**List of Supplemental Tables**:

**List of Supplemental Figures**:

**Table S1.** Carbon sink coefficients of ecological land.

|  | Carbon sink coefficient(tC/hm$^2$) | Source |
|---|---|---|
| Woodland(F) | 57.7 | Fang et al.(2007) |
| Grassland(G) | 0.021 | Fang et al.(2007) |
| Water(W) | 0.257 | Duan et al.(2008) |
| unused land(B) | 0.0005 | Lai (2010) |

**Table S2.** Economic coefficient, moisture content and carbon absorption rate of main crops in Yulin.

| Crop type | Economic coefficient | Moisture content(%) | Carbon absorption rate |
|---|---|---|---|
| Wheat | 0.4 | 0.12 | 0.485 |
| Rice | 0.45 | 0.12 | 0.414 |
| Corn | 0.4 | 0.13 | 0.471 |
| Soybean | 0.34 | 0.13 | 0.45 |
| Potato | 0.7 | 0.7 | 0.423 |
| Peanut | 0.43 | 0.1 | 0.45 |
| Rapeseed | 0.25 | 0.1 | 0.45 |
| Vegetables | 0.6 | 0.9 | 0.45 |
| Melons | 0.7 | 0.9 | 0.45 |

**Table S3.** Carbon emission coefficients of production space.

| Major agricultural resources | Carbon emission coefficient | Unit |
|---|---|---|
| Chemical fertilizer | 0.8956 | tC/t |
| Plastic film | 5.18 | tC/t |
| Diesel | 0.5927 | tC/t |
| Pesticide | 4.9341 | tC/t |
| Agricultural machinery | 0.00018 | tC/kW |
| Irrigation | 0.26648 | tC/hm$^2$ |
| Crop sowing | 0.01647 | tC/hm$^2$ |
| Rice field | 0.2312 | tC/hm$^2$ |
| Cement | 0.538 | tC/t |
| Calcium carbide | 1.154 | tC/t |

**Table S4.** Carbon emission coefficients of major animals.

| Animal | Carbon emission coefficient(kg C/unit) | |
| --- | --- | --- |
| | Enteric fermentation | Feces |
| Cow | 80.47 | 6.59 |
| Horse | 18 | 1.09 |
| Donkey | 10 | 0.9 |
| Mule | 10 | 0.9 |
| Pig | 1 | 1.38 |
| Goat | 8.33 | 0.32 |
| Sheep | 8.13 | 0.28 |
| Poultry | Null | 0.01 |

**Table S5.** Ecological relationships classification in ecological network analysis.

| Element attributes | Positive(+) | Neutral(0) | Negative(-) |
|---|---|---|---|
| Positive(+) | (+,+)mutualism | (+,0)commensalism | (+,-)exploitation |
| Neutral(0) | (0,+)commensalism host | (0,0)neutralism | (0,-)amensalism |
| Negative(-) | (-,+)control | (-,0)amensal host | (-,-)competition |

**Table S6.** "Ecological-production-living" land transfer matrix of Yulin from 2010 to 2020(10⁴hm²).

| 2010 | 2020 | | | | | | | | |
|------|-------|-------|--------|------|------|------|------|-------|--------|
|      | C     | F     | G      | W    | U    | R    | I    | B     | Sum    |
| C    | 87.97 | 7.55  | 61.92  | 1.28 | 0.16 | 0.83 | 1.17 | 2.69  | 163.57 |
| F    | 6.12  | 9.45  | 6.26   | 0.10 | 0.01 | 0.06 | 0.27 | 1.11  | 23.38  |
| G    | 56.73 | 6.20  | 109.86 | 0.98 | 0.04 | 0.21 | 3.56 | 9.67  | 187.25 |
| W    | 1.34  | 0.22  | 1.42   | 1.90 | 0.03 | 0    | 0.19 | 0.24  | 5.34   |
| U    | 0.06  | 0.02  | 0.04   | 0.01 | 0.18 | 0    | 0    | 0.02  | 0.33   |
| R    | 0.52  | 0.03  | 0.18   | 0.03 | 0.04 | 0.13 | 0.02 | 0.01  | 0.96   |
| I    | 0.08  | 0.01  | 0.13   | 0.03 | 0    | 0    | 0.33 | 0     | 0.58   |
| B    | 3.75  | 0.99  | 10.52  | 0.25 | 0.01 | 0.07 | 1.83 | 28.41 | 45.83  |
| Sum  | 56.57 | 24.47 | 190.33 | 4.58 | 0.47 | 1.30 | 7.37 | 42.15 | 427.24 |

**Table S7.** Carbon flow matrix of "ecological-production-living" space in Yulin from 2010 to 2020($10^4$t).

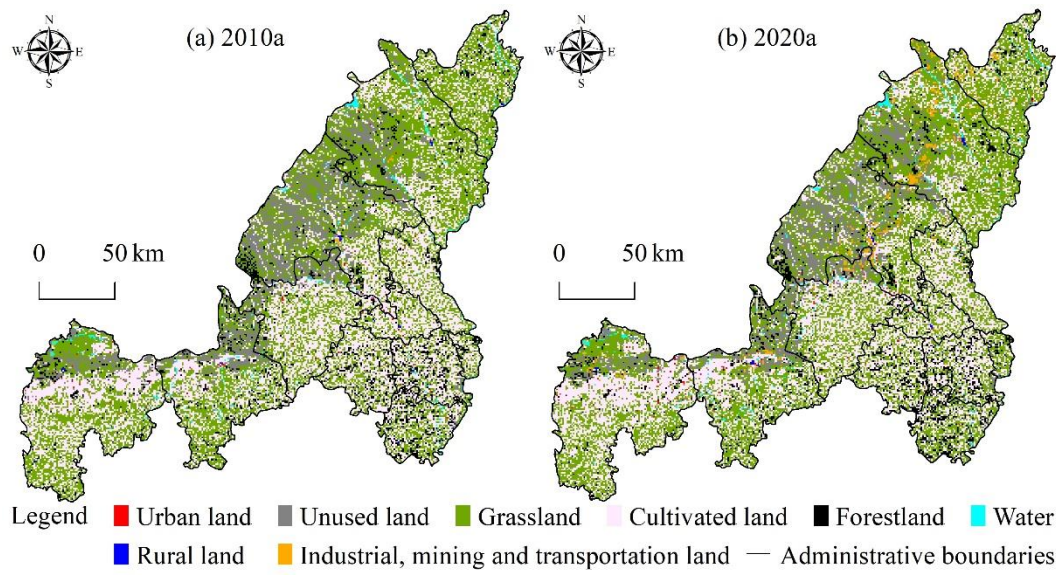| 2010 | 2020 | | | | | | | |
| | C | F | G | W | U | R | I | B |
|---|---|---|---|---|---|---|---|---|
| C | | 431.36 | -33.79 | -0.40 | -5.57 | -8.72 | -6068.04 | -1.52 |
| F | -346.98 | | -361.07 | -5.74 | -0.92 | -4.06 | -1415.74 | -64.05 |
| G | 55.78 | 357.61 | | 0.23 | -1.37 | -2.09 | -18461.50 | -0.20 |
| W | 1.00 | 12.64 | -0.34 | | -1.04 | 0.00 | -985.35 | -0.06 |
| U | 2.34 | 1.91 | 1.52 | 0.38 | | 0.00 | 0.00 | 0.76 |
| R | 8.74 | 2.20 | 5127.10 | 0.48 | -0.74 | | -103.40 | 0.16 |
| I | 1175.92 | 147.56 | 1910.74 | 440.95 | 0.00 | 0.00 | | 0.00 |
| B | 3.76 | 57.12 | 0.22 | 0.06 | -0.34 | -0.70 | -9490.00 | |

**Figure S1.** "ecological-production-living" space of Yulin City in 2010 and 2020.