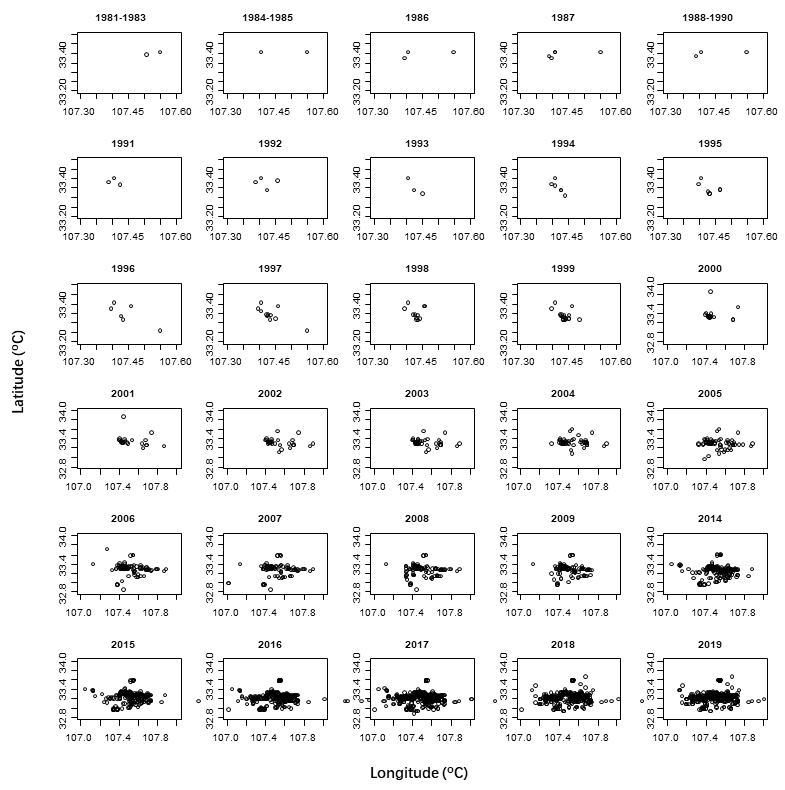
**Supplementary figures and tables**

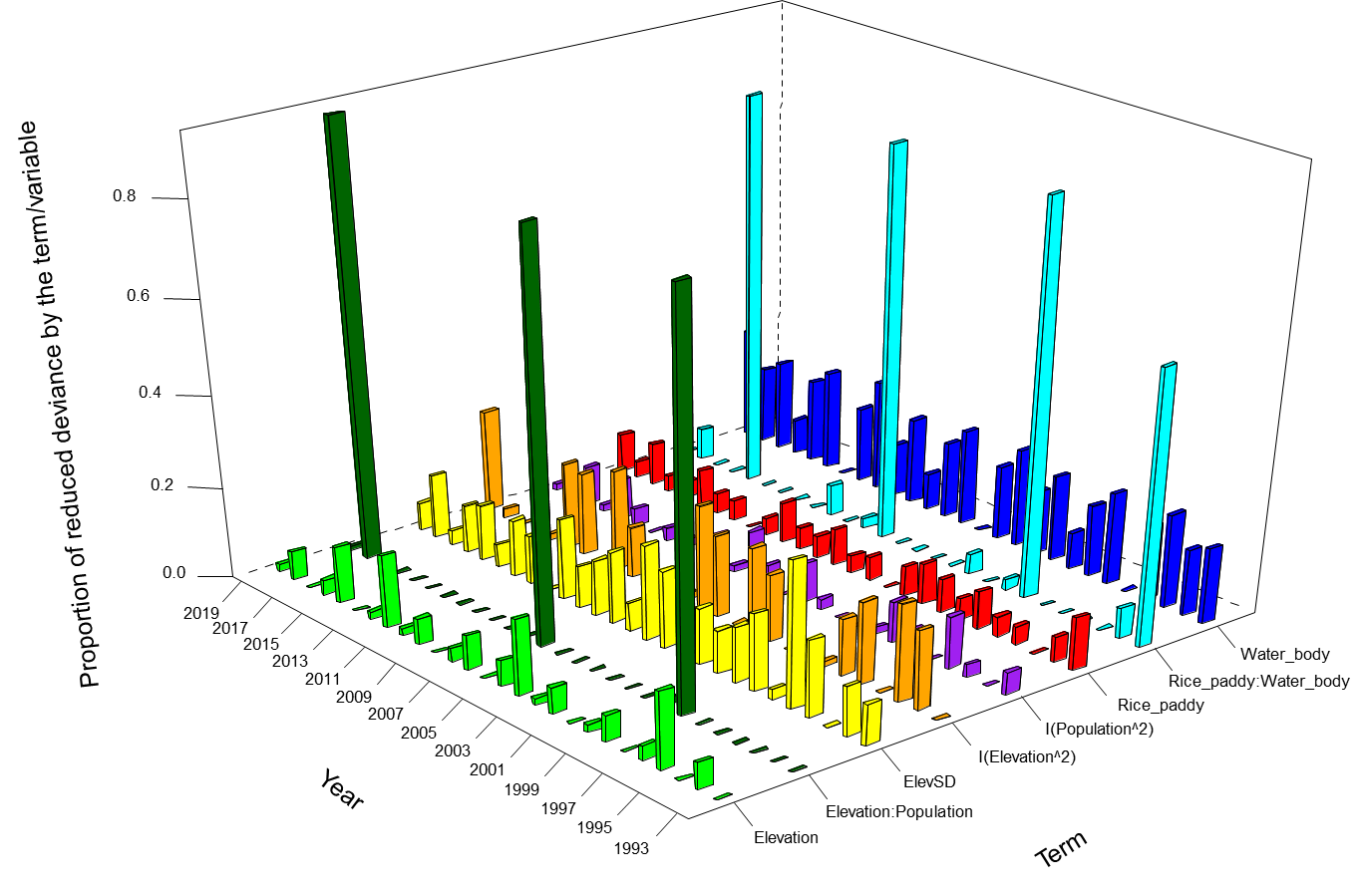
Table S1. The remaining variables and terms after stepwise negative binomial regressions fitting the number of crested ibis nests within watersheds from 1993 to 2019 based on the environmental variables of the watersheds.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Year** | **Df** | **Deviance** | **Resid\_Df** | **Resid\_Dev** | **P value** | **Proportion of decreased deviance** |
| Rice\_paddy | 1993 | 1 | 2.2 | 93 | 25.1 | 0.137 | 0.081 |
| Rice\_paddy:Water\_body | 1993 | 1 | 23.0 | 91 | 0.0 | 0.000 | 0.840 |
| Water\_body | 1993 | 1 | 2.2 | 92 | 23.0 | 0.142 | 0.079 |
| Rice\_paddy | 1994 | 1 | 4.4 | 93 | 50.2 | 0.036 | 0.081 |
| Rice\_paddy:Water\_body | 1994 | 1 | 45.9 | 91 | 0.0 | 0.000 | 0.840 |
| Water\_body | 1994 | 1 | 4.3 | 92 | 45.9 | 0.038 | 0.079 |
| Rice\_paddy | 1995 | 1 | 5.1 | 93 | 58.6 | 0.023 | 0.081 |
| Rice\_paddy:Water\_body | 1995 | 1 | 53.6 | 91 | 0.0 | 0.000 | 0.840 |
| Water\_body | 1995 | 1 | 5.0 | 92 | 53.6 | 0.025 | 0.079 |
| Elevation:Population | 1996 | 1 | 43.8 | 90 | 0.0 | 0.000 | 0.931 |
| ElevSD | 1996 | 1 | 2.9 | 91 | 43.8 | 0.091 | 0.061 |
| Elevation:Population | 1997 | 1 | 77.7 | 90 | 0.0 | 0.000 | 0.865 |
| ElevSD | 1997 | 1 | 10.8 | 91 | 77.7 | 0.001 | 0.120 |
| Elevation:Population | 1998 | 1 | 77.7 | 90 | 0.0 | 0.000 | 0.865 |
| ElevSD | 1998 | 1 | 10.8 | 91 | 77.7 | 0.001 | 0.120 |
| ElevSD | 1999 | 1 | 15.7 | 89 | 90.7 | 0.000 | 0.106 |
| Rice\_paddy | 1999 | 1 | 12.5 | 91 | 127.9 | 0.000 | 0.084 |
| Rice\_paddy:Water\_body | 1999 | 1 | 87.7 | 86 | 2.3 | 0.000 | 0.590 |
| Water\_body | 1999 | 1 | 21.6 | 90 | 106.3 | 0.000 | 0.145 |
| ElevSD | 2000 | 1 | 43.5 | 88 | 55.7 | 0.000 | 0.316 |
| I(Elevation^2) | 2000 | 1 | 17.0 | 87 | 38.6 | 0.000 | 0.124 |
| I(Population^2) | 2000 | 1 | 12.5 | 86 | 26.1 | 0.000 | 0.091 |
| Rice\_paddy | 2000 | 1 | 10.2 | 90 | 118.0 | 0.001 | 0.074 |
| Water\_body | 2000 | 1 | 18.8 | 89 | 99.2 | 0.000 | 0.137 |
| Elevation | 2001 | 1 | 2.7 | 93 | 181.3 | 0.101 | 0.015 |
| ElevSD | 2001 | 1 | 38.1 | 88 | 106.2 | 0.000 | 0.207 |
| I(Elevation^2) | 2001 | 1 | 41.8 | 87 | 64.4 | 0.000 | 0.227 |
| I(Population^2) | 2001 | 1 | 19.4 | 86 | 45.0 | 0.000 | 0.106 |
| Rice\_paddy | 2001 | 1 | 9.2 | 90 | 165.6 | 0.002 | 0.050 |
| Water\_body | 2001 | 1 | 21.3 | 89 | 144.3 | 0.000 | 0.116 |
| Elevation | 2002 | 1 | 2.8 | 93 | 163.8 | 0.094 | 0.017 |
| ElevSD | 2002 | 1 | 20.5 | 88 | 104.6 | 0.000 | 0.123 |
| I(Elevation^2) | 2002 | 1 | 31.1 | 87 | 73.5 | 0.000 | 0.186 |
| I(Population^2) | 2002 | 1 | 14.1 | 86 | 59.4 | 0.000 | 0.085 |
| Rice\_paddy | 2002 | 1 | 6.2 | 90 | 152.8 | 0.013 | 0.037 |
| Water\_body | 2002 | 1 | 27.7 | 89 | 125.1 | 0.000 | 0.166 |
| Elevation | 2003 | 1 | 3.9 | 93 | 227.7 | 0.050 | 0.017 |
| ElevSD | 2003 | 1 | 24.9 | 88 | 146.2 | 0.000 | 0.108 |
| I(Elevation^2) | 2003 | 1 | 48.8 | 87 | 97.4 | 0.000 | 0.211 |
| I(Population^2) | 2003 | 1 | 26.2 | 86 | 71.2 | 0.000 | 0.113 |
| Rice\_paddy | 2003 | 1 | 10.0 | 90 | 207.4 | 0.002 | 0.043 |
| Water\_body | 2003 | 1 | 36.3 | 89 | 171.1 | 0.000 | 0.157 |
| Elevation | 2004 | 1 | 2.8 | 93 | 163.8 | 0.094 | 0.017 |
| ElevSD | 2004 | 1 | 20.5 | 88 | 104.6 | 0.000 | 0.123 |
| I(Elevation^2) | 2004 | 1 | 31.1 | 87 | 73.5 | 0.000 | 0.186 |
| I(Population^2) | 2004 | 1 | 14.1 | 86 | 59.4 | 0.000 | 0.085 |
| Rice\_paddy | 2004 | 1 | 6.2 | 90 | 152.8 | 0.013 | 0.037 |
| Water\_body | 2004 | 1 | 27.7 | 89 | 125.1 | 0.000 | 0.166 |
| Elevation | 2005 | 1 | 11.2 | 93 | 381.6 | 0.001 | 0.028 |
| ElevSD | 2005 | 1 | 69.5 | 88 | 213.2 | 0.000 | 0.177 |
| I(Elevation^2) | 2005 | 1 | 85.7 | 87 | 127.6 | 0.000 | 0.218 |
| I(Population^2) | 2005 | 1 | 11.4 | 86 | 116.2 | 0.001 | 0.029 |
| Rice\_paddy | 2005 | 1 | 17.8 | 90 | 354.6 | 0.000 | 0.045 |
| Water\_body | 2005 | 1 | 71.9 | 89 | 282.7 | 0.000 | 0.183 |
| Elevation | 2006 | 1 | 17.5 | 93 | 495.0 | 0.000 | 0.034 |
| ElevSD | 2006 | 1 | 72.1 | 88 | 294.2 | 0.000 | 0.141 |
| I(Elevation^2) | 2006 | 1 | 115.3 | 87 | 178.9 | 0.000 | 0.225 |
| I(Population^2) | 2006 | 1 | 25.4 | 86 | 153.5 | 0.000 | 0.050 |
| Rice\_paddy | 2006 | 1 | 27.8 | 90 | 449.5 | 0.000 | 0.054 |
| Water\_body | 2006 | 1 | 83.2 | 89 | 366.3 | 0.000 | 0.162 |
| Elevation | 2007 | 1 | 16.0 | 93 | 490.6 | 0.000 | 0.032 |
| ElevSD | 2007 | 1 | 84.7 | 88 | 272.4 | 0.000 | 0.167 |
| Rice\_paddy | 2007 | 1 | 32.7 | 90 | 439.0 | 0.000 | 0.065 |
| Water\_body | 2007 | 1 | 81.9 | 89 | 357.1 | 0.000 | 0.162 |
| Elevation | 2008 | 1 | 30.1 | 93 | 488.0 | 0.000 | 0.058 |
| ElevSD | 2008 | 1 | 81.3 | 88 | 292.6 | 0.000 | 0.157 |
| I(Population^2) | 2008 | 1 | 32.3 | 87 | 260.3 | 0.000 | 0.062 |
| Rice\_paddy | 2008 | 1 | 19.1 | 90 | 459.9 | 0.000 | 0.037 |
| Water\_body | 2008 | 1 | 86.0 | 89 | 373.9 | 0.000 | 0.166 |
| Elevation | 2009 | 1 | 2.8 | 93 | 163.8 | 0.094 | 0.017 |
| ElevSD | 2009 | 1 | 20.5 | 88 | 104.6 | 0.000 | 0.123 |
| I(Elevation^2) | 2009 | 1 | 31.1 | 87 | 73.5 | 0.000 | 0.186 |
| I(Population^2) | 2009 | 1 | 14.1 | 86 | 59.4 | 0.000 | 0.085 |
| Rice\_paddy | 2009 | 1 | 6.2 | 90 | 152.8 | 0.013 | 0.037 |
| Water\_body | 2009 | 1 | 27.7 | 89 | 125.1 | 0.000 | 0.166 |
| Elevation | 2010 | 1 | 36.0 | 93 | 581.5 | 0.000 | 0.058 |
| ElevSD | 2010 | 1 | 103.8 | 88 | 330.5 | 0.000 | 0.168 |
| I(Elevation^2) | 2010 | 1 | 109.9 | 87 | 220.5 | 0.000 | 0.178 |
| I(Population^2) | 2010 | 1 | 28.7 | 86 | 191.8 | 0.000 | 0.046 |
| Rice\_paddy | 2010 | 1 | 29.0 | 90 | 550.6 | 0.000 | 0.047 |
| Rice\_paddy:Water\_body | 2010 | 1 | 13.8 | 69 | 0.0 | 0.000 | 0.022 |
| Water\_body | 2010 | 1 | 116.3 | 89 | 434.3 | 0.000 | 0.188 |
| Elevation | 2011 | 1 | 36.0 | 93 | 581.5 | 0.000 | 0.058 |
| ElevSD | 2011 | 1 | 103.8 | 88 | 330.5 | 0.000 | 0.168 |
| I(Elevation^2) | 2011 | 1 | 109.9 | 87 | 220.5 | 0.000 | 0.178 |
| I(Population^2) | 2011 | 1 | 28.7 | 86 | 191.8 | 0.000 | 0.046 |
| Rice\_paddy | 2011 | 1 | 29.0 | 90 | 550.6 | 0.000 | 0.047 |
| Rice\_paddy:Water\_body | 2011 | 1 | 13.8 | 69 | 0.0 | 0.000 | 0.022 |
| Water\_body | 2011 | 1 | 116.3 | 89 | 434.3 | 0.000 | 0.188 |
| Elevation | 2012 | 1 | 36.5 | 93 | 612.5 | 0.000 | 0.056 |
| ElevSD | 2012 | 1 | 67.8 | 88 | 389.5 | 0.000 | 0.104 |
| I(Elevation^2) | 2012 | 1 | 116.4 | 87 | 273.1 | 0.000 | 0.179 |
| I(Population^2) | 2012 | 1 | 24.9 | 86 | 248.2 | 0.000 | 0.038 |
| Rice\_paddy | 2012 | 1 | 24.8 | 90 | 583.9 | 0.000 | 0.038 |
| Water\_body | 2012 | 1 | 126.6 | 89 | 457.3 | 0.000 | 0.195 |
| Elevation | 2013 | 1 | 44.4 | 93 | 660.0 | 0.000 | 0.063 |
| Elevation:Population | 2013 | 1 | 7.6 | 83 | 196.1 | 0.006 | 0.011 |
| ElevSD | 2013 | 1 | 63.3 | 88 | 423.1 | 0.000 | 0.090 |
| I(Elevation^2) | 2013 | 1 | 122.0 | 87 | 301.1 | 0.000 | 0.173 |
| I(Population^2) | 2013 | 1 | 19.3 | 86 | 281.8 | 0.000 | 0.027 |
| Rice\_paddy | 2013 | 1 | 28.3 | 90 | 627.3 | 0.000 | 0.040 |
| Water\_body | 2013 | 1 | 141.0 | 89 | 486.4 | 0.000 | 0.200 |
| Elevation | 2014 | 1 | 43.5 | 93 | 708.7 | 0.000 | 0.058 |
| Elevation:Population | 2014 | 1 | 12.9 | 83 | 213.1 | 0.000 | 0.017 |
| ElevSD | 2014 | 1 | 70.3 | 88 | 436.3 | 0.000 | 0.093 |
| I(Elevation^2) | 2014 | 1 | 110.4 | 87 | 325.9 | 0.000 | 0.147 |
| I(Population^2) | 2014 | 1 | 18.3 | 86 | 307.6 | 0.000 | 0.024 |
| Rice\_paddy | 2014 | 1 | 39.0 | 90 | 665.1 | 0.000 | 0.052 |
| Water\_body | 2014 | 1 | 158.5 | 89 | 506.6 | 0.000 | 0.211 |
| Elevation | 2015 | 1 | 63.2 | 93 | 786.2 | 0.000 | 0.074 |
| ElevSD | 2015 | 1 | 76.0 | 88 | 482.6 | 0.000 | 0.090 |
| I(Elevation^2) | 2015 | 1 | 94.7 | 87 | 387.9 | 0.000 | 0.111 |
| I(Population^2) | 2015 | 1 | 14.3 | 86 | 373.6 | 0.000 | 0.017 |
| Rice\_paddy | 2015 | 1 | 38.2 | 90 | 742.7 | 0.000 | 0.045 |
| Water\_body | 2015 | 1 | 184.1 | 89 | 558.6 | 0.000 | 0.217 |
| Elevation | 2016 | 1 | 35.9 | 93 | 251.2 | 0.000 | 0.125 |
| ElevSD | 2016 | 1 | 9.2 | 88 | 148.7 | 0.002 | 0.032 |
| I(Elevation^2) | 2016 | 1 | 5.6 | 87 | 143.1 | 0.018 | 0.020 |
| I(Population^2) | 2016 | 1 | 4.0 | 86 | 139.1 | 0.046 | 0.014 |
| Rice\_paddy | 2016 | 1 | 33.1 | 90 | 216.7 | 0.000 | 0.115 |
| Rice\_paddy:Water\_body | 2016 | 1 | 19.1 | 76 | 53.3 | 0.000 | 0.067 |
| Water\_body | 2016 | 1 | 58.8 | 89 | 157.9 | 0.000 | 0.205 |
| Elevation | 2017 | 1 | 60.2 | 93 | 298.3 | 0.000 | 0.168 |
| ElevSD | 2017 | 1 | 8.3 | 88 | 174.7 | 0.004 | 0.023 |
| I(Elevation^2) | 2017 | 1 | 4.4 | 87 | 170.3 | 0.036 | 0.012 |
| I(Population^2) | 2017 | 1 | 5.5 | 86 | 164.7 | 0.019 | 0.015 |
| Rice\_paddy | 2017 | 1 | 32.2 | 90 | 259.8 | 0.000 | 0.090 |
| Rice\_paddy:Water\_body | 2017 | 1 | 15.6 | 75 | 67.1 | 0.000 | 0.044 |
| Water\_body | 2017 | 1 | 76.9 | 89 | 183.0 | 0.000 | 0.214 |
| Elevation | 2018 | 1 | 58.1 | 93 | 292.2 | 0.000 | 0.166 |
| ElevSD | 2018 | 1 | 21.5 | 88 | 148.3 | 0.000 | 0.061 |
| I(Elevation^2) | 2018 | 1 | 4.5 | 87 | 143.9 | 0.034 | 0.013 |
| I(Population^2) | 2018 | 1 | 4.1 | 86 | 139.8 | 0.043 | 0.012 |
| Rice\_paddy | 2018 | 1 | 30.6 | 90 | 254.6 | 0.000 | 0.087 |
| Rice\_paddy:Water\_body | 2018 | 1 | 23.0 | 77 | 74.5 | 0.000 | 0.066 |
| Water\_body | 2018 | 1 | 84.8 | 89 | 169.9 | 0.000 | 0.242 |
| Elevation | 2019 | 1 | 50.1 | 93 | 265.1 | 0.000 | 0.159 |
| ElevSD | 2019 | 1 | 16.5 | 88 | 133.1 | 0.000 | 0.052 |
| I(Elevation^2) | 2019 | 1 | 3.3 | 87 | 129.8 | 0.070 | 0.010 |
| I(Population^2) | 2019 | 1 | 4.3 | 86 | 125.4 | 0.037 | 0.014 |
| Rice\_paddy | 2019 | 1 | 29.4 | 90 | 224.9 | 0.000 | 0.093 |
| Rice\_paddy:Water\_body | 2019 | 1 | 21.8 | 77 | 68.7 | 0.000 | 0.069 |
| Water\_body | 2019 | 1 | 75.4 | 89 | 149.6 | 0.000 | 0.239 |

Table S2. The remaining variables and terms after stepwise negative binomial regressions fitting the number of crested ibis nests within watersheds from 1993 to 2019 based on the environmental variables of the watersheds.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable/term** | **Year** | **SS** | **Df** | **F\_value** | **P value** | **Proportion of explained variance** |
| Elevation | 1993 | 0.58 | 1 | 8.49 | 0.005 | 0.050 |
| Elevation:Rice\_paddy | 1993 | 0.82 | 1 | 11.98 | 0.001 | 0.070 |
| I(ElevSD^2) | 1993 | 0.45 | 1 | 6.60 | 0.012 | 0.039 |
| Rice\_paddy | 1993 | 0.31 | 1 | 4.48 | 0.038 | 0.026 |
| Rice\_paddy:ElevSD | 1993 | 0.62 | 1 | 9.02 | 0.004 | 0.053 |
| Rice\_paddy:Water\_body | 1993 | 1.12 | 1 | 16.43 | 0.000 | 0.096 |
| Water\_body | 1993 | 0.23 | 1 | 3.41 | 0.069 | 0.020 |
| Water\_body:ElevSD | 1993 | 0.54 | 1 | 7.94 | 0.006 | 0.047 |
| Elevation | 1994 | 2.32 | 1 | 8.49 | 0.005 | 0.050 |
| Elevation:Rice\_paddy | 1994 | 3.28 | 1 | 11.98 | 0.001 | 0.070 |
| I(ElevSD^2) | 1994 | 1.81 | 1 | 6.60 | 0.012 | 0.039 |
| Rice\_paddy | 1994 | 1.22 | 1 | 4.48 | 0.038 | 0.026 |
| Rice\_paddy:ElevSD | 1994 | 2.47 | 1 | 9.02 | 0.004 | 0.053 |
| Rice\_paddy:Water\_body | 1994 | 4.50 | 1 | 16.43 | 0.000 | 0.096 |
| Water\_body | 1994 | 0.93 | 1 | 3.41 | 0.069 | 0.020 |
| Water\_body:ElevSD | 1994 | 2.17 | 1 | 7.94 | 0.006 | 0.047 |
| Elevation | 1995 | 3.16 | 1 | 8.49 | 0.005 | 0.050 |
| Elevation:Rice\_paddy | 1995 | 4.46 | 1 | 11.98 | 0.001 | 0.070 |
| I(ElevSD^2) | 1995 | 2.46 | 1 | 6.60 | 0.012 | 0.039 |
| Rice\_paddy | 1995 | 1.67 | 1 | 4.48 | 0.038 | 0.026 |
| Rice\_paddy:ElevSD | 1995 | 3.36 | 1 | 9.02 | 0.004 | 0.053 |
| Rice\_paddy:Water\_body | 1995 | 6.12 | 1 | 16.43 | 0.000 | 0.096 |
| Water\_body | 1995 | 1.27 | 1 | 3.41 | 0.069 | 0.020 |
| Water\_body:ElevSD | 1995 | 2.96 | 1 | 7.94 | 0.006 | 0.047 |
| Elevation | 1996 | 0.87 | 1 | 6.32 | 0.014 | 0.033 |
| Elevation:Rice\_paddy | 1996 | 0.95 | 1 | 6.95 | 0.010 | 0.037 |
| Population | 1996 | 0.68 | 1 | 4.93 | 0.029 | 0.026 |
| Rice\_paddy | 1996 | 0.54 | 1 | 3.92 | 0.051 | 0.021 |
| Rice\_paddy:ElevSD | 1996 | 0.65 | 1 | 4.73 | 0.033 | 0.025 |
| Rice\_paddy:Water\_body | 1996 | 2.61 | 1 | 19.05 | 0.000 | 0.101 |
| Water\_body | 1996 | 0.55 | 1 | 4.03 | 0.048 | 0.021 |
| Water\_body:ElevSD | 1996 | 1.17 | 1 | 8.57 | 0.004 | 0.045 |
| Elevation | 1997 | 2.93 | 1 | 4.88 | 0.030 | 0.028 |
| Elevation:Rice\_paddy | 1997 | 5.32 | 1 | 8.85 | 0.004 | 0.051 |
| I(ElevSD^2) | 1997 | 1.52 | 1 | 2.53 | 0.116 | 0.015 |
| Population | 1997 | 2.11 | 1 | 3.51 | 0.065 | 0.020 |
| Rice\_paddy | 1997 | 2.40 | 1 | 3.99 | 0.049 | 0.023 |
| Rice\_paddy:ElevSD | 1997 | 4.05 | 1 | 6.73 | 0.011 | 0.039 |
| Rice\_paddy:Water\_body | 1997 | 11.78 | 1 | 19.59 | 0.000 | 0.114 |
| Water\_body | 1997 | 2.10 | 1 | 3.49 | 0.065 | 0.020 |
| Water\_body:ElevSD | 1997 | 6.22 | 1 | 10.33 | 0.002 | 0.060 |
| Elevation | 1998 | 2.93 | 1 | 4.88 | 0.030 | 0.028 |
| Elevation:Rice\_paddy | 1998 | 5.32 | 1 | 8.85 | 0.004 | 0.051 |
| I(ElevSD^2) | 1998 | 1.52 | 1 | 2.53 | 0.116 | 0.015 |
| Population | 1998 | 2.11 | 1 | 3.51 | 0.065 | 0.020 |
| Rice\_paddy | 1998 | 2.40 | 1 | 3.99 | 0.049 | 0.023 |
| Rice\_paddy:ElevSD | 1998 | 4.05 | 1 | 6.73 | 0.011 | 0.039 |
| Rice\_paddy:Water\_body | 1998 | 11.78 | 1 | 19.59 | 0.000 | 0.114 |
| Water\_body | 1998 | 2.10 | 1 | 3.49 | 0.065 | 0.020 |
| Water\_body:ElevSD | 1998 | 6.22 | 1 | 10.33 | 0.002 | 0.060 |
| Elevation | 1999 | 7.51 | 1 | 3.92 | 0.051 | 0.022 |
| Elevation:Rice\_paddy | 1999 | 23.81 | 1 | 12.43 | 0.001 | 0.071 |
| I(ElevSD^2) | 1999 | 13.34 | 1 | 6.96 | 0.010 | 0.040 |
| Rice\_paddy | 1999 | 9.92 | 1 | 5.18 | 0.026 | 0.030 |
| Rice\_paddy:ElevSD | 1999 | 16.85 | 1 | 8.80 | 0.004 | 0.050 |
| Rice\_paddy:Water\_body | 1999 | 35.56 | 1 | 18.56 | 0.000 | 0.106 |
| Water\_body | 1999 | 9.37 | 1 | 4.89 | 0.030 | 0.028 |
| Water\_body:ElevSD | 1999 | 14.61 | 1 | 7.63 | 0.007 | 0.044 |
| Elevation | 2000 | 11.67 | 1 | 8.23 | 0.005 | 0.045 |
| Elevation:Rice\_paddy | 2000 | 18.60 | 1 | 13.11 | 0.001 | 0.072 |
| I(ElevSD^2) | 2000 | 9.75 | 1 | 6.87 | 0.010 | 0.038 |
| Rice\_paddy | 2000 | 7.46 | 1 | 5.26 | 0.024 | 0.029 |
| Rice\_paddy:ElevSD | 2000 | 13.94 | 1 | 9.83 | 0.002 | 0.054 |
| Rice\_paddy:Water\_body | 2000 | 30.73 | 1 | 21.66 | 0.000 | 0.119 |
| Water\_body | 2000 | 6.35 | 1 | 4.48 | 0.037 | 0.024 |
| Water\_body:ElevSD | 2000 | 12.50 | 1 | 8.82 | 0.004 | 0.048 |
| Elevation | 2001 | 11.15 | 1 | 4.73 | 0.033 | 0.026 |
| Elevation:Rice\_paddy | 2001 | 33.87 | 1 | 14.36 | 0.000 | 0.078 |
| I(ElevSD^2) | 2001 | 11.66 | 1 | 4.94 | 0.029 | 0.027 |
| Rice\_paddy | 2001 | 14.09 | 1 | 5.97 | 0.017 | 0.032 |
| Rice\_paddy:ElevSD | 2001 | 23.69 | 1 | 10.05 | 0.002 | 0.054 |
| Rice\_paddy:Water\_body | 2001 | 50.68 | 1 | 21.49 | 0.000 | 0.116 |
| Water\_body | 2001 | 16.66 | 1 | 7.06 | 0.010 | 0.038 |
| Water\_body:ElevSD | 2001 | 16.28 | 1 | 6.90 | 0.010 | 0.037 |
| Elevation | 2002 | 5.91 | 1 | 3.70 | 0.058 | 0.020 |
| Elevation:Rice\_paddy | 2002 | 22.43 | 1 | 14.04 | 0.000 | 0.076 |
| I(ElevSD^2) | 2002 | 7.75 | 1 | 4.85 | 0.031 | 0.026 |
| Population | 2002 | 5.56 | 1 | 3.48 | 0.066 | 0.019 |
| Rice\_paddy | 2002 | 10.87 | 1 | 6.80 | 0.011 | 0.037 |
| Rice\_paddy:ElevSD | 2002 | 15.14 | 1 | 9.48 | 0.003 | 0.051 |
| Rice\_paddy:Water\_body | 2002 | 46.11 | 1 | 28.87 | 0.000 | 0.155 |
| Water\_body | 2002 | 3.87 | 1 | 2.42 | 0.124 | 0.013 |
| Water\_body:ElevSD | 2002 | 11.90 | 1 | 7.45 | 0.008 | 0.040 |
| Elevation | 2003 | 13.92 | 1 | 4.90 | 0.030 | 0.026 |
| Elevation:Rice\_paddy | 2003 | 31.07 | 1 | 10.95 | 0.001 | 0.058 |
| I(ElevSD^2) | 2003 | 5.86 | 1 | 2.06 | 0.155 | 0.011 |
| Population | 2003 | 12.45 | 1 | 4.38 | 0.040 | 0.023 |
| Rice\_paddy | 2003 | 15.97 | 1 | 5.63 | 0.020 | 0.030 |
| Rice\_paddy:ElevSD | 2003 | 22.70 | 1 | 8.00 | 0.006 | 0.042 |
| Rice\_paddy:Water\_body | 2003 | 82.30 | 1 | 28.99 | 0.000 | 0.153 |
| Water\_body | 2003 | 12.19 | 1 | 4.29 | 0.042 | 0.023 |
| Water\_body:ElevSD | 2003 | 29.37 | 1 | 10.35 | 0.002 | 0.055 |
| Elevation | 2004 | 40.17 | 1 | 5.56 | 0.021 | 0.031 |
| Elevation:Rice\_paddy | 2004 | 84.92 | 1 | 11.76 | 0.001 | 0.065 |
| I(ElevSD^2) | 2004 | 15.16 | 1 | 2.10 | 0.151 | 0.012 |
| Population | 2004 | 32.30 | 1 | 4.47 | 0.038 | 0.025 |
| Rice\_paddy | 2004 | 39.90 | 1 | 5.53 | 0.021 | 0.030 |
| Rice\_paddy:ElevSD | 2004 | 61.09 | 1 | 8.46 | 0.005 | 0.046 |
| Rice\_paddy:Water\_body | 2004 | 174.92 | 1 | 24.23 | 0.000 | 0.133 |
| Water\_body | 2004 | 23.88 | 1 | 3.31 | 0.073 | 0.018 |
| Water\_body:ElevSD | 2004 | 64.57 | 1 | 8.94 | 0.004 | 0.049 |
| Elevation | 2005 | 33.04 | 1 | 3.69 | 0.058 | 0.019 |
| Elevation:Rice\_paddy | 2005 | 134.08 | 1 | 14.98 | 0.000 | 0.077 |
| I(ElevSD^2) | 2005 | 52.70 | 1 | 5.89 | 0.018 | 0.030 |
| Population | 2005 | 23.76 | 1 | 2.65 | 0.107 | 0.014 |
| Rice\_paddy | 2005 | 66.18 | 1 | 7.39 | 0.008 | 0.038 |
| Rice\_paddy:ElevSD | 2005 | 91.22 | 1 | 10.19 | 0.002 | 0.052 |
| Rice\_paddy:Water\_body | 2005 | 313.72 | 1 | 35.04 | 0.000 | 0.180 |
| Water\_body:ElevSD | 2005 | 83.03 | 1 | 9.27 | 0.003 | 0.048 |
| Elevation | 2006 | 72.84 | 1 | 5.76 | 0.019 | 0.029 |
| Elevation:Rice\_paddy | 2006 | 154.00 | 1 | 12.18 | 0.001 | 0.061 |
| I(ElevSD^2) | 2006 | 32.45 | 1 | 2.57 | 0.113 | 0.013 |
| Population | 2006 | 49.87 | 1 | 3.95 | 0.051 | 0.020 |
| Rice\_paddy | 2006 | 71.14 | 1 | 5.63 | 0.020 | 0.028 |
| Rice\_paddy:ElevSD | 2006 | 119.32 | 1 | 9.44 | 0.003 | 0.047 |
| Rice\_paddy:Water\_body | 2006 | 451.78 | 1 | 35.75 | 0.000 | 0.180 |
| Water\_body | 2006 | 40.56 | 1 | 3.21 | 0.077 | 0.016 |
| Water\_body:ElevSD | 2006 | 133.11 | 1 | 10.53 | 0.002 | 0.053 |
| Elevation | 2007 | 63.43 | 1 | 4.68 | 0.034 | 0.023 |
| Elevation:Rice\_paddy | 2007 | 207.37 | 1 | 15.29 | 0.000 | 0.076 |
| I(ElevSD^2) | 2007 | 72.39 | 1 | 5.34 | 0.024 | 0.027 |
| Population | 2007 | 50.75 | 1 | 3.74 | 0.057 | 0.019 |
| Rice\_paddy | 2007 | 90.76 | 1 | 6.69 | 0.012 | 0.033 |
| Rice\_paddy:ElevSD | 2007 | 145.51 | 1 | 10.73 | 0.002 | 0.054 |
| Rice\_paddy:Water\_body | 2007 | 498.98 | 1 | 36.79 | 0.000 | 0.184 |
| Water\_body:ElevSD | 2007 | 103.36 | 1 | 7.62 | 0.007 | 0.038 |
| Elevation | 2008 | 99.38 | 1 | 7.63 | 0.007 | 0.035 |
| Elevation:Rice\_paddy | 2008 | 190.13 | 1 | 14.59 | 0.000 | 0.067 |
| I(ElevSD^2) | 2008 | 107.83 | 1 | 8.28 | 0.005 | 0.038 |
| Rice\_paddy | 2008 | 92.04 | 1 | 7.06 | 0.010 | 0.032 |
| Rice\_paddy:ElevSD | 2008 | 132.09 | 1 | 10.14 | 0.002 | 0.046 |
| Rice\_paddy:Water\_body | 2008 | 459.90 | 1 | 35.30 | 0.000 | 0.162 |
| Water\_body | 2008 | 102.26 | 1 | 7.85 | 0.006 | 0.036 |
| Water\_body:ElevSD | 2008 | 105.64 | 1 | 8.11 | 0.006 | 0.037 |
| Elevation | 2009 | 112.66 | 1 | 8.65 | 0.004 | 0.036 |
| Elevation:Rice\_paddy | 2009 | 212.34 | 1 | 16.30 | 0.000 | 0.069 |
| I(ElevSD^2) | 2009 | 120.48 | 1 | 9.25 | 0.003 | 0.039 |
| Rice\_paddy | 2009 | 113.84 | 1 | 8.74 | 0.004 | 0.037 |
| Rice\_paddy:ElevSD | 2009 | 141.47 | 1 | 10.86 | 0.001 | 0.046 |
| Rice\_paddy:Water\_body | 2009 | 595.25 | 1 | 45.70 | 0.000 | 0.192 |
| Water\_body | 2009 | 93.45 | 1 | 7.17 | 0.009 | 0.030 |
| Water\_body:ElevSD | 2009 | 100.10 | 1 | 7.68 | 0.007 | 0.032 |
| Elevation | 2010 | 100.81 | 1 | 8.02 | 0.006 | 0.034 |
| Elevation:Rice\_paddy | 2010 | 204.49 | 1 | 16.27 | 0.000 | 0.068 |
| I(ElevSD^2) | 2010 | 96.75 | 1 | 7.70 | 0.007 | 0.032 |
| Rice\_paddy | 2010 | 123.01 | 1 | 9.79 | 0.002 | 0.041 |
| Rice\_paddy:ElevSD | 2010 | 136.23 | 1 | 10.84 | 0.001 | 0.046 |
| Rice\_paddy:Water\_body | 2010 | 753.39 | 1 | 59.95 | 0.000 | 0.252 |
| Water\_body | 2010 | 31.34 | 1 | 2.49 | 0.118 | 0.010 |
| Water\_body:ElevSD | 2010 | 121.98 | 1 | 9.71 | 0.003 | 0.041 |
| Elevation | 2011 | 110.90 | 1 | 11.22 | 0.001 | 0.042 |
| Elevation:Rice\_paddy | 2011 | 165.18 | 1 | 16.71 | 0.000 | 0.063 |
| I(ElevSD^2) | 2011 | 81.83 | 1 | 8.28 | 0.005 | 0.031 |
| Rice\_paddy | 2011 | 138.41 | 1 | 14.00 | 0.000 | 0.052 |
| Rice\_paddy:ElevSD | 2011 | 90.57 | 1 | 9.16 | 0.003 | 0.034 |
| Rice\_paddy:Water\_body | 2011 | 772.88 | 1 | 78.19 | 0.000 | 0.293 |
| Water\_body:ElevSD | 2011 | 91.57 | 1 | 9.26 | 0.003 | 0.035 |
| Elevation | 2012 | 119.32 | 1 | 9.98 | 0.002 | 0.042 |
| Elevation:Rice\_paddy | 2012 | 182.29 | 1 | 15.24 | 0.000 | 0.064 |
| I(ElevSD^2) | 2012 | 59.27 | 1 | 4.95 | 0.029 | 0.021 |
| Rice\_paddy | 2012 | 171.65 | 1 | 14.35 | 0.000 | 0.060 |
| Rice\_paddy:ElevSD | 2012 | 85.42 | 1 | 7.14 | 0.009 | 0.030 |
| Rice\_paddy:Water\_body | 2012 | 858.79 | 1 | 71.80 | 0.000 | 0.299 |
| Water\_body:ElevSD | 2012 | 44.21 | 1 | 3.70 | 0.058 | 0.015 |
| Elevation | 2013 | 116.85 | 1 | 8.18 | 0.005 | 0.037 |
| Elevation:Rice\_paddy | 2013 | 224.71 | 1 | 15.73 | 0.000 | 0.070 |
| I(ElevSD^2) | 2013 | 67.49 | 1 | 4.72 | 0.033 | 0.021 |
| Rice\_paddy | 2013 | 165.82 | 1 | 11.61 | 0.001 | 0.052 |
| Rice\_paddy:ElevSD | 2013 | 127.21 | 1 | 8.90 | 0.004 | 0.040 |
| Rice\_paddy:Water\_body | 2013 | 936.44 | 1 | 65.54 | 0.000 | 0.293 |
| Water\_body:ElevSD | 2013 | 36.16 | 1 | 2.53 | 0.115 | 0.011 |
| Elevation | 2014 | 118.57 | 1 | 7.59 | 0.007 | 0.036 |
| Elevation:Rice\_paddy | 2014 | 161.26 | 1 | 10.33 | 0.002 | 0.049 |
| I(ElevSD^2) | 2014 | 79.42 | 1 | 5.09 | 0.027 | 0.024 |
| Rice\_paddy:ElevSD | 2014 | 178.58 | 1 | 11.44 | 0.001 | 0.054 |
| Rice\_paddy:Water\_body | 2014 | 1026.50 | 1 | 65.74 | 0.000 | 0.313 |
| Elevation | 2015 | 143.13 | 1 | 8.39 | 0.005 | 0.037 |
| Elevation:Rice\_paddy | 2015 | 130.63 | 1 | 7.66 | 0.007 | 0.034 |
| I(ElevSD^2) | 2015 | 87.29 | 1 | 5.12 | 0.026 | 0.023 |
| Rice\_paddy:ElevSD | 2015 | 154.75 | 1 | 9.07 | 0.003 | 0.040 |
| Rice\_paddy:Water\_body | 2015 | 1238.14 | 1 | 72.56 | 0.000 | 0.320 |
| Water\_body | 2015 | 192.45 | 1 | 11.28 | 0.001 | 0.050 |
| Elevation | 2016 | 151.31 | 1 | 8.30 | 0.005 | 0.030 |
| Elevation:Rice\_paddy | 2016 | 128.38 | 1 | 7.04 | 0.010 | 0.026 |
| I(ElevSD^2) | 2016 | 98.97 | 1 | 5.43 | 0.022 | 0.020 |
| Rice\_paddy:ElevSD | 2016 | 119.83 | 1 | 6.57 | 0.012 | 0.024 |
| Rice\_paddy:Water\_body | 2016 | 1979.88 | 1 | 108.58 | 0.000 | 0.394 |
| Water\_body | 2016 | 286.27 | 1 | 15.70 | 0.000 | 0.057 |
| Elevation:Rice\_paddy | 2017 | 256.51 | 1 | 12.13 | 0.001 | 0.035 |
| I(ElevSD^2) | 2017 | 155.92 | 1 | 7.38 | 0.008 | 0.021 |
| Rice\_paddy | 2017 | 298.45 | 1 | 14.12 | 0.000 | 0.040 |
| Rice\_paddy:ElevSD | 2017 | 120.20 | 1 | 5.69 | 0.019 | 0.016 |
| Rice\_paddy:Water\_body | 2017 | 2495.59 | 1 | 118.04 | 0.000 | 0.336 |
| Water\_body | 2017 | 880.82 | 1 | 41.66 | 0.000 | 0.119 |
| Elevation | 2018 | 293.05 | 1 | 10.75 | 0.002 | 0.026 |
| Elevation:Rice\_paddy | 2018 | 220.17 | 1 | 8.08 | 0.006 | 0.019 |
| I(ElevSD^2) | 2018 | 226.07 | 1 | 8.29 | 0.005 | 0.020 |
| Rice\_paddy | 2018 | 429.49 | 1 | 15.75 | 0.000 | 0.038 |
| Rice\_paddy:Water\_body | 2018 | 3384.13 | 1 | 124.12 | 0.000 | 0.295 |
| Water\_body | 2018 | 1437.19 | 1 | 52.71 | 0.000 | 0.125 |
| Elevation | 2019 | 314.35 | 1 | 7.14 | 0.009 | 0.018 |
| Elevation:Rice\_paddy | 2019 | 185.96 | 1 | 4.22 | 0.043 | 0.011 |
| I(ElevSD^2) | 2019 | 236.63 | 1 | 5.37 | 0.023 | 0.014 |
| Rice\_paddy | 2019 | 173.54 | 1 | 3.94 | 0.051 | 0.010 |
| Rice\_paddy:Water\_body | 2019 | 4135.03 | 1 | 93.88 | 0.000 | 0.240 |
| Water\_body | 2019 | 1576.56 | 1 | 35.80 | 0.000 | 0.092 |

**Figure S1.** The locations of nests built by the crested ibis from 1981 to 2019.

Figure S2. Contribution (proportion of deviance decreased) of variables/terms in the negative binomial regressions fitting the number of nests in the watersheds from 1993 to 2019. Figure S3. Variable importance in the random forest model explaining the variance of the number of nests in 95 watersheds in 2019. The variable wetland is the interaction term of areas of rice paddies and areas of water bodies.

Footprint

GDP

Population

Temperature

Precipitation

Elevation

Rice\_paddy

ElevSD

Area

Water\_body

Wetland

0

5

10

15

20

%IncMSE

Footprint

ElevSD

Temperature

GDP

Elevation

Rice\_paddy

Area

Population

Precipitation

Water\_body

Wetland

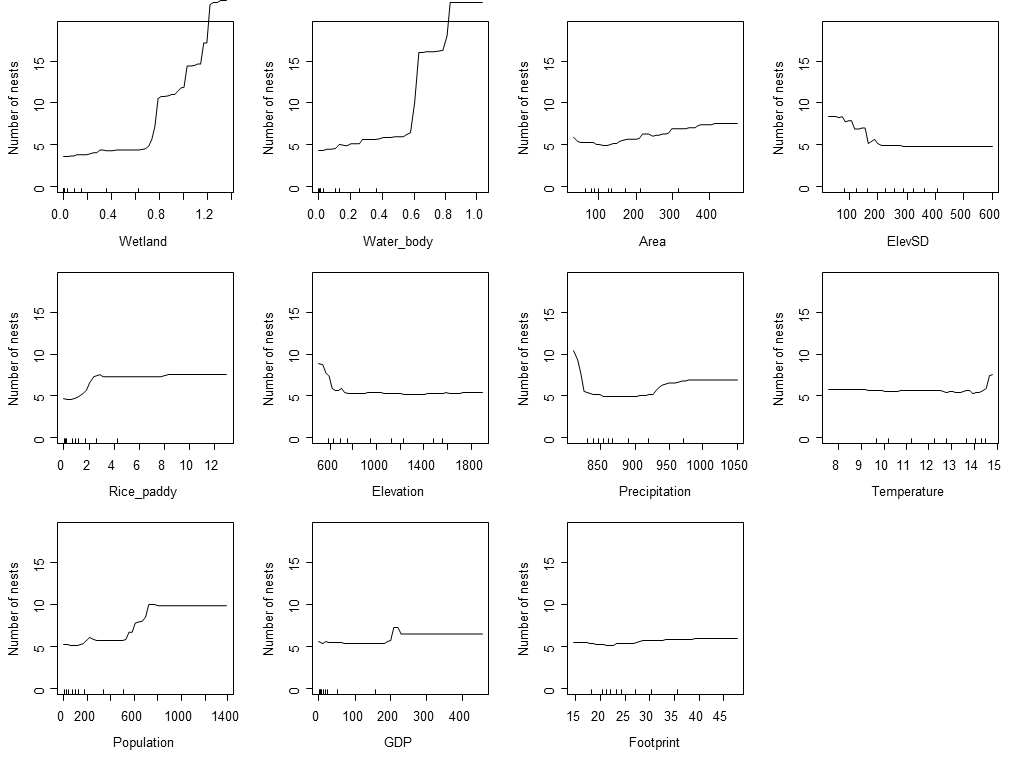
0

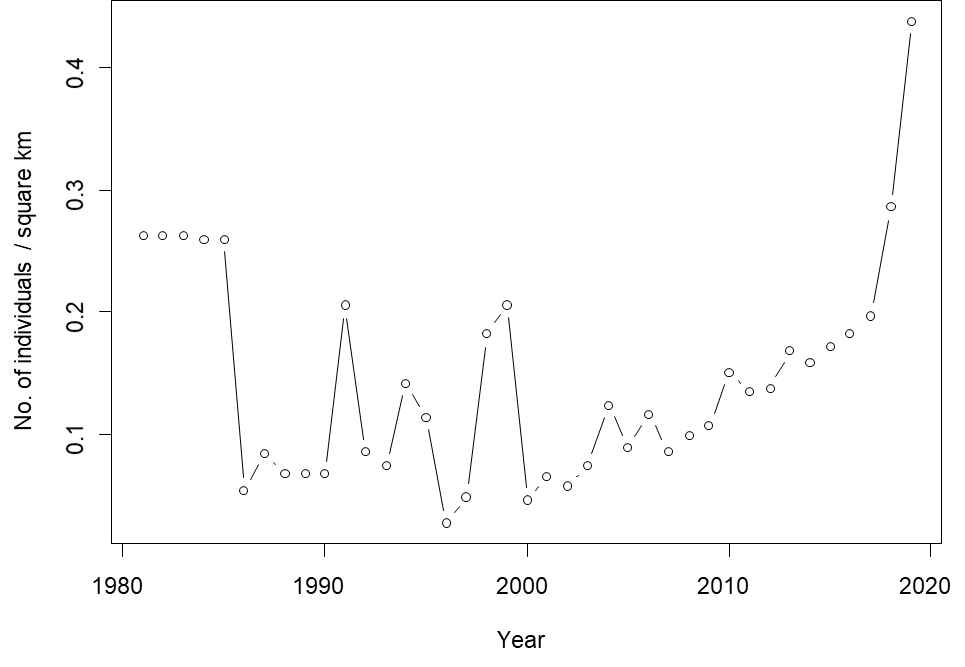
2000

4000

6000

IncNodePurity

Figure S4. Partial effects of each variable on the number of nests in watersheds in 2019 based on the random forest algorithm. The variables were ranked in descending importance order in the plot.

Figure S5. Population density (number of nests per km2) of the crested ibis in Hanzhong, China from 1981 to 2019.