2020 and Optimization Strategies for Carbon Sink Enhancement

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This files includes:

1) Table S1

Table S1. Evaluation factors of ecological resistance.

Factor	Weight	Grade	Value	Factor	Weight	Grade	Value
DEM/ m	0.154	1	1-35.00	LUCC	0.144	1	Forest, Water, Wetland
		3	35.00-51.00			3	Shrubland, Grass
		5	51.00-82.00			5	Cultivated land
		7	82.00-131.00			7	Artificial surface
		9	131.00-353.00			9	Bare land
SLOPE /(°)	0.147	1	0-1.40	Population density	0.136	1	0-0.011
		3	1.40-4.19			3	0.011-0.047
		5	4.19-8.39			5	0.047-0.134
		7	8.39-13.98			7	0.134-0.304
		9	13.98-32.41			9	0.304-0.570
MND WI	0.104	1	0.26-0.79	Water Network Density	0.103	1	0.28-0.65
		3	-0.07-0.26			3	0.20-0.28
		5	-0.26~-0.07			5	0.14-0.20
		7	-0.35~-0.26			7	0.05-0.14
		9	-0.71~-0.35			9	0-0.05
NDVI	0.108	1	0.55-0.69		0.104	1	0-83.36

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3	0.49-0.55	Road Network Density	3	83.36-180.65
5	0.41-0.49		5	180.65-353.60
7	0.31-0.41		7	353.60-602.22
9	-0.03-0.31		9	602.22-926.50

2) Definition

1. Degree

The degree of a node is defined as the number of edges connected to that node. The greater the degree of a node, the more important that node is in some sense.

2. Average path length

The distance between two nodes i and j in the network is defined as the number of edges on the shortest path connecting these two nodes. The average path length of the network is defined as the average of the distances between any two nodes.

3. Clustering coefficient

In your friend network, two of your friends may also become friends. This attribute is called the clustering feature of the network and the clustering coefficient is used to describe this attribute. The clustering coefficient is defined as the ratio of the number of edges E present between the k neighboring nodes of node i and the total number of possible edges C .

4. Closeness centrality

Closeness centrality is used to discover nodes that can efficiently disseminate information through the network. Proximity centrality is defined as the sum of the distances from node i to each of the other nodes, and then the inverse of the obtained sum is found to determine the proximity centrality of the node.

5. Betweenness centrality

Any two nodes in the network have at least one shortest path that minimizes the number of edges through which the path passes. The Betweenness Centrality of each node is the number of times these shortest paths cross that node.

6. eigenvector centrality

The importance of a node depends on the number of its neighboring nodes and on the importance of its neighboring nodes. The more important the neighboring nodes connected to it, the more important the node is.

7. Modularity

Modularity is a measure of the strength of the structure of a network community. The modularity is defined as the difference obtained by subtracting the proportion of edges in the network that connect nodes inside the community from the expected value of the proportion of edges in the random network that connect nodes inside the community structure.

8. dIIC

Integral Index of Connectivity (IIC) is used to characterize the degree of connectivity of the network. dIIC is the node importance value of the reference Integral Index of Connectivity.

9. Remote Sensing-based ecological index (RSEI)

The RSEI model is a new comprehensive ecological index which can be used to evaluate the ecological quality of patches by coupling four natural factors: surface moisture (WET), dryness (NDBSI), heatiness (LST) and greenness (NDVI) through the method of principal component analysis. This paper uses the RSEI model index to evaluate the ecological quality level of patches.

10.NDVI

NDVI can detect vegetation growth status, vegetation cover and eliminate some of the radiation errors etc. NDVI can reflect the background effects of plant canopy such as soil, wet ground, snow, dead leaves, roughness etc. and is related to vegetation cover.

11.MNDWI

MNDWI is an improvement of NDWI, which can better extract water information.

3) Table S2

Index	Abbreviation	Ecological meaning
Total landscape area	TA	TA determines the extent of the landscape and the maximum scale for research and analysis, and is the basis for calculating other indicators.
largest patch index	LPI	It helps to determine the dominant type of the landscape. The magnitude of its value determines the ecological characteristics such as the abundance of dominant and internal species in the landscape; the change of its value can change the intensity and frequency of disturbance and reflect the direction and strength of human activities.
landscape shape index	LSI	$LSI \geq 1$, therein $LSI = 1$ means that the landscape is composed of a single square patch of corresponding type. The bigger LSI is, the more complex the landscape shape is.
fractal dimension	PAFRAC	$1 \leq \text{PAFRAC} \leq 2$, therein $\text{PAFRAC} = 1$ indicates that the landscape shape is square, the closer PAFRAC is to 2, the more complex the patch shape is, and $\text{PAFRAC} = 1.5$ indicates that the landscape shape is most unstable.
spread index	CONTAG	The CONTAG index describes the degree of clustering or tendency of extension of

		different block types in the landscape. A high spreading value indicates that some dominant tessellation type in the landscape forms good connectivity; conversely, it indicates that the landscape is a dense pattern with multiple elements and a high degree of fragmentation in the landscape.
separation	SPLIT	$0 \leq \text{SPLIT} \leq$ the square of the number of units in the landscape area, $\text{SPLIT} = 0$ indicates that the landscape is composed of only one patch, the larger the SPLIT, the higher the degree of landscape fragmentation.
shannon diversity index	SHDI	The Shannon Diversity Index reflects landscape heterogeneity and expresses the amount of different patch types on the land in other words, richness, emphasizing the contribution of different patch types to the information.
shannon evenness index	SHEI	SHEI can reflect the dominance of patch types in the landscape space. When SHEI tends to 1, the dominance is low, indicating that there is no obvious dominant type in the landscape and each patch type is evenly distributed in the landscape.