**Appendix**

## A Green Development Indicator System and Ecological Footprint Account

Table. A1 China's national green development indicator system

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Secondary index | Serial number | Three-level indicator | Unit | Nature of the indicator | Weights |
| First, resource utilization (Weights=29.3%) | 1 | Total energy consumption | Ten thousand tons of standard coal equivalent | - | 1.83 |
| 2 | Unit GDP energy reduction rate | % | + | 2.75 |
| 3 | CO2 emission reduction rate per unit of GDP | % | + | 2.75 |
| 4 | Non-fossil energy accounts for the proportion of primary energy consumption | % | - | 2.75 |
| 5 | Total water use | One hundred million cubic meters | + | 1.83 |
| 6 | 10,000 yuan GDP water consumption decline | % | + | 2.75 |
| 7 | Unit industrial added value water consumption reduction rate | % | + | 1.83 |
| 8 | Effective utilization coefficient of farmland irrigation water | — | - | 1.83 |
| 9 | Cultivated land holdings | One hundred million acres | + | 2.75 |
| 10 | New construction land scale | One hundred million acres | + | 2.75 |
| 11 | Unit GDP construction land area reduction rate | （%） | + | 1.83 |
| 12 | Resource output rate | 10,000CNY / ton | + | 1.83 |
| 13 | General industrial solid waste comprehensive utilization rate | % | + | 0.92 |
| 14 | Comprehensive utilization of crop straw | % | + | 0.92 |
| Second, environmental governance (Weights=16.5%) | 15 | Reduced total chemical oxygen demand | % | + | 2.75 |
| 16 | Ammonia nitrogen emission reduction rate | % | + | 2.75 |
| 17 | Total reduction rate of sulphur dioxide emissions | % | + | 2.75 |
| 18 | Total reduction rate of total nitrogen oxide emissions | % | + | 2.75 |
| 19 | Hazardous waste disposal utilization | % | + | 0.92 |
| 20 | Harmless treatment rate of domestic garbage | % | + | 1.83 |
| 21 | Sewage centralized treatment rate | % | + | 1.83 |
| 22 | Environmental pollution control investment accounts for the proportion of GDP | % | + | 0.92 |
| Third, the environmental quality (Weights=19.3%) | 23 | Ratio of days with good air quality at prefecture level and above | % | + | 2.75 |
| 24 | Fine particulate matter (PM2.5) does not meet the standard concentration of the city and above | % | - | 2.75 |
| 25 | Surface water reaches or is better than Class III water body | % | + | 2.75 |
| 26 | Proportion of surface water inferior V water | % | - | 2.75 |
| 27 | Water quality compliance rate of important rivers and lakes water function area | % | + | 1.83 |
| 28 | The water quality of centralized drinking water sources at or above the prefecture level is higher or higher than the proportion of Class III | % | +- | 1.83 |
| 29 | Proportion of water quality (first and second class) in coastal waters | % | - | 1.83 |
| 30 | Contaminated farmland safety utilization rate | % | + | 0.92 |
| 31 | Fertilizer use per unit of cultivated land | km/ha | + | 0.92 |
| 32 | Pesticid use per unit of cultivated land area | km/ha | + | 0.92 |
| Fourth, ecological protection (Weights=16.5%) | 33 | Forest cover rate | % | + | 2.75 |
| 34 | Forest stock | one hundred million cubic meters | + | 2.75 |
| 35 | Grassland comprehensive vegetation coverage | % | + | 1.83 |
| 36 | Natural shoreline retention rate | % | + | 1.83 |
| 37 | Wetland protection rate | % | + | 1.83 |
| 38 | Land area of nature reserve | ten thousand hectares | + | 0.92 |
| 39 | Marine protected area | ten thousand hectares | + | 0.92 |
| 40 | New soil erosion control area | ten thousand hectares | + | 0.92 |
| 41 | Governable desertification land management rate | % | + | 1.83 |
| 42 | New mine restoration management area | hectare | + | 0.92 |
| Fifth: Quality of growth (Weight=9.2%) | 43 | Per capita GDP growth rate | % | + | 1.83 |
| 44 | Resident per capita disposable income | CNY / person | + | 1.83 |
| 45 | The added value of tertiary industry as a share of GDP | % | + | 1.83 |
| 46 | The value added of strategic emerging industries as a share of GDP | % | + | 1.83 |
| 47 | Research and experimental development expenditures as a share of GDP | % | + | 1.83 |
| 6. Green life (Weights=9.2%) | 48 | Per capita energy consumption reduction rate of public institutions | % | - | 0.92 |
| 49 | Green product market share（Market share of energy efficient products） | % | + | 0.92 |
| 50 | New energy vehicle ownership growth rate | % | + | 1.83 |
| 51 | Green travel（Public transport passenger traffic per 10,000 population） | million times /per 10,000 person | + | 0.92 |
| 52 | Urban green buildings account for the proportion of new buildings | % | + | 0.92 |
| 53 | Urban built-up area green rate | % | + | 0.92 |
| 54 | Rural tap water penetration rate | % | + | 1.83 |
| 55 | Rural health toilet penetration rate | % | - | 0.92 |

Source: China National Development and Reform Commission, National Bureau of Statistics, Ministry of Ecology and Environment, etc. Green Development Indicator System. 2016

Table A2 Shaanxi Province Green Development Index System

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Secondary index | Serial number | Three-level indicator | Unit | Nature of the indicator | Weights |
| First, resource utilization (Weights=29.3%) | 1 | Total energy consumption | Ten thousand tons of standard coal equivalent | **-** | 2.01 |
| 2 | Unit GDP energy reduction rate | % | **+** | 3.02 |
| 3 | CO2 emission reduction rate per unit of GDP | % | **+** | 3.02 |
| 4 | Non-fossil energy accounts for the proportion of primary energy consumption | % | **-** | 3.02 |
| 5 | Total water use | 108m3 | **+** | 2.01 |
| 6 | 10,000 yuan GDP water consumption decline rate | % | + | 3.02 |
| 7 | Unit industrial added value water consumption reduction rate | % | **+** | 2.01 |
| 8 | Cultivated land holdings | 108ha | **+** | 2.01 |
| 9 | New construction land scale | 104ha | **+** | 3.02 |
| 10 | Unit GDP construction land area reduction rate | % | **+** | 3.02 |
| 11 | Resource output rate | CNY 104/t | **+** | 2.01 |
| 12 | General industrial solid waste comprehensive utilization rate | % | **+** | 1.05 |
| Second, environmental governance (Weights=16.5%) | 13 | Reduced total chemical oxygen demand | % | **+** | 2.75 |
| 14 | Ammonia nitrogen emission reduction rate | % | **+** | 2.75 |
| 15 | Reduced total sulfur dioxide emissions | % | **+** | 2.75 |
| 16 | Total reduction rate of total nitrogen oxide emissions | % | **+** | 2.75 |
| 17 | Hazardous waste disposal utilization | % | **+** | 0.92 |
| 18 | Harmless treatment rate of domestic garbage | % | **+** | 1.83 |
| 19 | Sewage centralized treatment rate | % | **+** | 1.83 |
| 20 | Environmental pollution control investment accounts for the proportion of GDP | % | + | 0.92 |
| Third, the environmental quality (Weights=19.3%) | 21 | Ratio of days with good air quality at prefecture level and above | % | + | 3.59 |
| 22 | Daily average of inhalable particles | mg/m3 | - | 3.59 |
| 23 | Proportion of river section of water quality I-III | % | + | 3.59 |
| 24 | Proportion of rivers with inferior V waters | % | - | 3.59 |
| 25 | The water quality of centralized drinking water sources at or above the prefecture level is higher or higher than the proportion of Class III | % | **+** | 2.49 |
| 26 | Fertilizer use per unit of cultivated land | kg/ha | **+** | 2.49 |
| 27 | Pesticid use per unit of cultivated land area | kg/ha | **+** | 1.2 |
| Fourth, ecological protection (Weights=16.5%) | 28 | Forest cover rate | % | **+** | 3.8 |
| 29 | Forest stock | 108m3 | **+** | 3.8 |
| 30 | Grassland comprehensive vegetation coverage | % | **+** | 2.53 |
| 31 | Wetland protection rate | % | **+** | 2.53 |
| 32 | Land area of nature reserve | 104ha | **+** | 1.28 |
| 33 | New soil erosion control area | 104ha | **+** | 1.28 |
| 34 | New mine restoration management area | ha | + | 1.28 |
| Fifth: Quality of growth (Weight=9.2%) | 35 | Per capita GDP growth rate | % | **+** | 1.83 |
| 36 | Resident per capita disposable income | CNY/per |  | 1.83 |
| 37 | The added value of tertiary industry as a share of GDP | % | **+** | 1.83 |
| 38 | The value added of strategic emerging industries as a share of GDP | % | **+** | 1.83 |
| 39 | Research and experimental development expenditures as a share of GDP | % | **+** | 1.83 |
| 6. Green life (Weights=9.2%) | 40 | Per capita daily water consumption | m2 | **-** | 1.31 |
| 41 | Per capita park green area | % | **+** | 1.31 |
| 42 | Green travel (public transport passenger traffic per 10,000 population) | Million times /per 10,000 person | **+** | 1.31 |
| 43 | Urban built-up area green rate | % | **+** | 1.31 |
| 44 | Rural tap water penetration rate | % | **+** | 2.73 |
| 45 | Rural health toilet penetration rate | % | **-** | 1.31 |

Source: China National Development and Reform Commission, National Bureau of Statistics, Ministry of Ecology and Environment, etc. Green Development Indicator System. 2016

Table A3 Ecological Footprint Account

|  |  |  |
| --- | --- | --- |
| Composition of ecological footprint | Specific indicators | Land type |
| Biological resource account | Wheat, rice, corn, soybeans, cotton, tobacco, oil, vegetables, hemp, sugar | arable land |
| Walnut, chestnut, raw lacquer, fruit, tea, pepper, tung tree seed, five times seed, brown piece | woodland |
| Pork, beef, lamb, milk, eggs | Grassland |
| Aquatic products | Waters |
| Energy resource account | Coal, oil, natural gas | Fossil energy land |
| electric power | Building land |
| Pollution discharge account | Waste water, waste gas, solid waste | Contaminated area |

## B Raw data

Table B1 Agricultural output in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unit (ten thousand tons) | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Wheat | 356.99 | 391.50 | 383.10 | 403.80 | 410.10 | 435.50 | 389.80 | 417.24 | 458.10 | 445.03 |
| Paddy | 66.93 | 67.88 | 82.50 | 81.01 | 84.50 | 87.35 | 90.95 | 90.87 | 91.90 | 91.93 |
| Corn | 498.77 | 504.31 | 526.10 | 532.20 | 550.70 | 566.90 | 586.73 | 539.57 | 543.10 | 545.39 |
| Soy | 22.93 | 24.56 | 42.36 | 39.71 | 24.39 | 36.01 | 24.95 | 18.11 | 12.30 | 17.93 |
| Cotton | 8.98 | 10.07 | 8.58 | 6.92 | 6.74 | 6.70 | 5.79 | 4.22 | 3.86 | 3.38 |
| Tobacco | 5.56 | 7.14 | 7.31 | 6.73 | 7.67 | 9.15 | 8.54 | 7.20 | 7.21 | 6.74 |
| Oil | 39.15 | 49.46 | 54.38 | 56.08 | 58.97 | 60.33 | 59.52 | 62.30 | 62.66 | 63.80 |
| Vegetables | 928.10 | 1,067.12 | 1,257.59 | 1,384.02 | 1,432.50 | 1,525.62 | 1,629.36 | 1,724.68 | 1,822.53 | 1,896.18 |
| Hemp | 0.08 | 0.06 | 0.05 | 0.06 | 0.06 | 0.07 | 0.07 | 0.06 | 0.06 | 0.07 |
| Sugar | 0.31 | 0.30 | 0.17 | 0.20 | 0.16 | 0.17 | 0.16 | 0.15 | 0.15 | 0.16 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B2 Output of forest products in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unit (tons) | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |  | 2014 | 2015 | 2016 |
| Walnut | 46717 | 74,069 | 88,773 | 60,453 | 141,362 | 162,981 | 161,500 |  | 181,771 | 221,074 | 265,820 |
| Chestnut | 35,778 | 40,435 | 46,315 | 52,037 | 69,132 | 71,985 | 74,491 |  | 78,984 | 83,272 | 86,579 |
| Raw lacquer | 1,851 | 1,697 | 2,552 | 1,915 | 2,434 | 3,443 | 4,516 |  | 2,864 | 3,445 | 3,239 |
| Fruit | 9,402,300 | 10,676,700 | 11,504,500 | 12,385,000 | 13,326,800 | 16,938,000 | 14,873,800 |  | 15,539,800 | 16,306,200 | 17,139,600 |
| Tea | 14,400 | 16,025 | 20,153 | 25,052 | 28,430 | 35,195 | 40,656 |  | 49,128 | 54,854 | 62,136 |
| Pepper | 34,904 | 44,000 | 48,571 | 44,789 | 52,974 | 61,698 | 52,537 |  | 61,072 | 66,245 | 64,146 |
| Tung oil seed | 11,496 | 14,534 | 17,871 | 17,096 | 19,664 | 22,622 | 28,421 |  | 29,114 | 27,764 | 27,549 |
| Five times Seed | 2,383 | 2,785 | 3,386 | 3,152 | 3,441 | 3,969 | 4,256 |  | 4,590 | 4,483 | 4,388 |
| Brown film | 3,511 | 4,164 | 3,989 | 3,202 | 3,147 | 2,987 | 2,536 |  | 3,473 | 2,962 | 3,575 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B3 Production of grass products in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unit (tons) | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |  2014 | 2015 | 2016 |
| Pork | 702,000 | 833,342 | 750,000 | 791,000 | 773,000 | 834,500 | 883,400 |  918,000 | 904,200 | 859,000 |
| Beef | 76,000 | 85,750 | 78,000 | 73,000 | 73,900 | 75,009 | 75,200 |  77,000 | 79,000 | 80,300 |
| Lamb | 70,000 | 82,690 | 73,000 | 73,000 | 67,000 | 68,541 | 70,400 |  75,000 | 78,100 | 79,900 |
| Milk | 1,802,594 | 1,976,459 | 1,858,326 | 1,776,200 | 1,823,700 | 1,890,751 | 1,885,100 |  1,923,400 | 1,899,200 | 1,891,400 |
| Egg | 433,001 | 479,212 | 481,000 | 470,700 | 503,000 | 518,593 | 554,000 |  545,000 | 580,600 | 593,200 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B4 Production of aquatic products in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unit (ten thousand tons) | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |  | 2013 | 2014 | 2015 | 2016 |
| Aquatic products | 5.03 | 5.22 | 5.60 | 6.04 | 8.18 | 10.54 |  | 12.52 | 13.93 | 17.58 | 18.42 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B5 Pollutant emissions in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental pollution |  | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Waste water (10,000 tons) | Industrial waste | 48,523 | 48,119 | 49,900 | 48,050 | 40,806 | 38,037 | 34,871 | 36,163 | 37,730 | 28,417 |
| COD | 34.5 | 33.2 | 31.8 | 30.8 | 55.6 | 9.8 | 51.93 | 50.49 | 48.91 | 18.73 |
| Domestic sewage | 50,825 | 56,210 | 62,300 | 71,046 | 80,933 | 90,626 | 97,166 | 109,536 | 130,303 | 138,027 |
| Exhaust gas (10,000 tons) | SO2 | 92.7 | 88.9 | 80.4 | 77.9 | 91.7 | 74.71 | 70.71 | 67.16 | 59.93 | 19.08 |
| Smoke (powder) dust | 25.69 | 35.59 | 29.88 | 30.44 | 39.70 | 38.55 | 46.85 | 53.78 | 45.50 | 18.20 |
| Solid waste (10,000 tons) | Industrial solid waste | 5,480.02 | 6,136.86 | 5,546.70 | 6,896.10 | 7,170.57 | 7,215.11 | 7,491.10 | 8,682.50 | 9,329.65 | 8,647.85 |
| Domestic garbage | 334 | 320 | 356 | 388 | 428 | 433 | 437 | 497 | 512 | 533 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B6 Energy consumption of Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Energy consumption | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Coal (10,000 tons) | 3,726.095 | 3,943.833 | 4,352.757 | 4,859.440 | 5,401.929 | 5,980.391 | 7,671.85 | 8,125.91 | 8,520.92 | 9,151.20 |
| Oil (ten thousand tons) | 1,510.602 | 1,944.307 | 2,008.576 | 2,233.630 | 2,323.446 | 2,413.534 | 1,652.66 | 1,690.24 | 1,552.57 | 1,199.44 |
| Natural gas (10,000 cubic meters) | 650.2091 | 833.4079 | 807.6597 | 928.089 | 1,009.144 | 1,266.094 | 907.100 | 998.580 | 1,109.91 | 1,276.93 |
| Electricity (10,000 kWh) | 74.99358 | 77.45541 | 100.864 | 131.786 | 133.260 | 121.966 | 378.870 | 407.720 | 532.44 | 492.560 |

Source: Shaanxi Statistical Yearbook 2008-2017

Table B7 Raw data of Shaanxi 2007-2016 resource utilization

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| resource utilization | Total energy consumption | 6,774.86 | 7,417.46 | 8,043.60 | 8,882.11 | 9,107.48 | 9,914.53 | 10,610.48 | 11,222.46 | 11,715.85 | 12,120.14 |
| Unit GDP energy reduction rate | 4.55 | 5.94 | 4.56 | 3.64 | 3.56 | 3.54 | 3.55 | 3.58 | 3.21 | 3.83 |
| CO2 emission reduction rate per unit of GDP | 11.85 | 20.98 | -0.24 | 12.77 | 14.62 | 3.09 | 6.79 | 2.99 | -2.71 | -2.45 |
| Non-fossil energy accounts for the proportion of primary energy consumption | 2.50 | 2.30 | 2.70 | 3.14 | 2.88 | 2.85 | 3.57 | 3.63 | 4.54 | 4.06 |
| Total water use | 81.55 | 85.46 | 84.34 | 83.41 | 87.76 | 88.04 | 89.21 | 89.81 | 91.16 | 90.84 |
| 10,000 yuan GDP water consumption decline rate | 20.09 | 17.52 | 11.64 | 20.19 | 14.87 | 13.16 | 9.62 | 7.78 | 0.37 | 7.43 |
| Unit industrial added value water consumption reduction rate | 29.62 | 13.08 | 22.50 | 20.66 | 11.55 | 14.25 | 7.93 | 3.34 | -5.63 | 10.04 |
| Cultivated land holdings | 2,840.73 | 2,848.37 | 2,860.04 | 2,860.53 | 2,860.98 | 2,864.29 | 2,870.98 | 2,865.99 | 2,904.11 | 2,915.08 |
| New construction land scale | 6,140.00 | 6,140.00 | 6,140.00 | 6,140.00 | 6,140.00 | 6,140.00 | 6,140.00 | 12,500.00 | 7,672.00 | 7,603.00 |
| Unit GDP construction land area reduction rate | 17.61 | 21.29 | 10.47 | 19.30 | 19.09 | 13.43 | 10.81 | 4.10 | 0.47 | 5.90 |
| Resource output rate | 0.89 | 1.04 | 1.04 | 1.18 | 1.42 | 1.50 | 1.58 | 1.64 | 1.61 | 1.67 |
| General industrial solid waste comprehensive utilization rate | 41.60 | 40.28 | 53.97 | 54.66 | 60.13 | 61.29 | 63.52 | 62.93 | 65.31 | 76.69 |

Source: Shaanxi Statistical Yearbook 2008-2017, China Environmental Statistics Yearbook 2008-2017.

Table B8 Raw data of environmental governance in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Environmental governance | Reduced total chemical oxygen demand | -0.31 | 3.68 | 4.23 | 3.25 | -80.81 | 3.85 | 3.18 | 2.76 | 3.13 | 61.70 |
| Ammonia nitrogen emission reduction rate | 2.34 | -22.64 | -1.20 | -2.71 | -92.36 | 2.36 | 3.76 | 2.18 | 4.45 | 5.49 |
| Reduced total sulfur dioxide emissions | -2.08 | 4.08 | 9.55 | 3.20 | -17.75 | 7.97 | 4.46 | 3.13 | 5.88 | 5.67 |
| Total reduction rate of total nitrogen oxide emissions | 2.85 | 2.85 | 2.85 | 2.85 | 2.85 | 2.85 | 6.11 | 7.01 | 11.11 | 39.38 |
| Hazardous waste disposal utilization | 29.00 | 29.00 | 29.00 | 29.00 | 30.00 | 29.00 | 32.00 | 33.30 | 57.10 | 55.01 |
| Harmless treatment rate of domestic garbage | 67.26 | 68.52 | 69.16 | 79.84 | 90.27 | 97.23 | 96.44 | 95.84 | 98.02 | 98.53 |
| Sewage centralized treatment rate | 38.62 | 46.01 | 56.32 | 67.65 | 82.31 | 87.64 | 89.04 | 91.99 | 91.52 | 91.36 |
| Environmental pollution control investment accounts for the proportion of GDP | 1.11 | 1.06 | 1.46 | 1.79 | 0.79 | 0.80 | 1.38 | 1.56 | 1.33 | 1.32 |

Source: Shaanxi Statistical Yearbook 2008-2017, China Environmental Statistics Yearbook 2008-2017.

Table B9 Raw data of environmental quality in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Environmental Quality | Ratio of days with good air quality at prefecture level and above | 84.10 | 87.80 | 89.70 | 89.30 | 89.70 | 86.10 | 90.10 | 63.10 | 69.50 | 62.90 |
| Daily average of inhalable particles | 0.11 | 0.09 | 0.09 | 0.10 | 0.09 | 0.08 | 0.08 | 0.07 | 0.06 | 0.06 |
| Proportion of river section of water quality I-III | 62.70 | 63.00 | 65.00 | 46.40 | 48.20 | 51.70 | 54.20 | 51.80 | 56.50 | 54.20 |
| Proportion of rivers with inferior V waters | 18.40 | 18.40 | 18.40 | 25.00 | 25.00 | 24.10 | 14.50 | 12.10 | 12.90 | 12.50 |
| The water quality of centralized drinking water sources at or above the prefecture level is higher or higher than the proportion of Class III | 99.92 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.80 | 100.00 | 100.00 | 96.40 |
| Fertilizer use per unit of cultivated land | 559.01 | 582.44 | 633.91 | 687.98 | 724.58 | 837.21 | 841.88 | 803.21 | 798.52 | 799.64 |
| Pesticid use per unit of cultivated land area | 3.77 | 3.85 | 4.60 | 4.34 | 4.34 | 4.52 | 4.53 | 4.46 | 4.51 | 4.52 |

Data Sources：Shaanxi Statistical Yearbook 2008-2017，China Environmental Statistics Yearbook 2008-2017.

Table B10 Raw data of ecological protection in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Ecological Protection | Forest cover rate | 37.26  | 37.26  | 37.26  | 41.42  | 41.42  | 41.42  | 41.42  | 41.42  | 41.42  | 41.42  |
| Forest stock | 3.38  | 3.38  | 3.38  | 3.96  | 3.96  | 3.96  | 3.96  | 3.96  | 3.96  | 3.96  |
| Grassland comprehensive vegetation coverage | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  | 25.32  |
| Wetland protection rate | 1.42  | 1.42  | 1.42  | 1.42  | 1.42  | 1.42  | 1.50  | 1.50  | 1.50  | 1.50  |
| Land area of nature reserve | 104.60  | 104.60  | 104.60  | 116.10  | 117.20  | 116.30  | 116.60  | 113.10  | 113.10  | 113.10  |
| New soil erosion control area | 55.91  | 68.12  | 68.26  | 66.10  | 65.87  | 66.39  | 66.50  | 66.52  | 66.36  | 46.00  |
| New mine restoration management area | 331.00  | 331.00  | 4065.00  | 267.00  | 234.00  | 324.00  | 268.00  | 103.00  | 169.00  | 2188.00  |

Data Sources：Shaanxi Statistical Yearbook 2008-2017，China Environmental Statistics Yearbook 2008-2017.

Table B11 Raw date of growth quality data in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Growth Quality | Per capita GDP growth rate | 21.07 | 26.72 | 11.41 | 23.63 | 23.33 | 15.24 | 11.81 | 8.84 | 1.49 | 7.12 |
| Resident per capita disposable income | 10,763.00 | 12,858.00 | 14,129.00 | 15,695.00 | 18,245.00 | 20,734.00 | 22,346.00 | 24,336.00 | 26,420.00 | 28,440.00 |
| The added value of tertiary industry as a share of GDP | 37.83 | 36.91 | 38.48 | 36.44 | 34.81 | 34.66 | 35.99 | 37.01 | 41.24 | 42.35 |
| The value added of strategic emerging industries as a share of GDP | 41.50 | 38.60 | 44.80 | 33.40 | 32.70 | 32.40 | 33.00 | 32.70 | 47.60 | 47.50 |
| Research and experimental development expenditures as a share of GDP | 2.11 | 1.96 | 2.32 | 2.15 | 1.99 | 1.99 | 2.12 | 2.07 | 2.18 | 2.16 |

Data Sources：Shaanxi Statistical Yearbook 2008-2017，China Environmental Statistics Yearbook 2008-2017.

Table B12 Raw data of green living in Shaanxi from 2007 to 2016

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary indicator | Secondary indicators | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Green Life | Per capita daily water consumption | 154.50 | 165.70 | 164.70 | 165.70 | 163.30 | 174.70 | 179.50 | 154.10 | 155.70 | 159.30 |
| Per capita park green area | 8.00 | 8.71 | 9.34 | 10.67 | 11.40 | 11.60 | 11.80 | 12.50 | 12.60 | 12.30 |
| Green travel (public transport passenger traffic per 10,000 population) | 15.98 | 18.58 | 19.86 | 22.37 | 24.29 | 25.46 | 25.07 | 26.92 | 26.92 | 26.94 |
| Urban built-up area green rate | 30.39 | 31.92 | 32.12 | 31.84 | 32.60 | 33.50 | 33.90 | 34.10 | 34.40 | 34.20 |
| Rural tap water penetration rate | 33.20 | 34.30 | 36.50 | 37.20 | 38.80 | 39.79 | 41.70 | 42.50 | 55.40 | 56.10 |
| Rural health toilet penetration rate | 35.00 | 37.60 | 40.89 | 45.34 | 49.42 | 51.53 | 50.75 | 50.78 | 57.60 | 57.60 |

Data Sources：Shaanxi Statistical Yearbook 2008-2017，China Environmental Statistics Yearbook 2008-201

## C Calculation process

（1）The ecological footprint of biological resources is taken as an example in 2016. The calculation results are shown in Table C1.

Table C1 2016 Shaanxi Ecological and Biological Resources Footprint

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Classification | Global average production（kg/hm2） | Production | Equilibrium factor | Total ecological footprint（hm2） | Per capita ecological footprint（hm2/person） | Bio-productive land type |
| Agricultural products（Ten thousand tons） | Wheat | 2,532 | 445.03 | 2.52 | 4,429,208.531 | 0.116160727 | Arable land |
| Paddy | 2,744 | 91.93 | 2.52 | 844,255.102 | 0.022141492 | Arable land |
| Corn | 2,744 | 545.39 | 2.52 | 5,008,683.673 | 0.131358082 | Arable land |
| Soy | 1,935 | 17.93 | 2.52 | 233,506.9767 | 0.00612397 | Arable land |
| Cotton | 1,000 | 3.38 | 2.52 | 85,176 | 0.002233832 | Arable land |
| Tobacco leaf | 1,576 | 6.74 | 2.52 | 107,771.5736 | 0.002826425 | Arable land |
| Oil | 1,856 | 63.80 | 2.52 | 866,250 | 0.022718332 | Arable land |
| Vegetables | 18,000 | 1,896.18 | 2.52 | 2,654,652 | 0.069621086 | Arable land |
| Hemp | 1,500 | 0.07 | 2.52 | 1,176 | 3.08419 | Arable land |
| Sugar | 5,520 | 0.16 | 2.52 | 730.4347826 | 1.91564 | Arable land |
|  | Subtotal | - | - | - | 14,231,410.29 | 0.373233944 | Arable land |
| Forest products（ton） | Walnut | 2,150 | 265,820 | 1.28 | 158,255.6279 | 0.004150423 | Woodland |
| Chestnut | 1,311 | 86,579 | 1.28 | 84,531.74676 | 0.002216935 | Woodland |
| Raw lacquer | 3,732 | 3,239 | 1.28 | 1,110.91104 | 2.91348 | Woodland |
| Fruits | 18,000 | 17,139,600 | 1.28 | 1,218,816 | 0.031964752 | Woodland |
| Tea | 566 | 62,136 | 1.28 | 140,519.576 | 0.003685276 | Woodland |
| Pepper | 385 | 64,146 | 1.28 | 213,264.6234 | 0.005593093 | Woodland |
| Tung oil seed | 1,856 | 27,549 | 1.28 | 18999.31034 | 0.000498277 | Woodland |
| Five times seed | 1,856 | 4,388 | 1.28 | 3,026.206897 | 7.93655 | Woodland |
| Brown film | 3,732 | 3,575 | 1.28 | 1,226.152197 | 3.21572 | Woodland |
|  | Subtotal | - | - | - | 1,839,750.154 | 0.048249414 | Woodland |
| Grass products（ton） | Pork | 74 | 859000 | 0.43 | 4,991,486.486 | 0.130907068 | Grassland |
| Beef | 33 | 80300 | 0.43 | 1,046,333.333 | 0.02744121 | Grassland |
| Lamb | 33 | 79900 | 0.43 | 1,041,121.212 | 0.027304516 | Grassland |
| Milk | 502 | 1891400 | 0.43 | 1,620,123.506 | 0.04248947 | Grassland |
| Eggs | 2760 | 593200 | 0.43 | 92,418.84058 | 0.002423783 | Grassland |
|  | Subtotal | - | - | - | 8,791,483.378 | 0.230566047 | Grassland |
| Aquatic products（ton） | Aquatic products | 29 | 18.42 | 0.35 | 2,223,308.621 | 0.058308645 | Waters |
| Total | - | - | - | - | 27,085,952.45 | 0.71035805 | - |

（2）GDI, taking 2016 as an example, the calculation results are shown in Table C2.

Table C2 2016 Shaanxi Ecological and Biological Resources Footprint

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Secondary indicators | Three-level indicator | Weights | 2016 | max | min | x′= (x-min)/(max-min) Positive | x′=(max-x)/(max-min) Negative | Nature of the indicator | 2016' | Development index |
| Resource utilization（Weights=29.3%） | Total energy consumption | 2.01 | 12,120.14 | 12,120.14 | 6774.86 | 1.00 | 0.00 | **-** | 0.00 | 0.00 |
| Unit GDP energy reduction rate | 3.02 | 3.83 | 5.94 | 3.21 | 0.23 | 0.77 | **+** | 0.23 | 0.69 |
| CO2 emission reduction rate per unit of GDP | 3.02 | -2.45 | 20.98 | -2.71 | 0.01 | 0.99 | **+** | 0.01 | 0.03 |
| Non-fossil energy accounts for the proportion of primary energy consumption | 3.02 | 4.06 | 4.54 | 2.30 | 0.79 | 0.21 | **+** | 0.79 | 2.37 |
| Total water use | 2.01 | 90.84 | 91.16 | 81.55 | 0.97 | 0.03 | **-** | 0.03 | 0.07 |
| 10,000 yuan GDP water consumption decline rate | 3.02 | 7.43 | 20.19 | 0.37 | 0.36 | 0.64 | **+** | 0.36 | 1.08 |
| Unit industrial added value water consumption reduction rate | 2.01 | 10.04 | 29.62 | -5.63 | 0.44 | 0.56 | **+** | 0.44 | 0.89 |
| Cultivated land holdings | 2.01 | 2,915.08 | 2,915.08 | 2,840.73 | 1.00 | 0.00 | **+** | 1.00 | 2.01 |
| New construction land scale | 3.02 | 7,603.00 | 12,500.00 | 6,140.00 | 0.23 | 0.77 | **-** | 0.77 | 2.33 |
| Unit GDP construction land area reduction rate | 3.02 | 5.9 | 21.29 | 0.47 | 0.26 | 0.74 | **+** | 0.26 | 0.79 |
| Resource output rate | 2.01 | 1.668412 | 1.67 | 0.89 | 1.00 | 0.00 | **+** | 1.00 | 2.01 |
| General industrial solid waste comprehensive utilization rate | 1.05 | 76.69 | 76.69 | 40.28 | 1.00 | 0.00 | **+** | 1.00 | 1.05 |
| Environmental governance（Weights=16.5%） | Reduced total chemical oxygen demand | 2.75 | 61.7 | 61.70 | -80.81 | 1.00 | 0.00 | **+** | 1.00 | 2.75 |
| Ammonia nitrogen emission reduction rate | 2.75 | 5.49 | 5.49 | -92.36 | 1.00 | 0.00 | **+** | 1.00 | 2.75 |
| Reduced total sulfur dioxide emissions | 2.75 | 5.67 | 9.55 | -17.75 | 0.86 | 0.14 | **+** | 0.86 | 2.36 |
| Total reduction rate of total nitrogen oxide emissions | 2.75 | 39.38 | 39.38 | 2.85 | 1.00 | 0.00 | **+** | 1.00 | 2.75 |
| Hazardous waste disposal utilization | 0.92 | 55.01 | 57.10 | 29.00 | 0.93 | 0.07 | **+** | 0.93 | 0.85 |
| Harmless treatment rate of domestic garbage | 1.83 | 98.53 | 98.53 | 67.26 | 1.00 | 0.00 | **+** | 1.00 | 1.83 |
| Sewage centralized treatment rate | 1.83 | 91.36 | 91.99 | 38.62 | 0.99 | 0.01 | **+** | 0.99 | 1.81 |
| Environmental pollution control investment accounts for the proportion of GDP | 0.92 | 1.32 | 1.79 | 0.79 | 0.53 | 0.47 | **+** | 0.53 | 0.49 |
| Environmental Quality（Weights=19.3%） | Ratio of days with good air quality at prefecture level and above | 3.59 | 62.9 | 90.10 | 62.90 | 0.00 | 1.00 | **+** | 0.00 | 0.00 |
| Daily average of inhalable particles | 3.59 | 0.062 | 0.11 | 0.06 | 0.07 | 0.93 | **-** | 0.93 | 3.36 |
| Proportion of river section of water quality I-III | 3.59 | 54.2 | 65.00 | 46.40 | 0.42 | 0.58 | **+** | 0.42 | 1.51 |
| Proportion of rivers with inferior V waters | 3.59 | 12.5 | 25.00 | 12.10 | 0.03 | 0.97 | **-** | 0.97 | 3.48 |
| The water quality of centralized drinking water sources at or above the prefecture level is higher or higher than the proportion of Class III | 2.49 | 96.4 | 100.00 | 96.40 | 0.00 | 1.00 | **+** | 0.00 | 0.00 |
| Fertilizer use per unit of cultivated land | 1.2 | 799.635 | 841.88 | 559.01 | 0.85 | 0.15 | **-** | 0.15 | 0.18 |
| Pesticid use per unit of cultivated land area | 1.2 | 4.524747 | 4.60 | 3.77 | 0.91 | 0.09 | **-** | 0.09 | 0.10 |
| Ecological Protection(Weights=16.5%） | Forest cover rate | 3.8 | 41.42 | 41.42 | 37.26 | 1.00 | 0.00 | **+** | 1.00 | 3.80 |
| Forest stock | 3.8 | 3.96 | 3.96 | 3.38 | 1.00 | 0.00 | **+** | 1.00 | 3.80 |
| Grassland comprehensive vegetation coverage | 2.53 | 25.32 | 25.32 | 25.32 | 0.00 | 0.00 | **+** | 0.00 | 0.00 |
| Wetland protection rate | 2.53 | 1.5 | 1.50 | 1.42 | 1.00 | 0.00 | **+** | 1.00 | 2.53 |
| Land area of nature reserve | 1.28 | 113.1 | 117.20 | 104.60 | 0.67 | 0.33 | **+** | 0.67 | 0.86 |
| New soil erosion control area | 1.28 | 46 | 68.26 | 46.00 | 0.00 | 1.00 | **+** | 0.00 | 0.00 |
| New mine restoration management area | 1.28 | 2188 | 4065.00 | 103.00 | 0.53 | 0.47 | **+** | 0.53 | 0.67 |
| Growth quality（Weights=9.2%） | Per capita GDP growth rate | 1.83 | 7.115861 | 26.72 | 1.49 | 0.22 | 0.78 | **+** | 0.22 | 0.41 |
| Resident per capita disposable income | 1.83 | 28,440 | 28,440 | 10763 | 1.00 | 0.00 | **+** | 1.00 | 1.83 |
| The added value of tertiary industry as a share of GDP | 1.83 | 42.34636 | 42.35 | 34.66 | 1.00 | 0.00 | **+** | 1.00 | 1.83 |
| The value added of strategic emerging industries as a share of GDP | 1.83 | 47.5 | 47.60 | 32.40 | 0.99 | 0.01 | **+** | 0.99 | 1.82 |
| Research and experimental development expenditures as a share of GDP | 1.83 | 2.162702 | 2.32 | 1.96 | 0.57 | 0.43 | **+** | 0.57 | 1.03 |
| Green Life（Weights=9.2%） | Per capita daily water consumption | 1.31 | 159.3 | 179.50 | 154.10 | 0.20 | 0.80 | **-** | 0.80 | 1.04 |
| Per capita park green area | 1.31 | 12.3 | 12.60 | 8.00 | 0.93 | 0.07 | **+** | 0.93 | 1.22 |
| Green travel (public transport passenger traffic per 10,000 population) | 1.31 | 26.94 | 26.94 | 15.98 | 1.00 | 0.00 | **+** | 1.00 | 1.31 |
| Urban built-up area green rate | 1.31 | 34.2 | 34.40 | 30.39 | 0.95 | 0.05 | **+** | 0.95 | 1.24 |
| Rural tap water penetration rate | 2.73 | 56.1 | 56.10 | 33.20 | 1.00 | 0.00 | **+** | 1.00 | 2.73 |
| Rural health toilet penetration rate | 1.31 | 57.6 | 57.60 | 35.00 | 1.00 | 0.00 | **+** | 1.00 | 1.31 |
| GDI |  |  |  |  |  |  |  |  |  | 64.97 |

## D Calculation results

Table. D1 Changes of per capita ecological footprint of Shaanxi province from 2007 to 2016

Unit：ha/cap

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ecological footprint account | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Biological resource account | Agricultural products（arable land） | 0.299  | 0.319  | 0.339  | 0.352  | 0.356  | 0.375  | 0.367  | 0.362  | 0.373  | 0.373  |
| Forest products (forest land) | 0.024  | 0.028  | 0.030  | 0.032  | 0.037  | 0.040  | 0.041  | 0.044  | 0.046  | 0.049  |
| Grass product (grass) | 0.217  | 0.250  | 0.227  | 0.232  | 0.228  | 0.240  | 0.248  | 0.256  | 0.254  | 0.247  |
| Aquatic products (waters) | 0.017  | 0.019  | 0.019  | 0.021  | 0.028  | 0.036  | 0.047  | 0.047  | 0.059  | 0.062  |
| Total | 0.557  | 0.616  | 0.615  | 0.637  | 0.648  | 0.691  | 0.703  | 0.709  | 0.733  | 0.730  |
| Pollution discharge account | Water pollution | 0.073  | 0.076  | 0.081  | 0.087  | 0.089  | 0.094  | 0.096  | 0.106  | 0.121  | 0.120  |
| Air Pollution | 0.255  | 0.243  | 0.223  | 0.214  | 0.252  | 0.226  | 0.213  | 0.202  | 0.179  | 0.057  |
| Solid waste pollution | 0.152  | 0.168  | 0.154  | 0.194  | 0.199  | 0.200  | 0.207  | 0.239  | 0.255  | 0.236  |
| Total（Contaminated area） | 0.480  | 0.487  | 0.458  | 0.495  | 0.540  | 0.520  | 0.516  | 0.547  | 0.555  | 0.413  |
| Energy consumption account | Coal（Fossil energy land） | 0.656  | 0.678  | 0.749  | 0.768  | 0.861  | 0.949  | 1.001  | 1.057  | 1.103  | 1.178  |
| Oil（Fossil energy land） | 0.221  | 0.283  | 0.292  | 0.298  | 0.302  | 0.328  | 0.344  | 0.351  | 0.321  | 0.246  |
| natural gas（Fossil energy land） | 0.077  | 0.099  | 0.095  | 0.107  | 0.118  | 0.116  | 0.130  | 0.143  | 0.158  | 0.181  |
| Hydropower（Building land） | 0.003  | 0.004  | 0.005  | 0.007  | 0.007  | 0.007  | 0.009  | 0.010  | 0.013  | 0.012  |
| Total | 0.958  | 1.065  | 1.141  | 1.181  | 1.288  | 1.400  | 1.484  | 1.560  | 1.594  | 1.617  |
| Total |  | 1.994  | 2.168  | 2.214  | 2.313  | 2.477  | 2.611  | 2.703  | 2.816  | 2.883  | 2.760  |

Table D2 2016 Shaanxi GDI Calculation Table

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Per Capita Ecological Capacity | 1.212  | 1.208  | 1.264  | 1.276  | 1.272  | 1.271  | 1.267  | 1.272  | 1.267  | 1.260  |
| Per Capita Ecological Deficit | 0.782  | 0.960  | 0.950  | 1.037  | 1.204  | 1.340  | 1.435  | 1.544  | 1.616  | 1.500  |
| Ecological Pressure Index | 1.645  | 1.794  | 1.752  | 1.813  | 1.947  | 2.054  | 2.133  | 2.214  | 2.276  | 2.190  |

Table. D3 2007-2016 Shaanxi Green Development Index Calculation Results

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Green development index | 42.77  | 46.29  | 46.82  | 52.46  | 45.45  | 50.50  | 58.28  | 49.32  | 62.16  | 64.97  |
| Resource utilization index | 18.19  | 19.31  | 14.41  | 18.38  | 16.61  | 14.13  | 14.26  | 8.98  | 9.76  | 13.31  |
| Environmental governance index | 6.09  | 6.36  | 8.29  | 8.90  | 2.88  | 10.33  | 10.88  | 11.04  | 12.37  | 15.59  |
| Environmental quality index | 12.62  | 13.94  | 13.35  | 7.78  | 8.26  | 8.67  | 12.19  | 6.88  | 12.58  | 8.62  |
| Ecological protection index | 0.54  | 1.35  | 2.56  | 9.98  | 10.06  | 10.03  | 12.58  | 12.17  | 12.19  | 11.67  |
| Growth quality index | 4.06  | 3.33  | 5.30  | 3.62  | 2.60  | 2.17  | 3.13  | 3.12  | 6.15  | 6.92  |
| Green life index | 1.29  | 2.01  | 2.91  | 3.79  | 5.02  | 5.17  | 5.24  | 7.13  | 9.11  | 8.86  |