**Supplementary Material**

# Long-term data indicates that supplementary food enhances the number of breeding pairs in a Cape Vulture *Gyps coprotheres* colony

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**Effects of long-term conditions**

Large birds might react to long-term changes in conditions rather than to short-term changes. Thus, we did separate analyses including the amount of food supplied and the amount of rainfall during the entire pre-breeding year (focal year – 1, months January to December) in our analyses. In a first analysis, we tested whether the total amount of supplementary food and total rainfall during the pre-breeding year (years 2001 – 2011) or during the nest-building stage of the focal breeding year (years 2002 – 2012) had an influence on the number of nests in the focal breeding year (years 2002 – 2012) using a generalized linear model (model formula: NumberOfNests~RainPrevYear+FoodPrevYear+RainNestbuilding+FoodNestbuilding). Owing to overdispersion of our model, we used a quasipoisson error structure (Crawley 2007). In a second analysis, we tested whether the amount of supplementary food provided and total rainfall during the pre-breeding year (years 2001 – 2011) or during the incubation and during the rearing stage of the focal breeding year (years 2002 – 2012) had an effect on breeding success of the focal year (years 2002 – 2012; model formula: BreedingSuccess~ RainPrevYear+FoodPrevYear+RainIncubationAndRearing+FoodIncubation+FoodRearing). As breeding success is the proportion of successful nests at the end of the breeding season, we used a generalized linear model with a quasibinomial error distribution.

For both analyses, we selected the best model set starting from a global model including all predictor variables (see model formulas above). Model selection was performed using QAICc (package MuMIn). We then averaged parameter estimates and their significance across the set of best models (delta QAICc < 2; Symonds & Moussalli 2011). All statistical analyses were performed with R 3.0.1 (R Development Core Team 2013).

Regarding the influence on the number of nests, the amount of supplementary food during the nest-building stage was the only variable remaining in the best model and had a positive effect on the number of breeding pairs at the beginning of the breeding season (*z* = 3.16; *P* = 0.002; Table S1).

Model selection revealed that the model with the amount of rain during the previous year and the null model were the best models (delta QAICc < 2, Table 1). Model averaging then revealed that the amount of rain during the previous year had a positive effect on breeding success (*z* = 4.20; P < 0.001; Table S2).

Table S1. Model selection table showing the set of the five best models testing for an effect of the total amount of supplementary food and total rainfall during the previous year or during the nest-building on the number of breeding pairs. Parameter estimates of the respective variables,QAICc-values, delta (difference between QAICc of the respective model and the best model) as well as QAICc-weights are given. Models that were included in the best model set for model averaging are highlighted with delta QAICc in boldface type.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Model number | Food during pre-year | Food during nest-building | Rain during pre-year | Rain during nest-building | QAICc | Delta QAICc | QAICc weights |
| 1 | - | 0.00 | - | - | 47.40 | **0.00** | 0.57 |
| 2 | - | - | - | - | 49.90 | 2.44 | 0.17 |
| 3 | - | - | - | 0.00 | 51.90 | 4.48 | 0.06 |
| 4 | 0.00 | - | 0.00 | - | 52.60 | 5.18 | 0.04 |
| 5 | 0.00 | - | - | 0.00 | 52.70 | 5.21 | 0.04 |

Table S2. Model selection table showing the set of the five best models testing for an effect of the amount of supplementary food provided and total rainfall during the pre-season or during the incubation and during the rearing stage had an effect on breeding success. Parameter estimates of the respective variables,QAICc-values, delta (difference between QAICc of the respective model and the best model) as well as QAICc-weights are given. Models that were included in the best model set for model averaging are highlighted with delta QAICc in boldface type.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model number | Food during pre-year | Food during incubation | Food duirng rearing | Rain during pre-year | Rain | QAICc | Delta QAICc | QAICc weights |
| 1 | - | - | - | 0.00 | - | 29.30 | **0.00** | 0.43 |
| 2 | - | - | - | - | - | 30.90 | **1.66** | 0.19 |
| 3 | - | - | 0.00 | 0.00 | - | 33.30 | 4.09 | 0.06 |
| 4 | - | - | - | 0.00 | 0.00 | 33.40 | 4.10 | 0.06 |
| 5 | 0.00 | - | - | 0.00 | - | 33.60 | 4.31 | 0.05 |