## Supplementary Information

**Table S1** Definitions and methods of calculating the landscape pattern indexes.

| Metric | Explanation | Formula | Supplement |
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| Impervious ratio, IR | The percentage of impervious area in the block. | $\mathrm{IR} = \frac{A_{Imp}}{A} \times 100$ | $A_{Imp}$ is the area of the impervious surface of the block; $A$ is the area of the block; the range of *IR* is [0 100]. |
| Green ratio, GR | The percentage of water-permeable area with green space as the main category in the block. | $\mathrm{GR} = \frac{A_{Green}}{A} \times 100$ | $A_{Green}$ is the green area of a block, where green land is the main category of permeable surface; $A$ is the area of a block; The range of *GR* is [0 100]. |
| Average patch area, AREA | The average area of each type of patch in the block. | $\mathrm{Area} = \frac{\sum_{j=1}^{n} a_{ij}}{n_i}$ | $Area_{ij}$ is the area of patch $j$ of block $i$ in units of $m^2$. |
| Patch Density, PD | The number of patches per unit area within the block. | $\mathrm{PD} = \frac{n_i}{A} \times 10{,}000 \times 100$ | $n_i$ is the number of patches of type $i$; A is the area of the block, and *PD* is $\geqslant 0$. |
| Total Core Area, TCA | The total area of the core region of each patch. | $\mathrm{TCA} = \sum_{j=1}^{n} a_{ij}^{c}$ | $a_{ij}^{c}$ is the total area of the core region of type $j$ in units of $m^2$. |
| Shape Index, SHAPE | The indicator's value is independent of the area, with a | $\mathrm{SHAPE} = \frac{0.25 p_{ij}}{\sqrt{a_{ij}}}$ | $p_{ij}$ is the perimeter of the patch in units of m; $a_{ij}$ is the patch area in units of $m^2$. |

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| | value of 1 representing the most regular square and the larger the value the more complex the shape. | | |
| Fractal Dimension Index, FRAC | A metric of the complexity of the shape by comparing circumference and area. | $\mathrm{FRAC} = \frac{2\ln(0.25p_{ij})}{\ln a_{ij}}$ | $p_{ij}$ is the perimeter of the patch in units of m; $a_{ij}$ is the area of the block in units of $m^2$; The range of FRAC is [1 2]. |
| Landscape Shape Index, LSI | A metric of the degree of deviation of the patch from the shape of a square | $\mathrm{LSI} = \frac{0.25\sum_{k=1}^{m} e_{ik}^{*}}{\sqrt{A}}$ | $e_{ik}^{*}$ is the total length of different types of patch edges in units of m; $A$ is the area of the plot in units of $m^2$. |
| Total Edge Contrast Index, TECI | A metric of the shape feature equal to the percentage of weighted patch edge to total edge length | $\mathrm{TECI} = \frac{\sum_{k=1}^{m}(e_{ik}d_{ik})}{\sum_{k=1}^{m} e_{ik}^{*}} \times 100$ | $e_{ik}$ is the length of patch edge in units of m; $d_{ik}$ is the dissimilarity of different patches; $e_{ik}^{*}$ is the total length of different types of patch edges in units of m. |
| Contrast-Weighted Edge Densit, CWED | A metric of the shape features equal to the ratio of edge length to area. | $\mathrm{CWED} = \frac{\sum_{k=1}^{m}(e_{ik}d_{ik})}{A} \times 100$ | $e_{ik}$ is the length of patch edge in units of ; $d_{ik}$ is the dissimilarity of different patches; $A$ is the area of the plot in units of $m^2$。 |
| Edge Contrast Index, ECON | A metric of the shape features equal to the ratio of the weighted length of adjacent patch to the perimeter of the patch. | $\mathrm{ECON} = \frac{\sum_{k=1}^{m}(e_{ik}d_{ik})}{p_{ij}} \times 100$ | $e_{ik}$ is the length of patch edge in units of m; $d_{ik}$ is the dissimilarity of different patches; $p_{ij}$ is the perimeter of the patch in units of m. |

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| Contiguity Index, CONTIG | The adjacency to one another of different types of patches. | $\mathrm{CONTIG} = \frac{\left[\frac{\sum_{r=1}^{z} c_{ijr}}{a_{ij}^{*}}\right] - 1}{V - 1}$ | $c_{ijr}$ is the adjacency of each patch; $a_{ij}^{*}$ is the area of this patch ; $V$ is the sum of the adjacencies in 3×3 patches. |
| Euclidean Nearest Neighbor Index, ENN | A metric of the spatial distribution equal to the distance between the centers of adjacent patches. | $\mathrm{ENN} = h_{ij}$ | $h_{ij}$ is the distance from the center of the patch to the center of another patch of the same type. |
| Contagion Index, CONTAG | The degree of agglomeration or extension of different patches. Smaller values indicate the presence of many small patches in the landscape; values tending towards 100 indicate the presence of highly connected dominant patch types in the landscape. | $\mathrm{CONTAG} = \left\{ \frac{1 + \sum_{i=1}^{m}\sum_{k=1}^{m}\left[p_i \frac{g_{ik}}{\sum_{k=1}^{m} g_{ik}}\right]\left[\ln p_i \frac{g_{ik}}{\sum_{k=1}^{m} g_{ik}}\right]}{2\ln(m)} \right\} \times 100$ | $m$ is the total number of different patch types; $p_i$ is the percentage of type $i$ patches in the entire bock; $g_{ik}$ is the number of adjacencies between different patch types. |
| Proportion of Like Adjacency, PLADJ | A metric of the degree of aggregation of different types of patches equal to the ratio of the number of similar adjacencies of each patch type to the number of similar adjacencies of all types of patches in the entire block. | $\mathrm{PLADJ} = \left[\frac{\sum_{i=1}^{m} g_{ii}}{\sum_{i=1}^{m}\sum_{k=1}^{m} g_{ik}}\right] \times 100$ | $m$ is the total number of different patch types; $g_{ik}$ is the number of adjacencies between different patch types. |

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| Landscape Division Index, DIVISION | A metric of the landscape division equal to the ratio of the area of each patch type to the area of the entire block. | $\mathrm{DIVISION} = \left[1 - \sum_{i=1}^{m}\sum_{j=1}^{n}\left(\frac{a_{ij}}{A}\right)^2\right]$ | $a_{ij}$ is the area of each patchin units of $m^2$; A is the area of the block, in $m^2$. |
| Splitting Index, SPLIT | A metric of the degree of separation equal to the ratio of the area of each patch to the total area. | $\mathrm{SPLIT} = \frac{A^2}{\sum_{i=1}^{m}\sum_{j=1}^{n} a_{ij}^2}$ | $a_{ij}$ is the area of each patchin units of $m^2$; A is the area of the block, in $m^2$. |
| Shannon Diversity Index, SHDI | The percentage of the area of each patch type multiplied by its natural logarithmic value. | $\mathrm{SHDI} = -\sum_{i=1}^{m}(p_i \ln p_i)$ | $p_i$ is the area percentage of type *i* patches. |
| Aggregation Index, AI | A metric of the degree of aggregation equal to the number of adjacent patches of the same type in the block. | $\mathrm{AI} = \left[\frac{g_{ii}}{max - g_{ii}}\right] \times 100$ | $g_{ii}$ is the number of adjacencies between patches of the same type. |

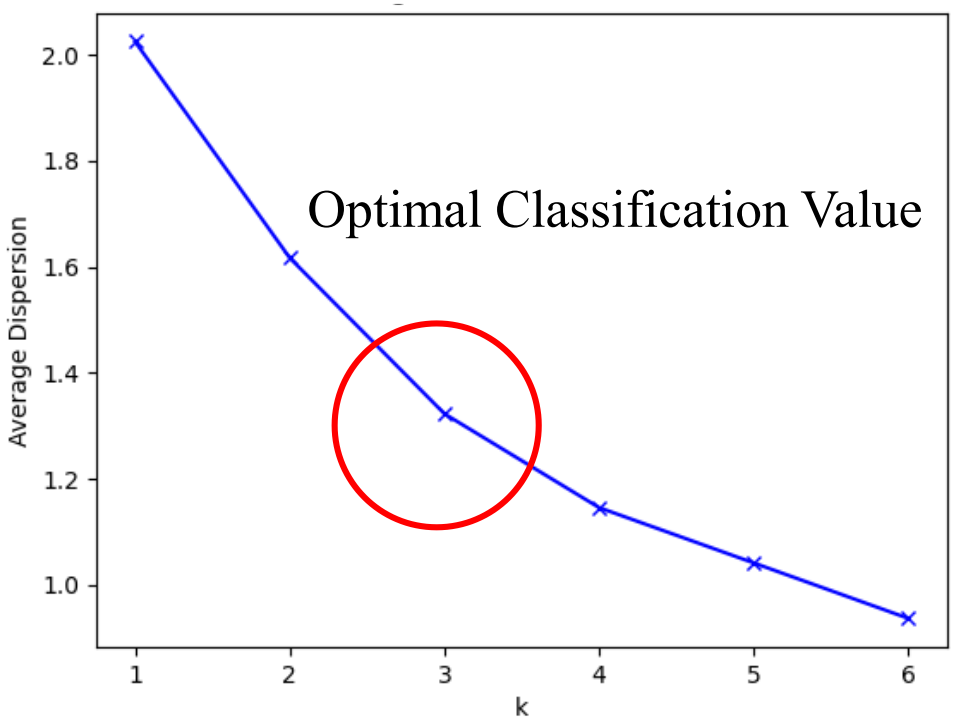


**Fig. S1** Determination of classification value Using the Elbow Method.