

Supplementary Materials

Land-use optimization based on ecological security pattern — A case study of Baicheng,
Northeast China

Bin Peng ^{1,2}, Jiuchun Yang ^{1,*}, Yixue Li ², Shuwen Zhang ¹

¹ Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences,
Changchun 130102, China

² College of Resources and Environment, Shandong Agricultural University, Taian 271018,
China

* Correspondence: yangjiuchun@iga.ac.cn

Table S1. Area of ecological functional zones

| Zone types | Area (km ²) | Percentage (%) |
|------------------------|-------------------------|----------------|
| Ecological core area | 5112.84 | 19.92 |
| Ecological buffer area | 9386.54 | 36.58 |
| Ecotone area | 7574.48 | 29.52 |
| Living-productive area | 3588.68 | 13.98 |

Table S2. Land use structure in 2020 for ecological function zones (%)

| Zone types | Cultivated | Forest | Grassland | Water area | Built-up area | Unused land | Swampland |
|------------------------|------------|--------|-----------|------------|---------------|-------------|-----------|
| Ecological core area | 31.48 | 6.53 | 16.31 | 3.43 | 1.49 | 23.88 | 16.88 |
| Ecological buffer area | 40.56 | 5.15 | 12.21 | 4.32 | 2.04 | 24.55 | 11.16 |
| Ecotone area | 58.38 | 4.73 | 9.65 | 4.42 | 3.45 | 17.13 | 2.23 |
| Living-productive area | 64.59 | 5.90 | 7.77 | 1.42 | 8.00 | 11.71 | 0.62 |

Table S3. Transition matrices

| Land use types | BAU&EPR | | | | | | | EDP&ELP | | | | | | |
|----------------|---------|---|---|---|---|---|---|---------|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| 2 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 3 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |
| 5 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |

Note: 1, 2, 3, 4, 5, 6, 7 represent cultivated, forest, grassland, water area, built-up area, unused land, and swampland respectively; rows denote transfers out and columns denote transfers in.

Table S4. Neighborhood weight parameters for the years 2020–2030.

| Land use type | Cropland | Woodland | Grassland | Water bodies | Construction land | Unused land | Marshland |
|----------------------|----------|----------|-----------|--------------|-------------------|-------------|-----------|
| Neighborhood weights | 0.969 | 0 | 0.133 | 0.134 | 0.135 | 1 | 0.108 |

Table S5. Land use structure of ecological corridors in 2020 and CEP scenario (km²)

| Scenarios | Cultivated | Forest | Grassland | Water area | Built-up area | Unused land | Swampland |
|-----------|------------|--------|-----------|------------|---------------|-------------|-----------|
| 2020 | 85.80 | 11.86 | 19.52 | 4.20 | 0.50 | 15.10 | 4.26 |
| CEP | 85.81 | 12.98 | 20.74 | 4.10 | 0.29 | 11.98 | 5.34 |