**Supplementary materials**

**Table captions:**

Table S1 Nitrogen and phosphorus nutrient demands to reach 100 kg in crop yields

Table S2 Total nitrogen content of cultivated land in 11 municipal districts

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**Table S1 Nitrogen and phosphorus nutrient demands to reach 100 kg in crop yields**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Nitrogen** | **Phosphorus** | **Name** | **Nitrogen** | **Phosphorus** |
| **(kg)** | **(kg)** | **(kg)** | **(kg)** |
| Rice | 2.20 | 0.80 | Tobacco | 3.85 | 0.53 |
| Wheat | 3.00 | 1.00 | Vegetables | 0.36 | 0.088 |
| Corn | 2.30 | 0.30 | Watermelon | 0.80 | 0.33 |
| Millet | 3.80 | 0.44 | Melon | 0.30 | 0.15 |
| Beans | 7.20 | 0.75 | Strawberry | 0.35 | 0.17 |
| Potato | 0.50 | 0.088 | Tea | 6.40 | 0.88 |
| Oil crop | 7.19 | 0.88 | Citrus | 0.60 | 0.11 |
| Cotton | 11.70 | 3.04 | Pear | 0.47 | 0.23 |
| Cane | 0.18 | 0.016 | Grape | 0.74 | 0.51 |

**Table S2 Total nitrogen content of cultivated land in 11 municipal districts**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| City | Number of samples | Maximum(g·kg-1) | Minimum(g·kg-1) | Mean(g·kg-1) | SD(g·kg-1) | CV（%) |
| Fuzhou | 1714 | 3.43 | 0.36 | 1.69 | 0.0484 | 28.66 |
| Ganzhou | 2920 | 3.52 | 0.33 | 1.47 | 0.0474 | 32.32 |
| Ji'an | 2408 | 3.06 | 0.47 | 1.58 | 0.0418 | 26.43 |
| Jingdezhen | 495 | 3.3 | 0.56 | 1.67 | 0.0423 | 25.29 |
| Jiujiang | 1600 | 3.14 | 0.26 | 1.22 | 0.0454 | 37.34 |
| Nanchang | 1267 | 3.18 | 0.42 | 1.75 | 0.0476 | 27.22 |
| Pingxiang | 508 | 3.42 | 0.55 | 1.91 | 0.0519 | 27.2 |
| Shangrao | 2389 | 3.32 | 0.36 | 1.6 | 0.0458 | 28.64 |
| Xinyu | 443 | 3.57 | 0.46 | 1.99 | 0.0551 | 27.66 |
| Yichun | 1928 | 3.21 | 0.35 | 1.65 | 0.0461 | 27.89 |
| Yingtan | 523 | 2.78 | 0.37 | 1.61 | 0.0476 | 29.69 |

**Table S3 Recommended value of fertilizer supply ratio for different nitrogen and phosphorus levels**

|  |  |  |  |
| --- | --- | --- | --- |
| Soil nitrogen and phosphorus nutrient classification | I | II | III |
| Percentage of fertilization supply | 35% | 45% | 55% |
| Total nitrogen content（g·kg-1） | Field crops | >1.0 | 0.8~1.0 | <0.8 |
| Paddy field | >1.2 | 1.0~1.2 | <1.0 |
| Vegetable field | >1.2 | 1.0~1.2 | <1.0 |
| Orchard | >1.0 | 0.8~1.0 | <0.8 |
| Soil available phosphorus content（mg·kg-1） | >40 | 20~40 | <20 |

**Table S4 Available phosphorus content of cultivated soil**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Content range (mg·kg-1)Percentage of fertilization supply | I | II | III | Sum |
| >40 | 20~40 | 10~20 |  |
| 35% | 45% | 55% | $$FP\_{P}$$ |
| Fuzhou | 0.18 | 0.61 | 0.21 | 45.34% |
| Ganzhou | 0.15 | 0.45 | 0.39 | 47.40% |
| Ji'an | 0.10 | 0.40 | 0.50 | 49.00% |
| Jingdezhen | 0.49 | 0.39 | 0.12 | 41.23% |
| Jiujiang | 0.00 | 0.39 | 0.61 | 51.14% |
| Nanchang | 0.08 | 0.74 | 0.18 | 45.99% |
| Pingxiang | 0.07 | 0.45 | 0.47 | 48.99% |
| Shangrao | 0.05 | 0.31 | 0.64 | 50.91% |
| Xinyu | 0.00 | 0.08 | 0.92 | 54.16% |
| Yichun | 0.01 | 0.64 | 0.35 | 48.44% |
| Yingtan | 0.00 | 0.47 | 0.53 | 50.30% |
| Average percentage of phosphorus supplied through fertilization  | 48.45% |

**Table S5 Excretion coefficient of livestock and poultry breeding**

|  |  |  |
| --- | --- | --- |
| Species | Nitrogen kg/(ca·a) | Phosphorus kg/(ca·a) |
|  | Manure | Urine | Sum | Manure | Urine | Sum |
| Cattle | 31.909 | 24.893 | 56.802 | 24.93 | 1.494 | 26.424 |
| Pig | 6.132 | 3.285 | 9.417 | 4.38 | 1.341 | 5.721 |
| Sheep | —— | —— | 5.694 | —— | —— | 2.847 |
| Poultry | —— | —— | 0.548 | —— | —— | 0.365 |