Appendix 1.

Table A1.1. Models used to quantify the ES indicators.

Ecosystem service	Indicator and Unit	Model description
Local climate regulation	Surface emissions [index]	A lookup-table was built to link the land cover classes to the land surface emissions. The relationship was estimated by combining the Corine land cover data for the year 2000 and the Landsat 7 ETM+ thermal band 6.1 (image courtesy of the U.S. Geological Survey; spatial resolution 60m x 60m). The satellite scene was collected on 20 August 2002 at approximately 10:30 am. The following index was created for each land cover i to show the differences in the thermal emissions: *emissionIndex[i]=emission[i] / emission [forest] • 100 –100* The indices for the land cover classes were created without correcting for in-scene variability or atmospheric influence. More details can be found elsewhere (Schwarz et al., 2011a).
Recreation potential	Green space per capita [m^2 / person]	The urban green space (UGS) was used as a proxy for recreation space; UGS was computed using a Geographic Information System (GIS)-selection procedure to identify and extract all UGS land use types. The UGS supply demand per capita:the per capita demand of UGS was determined as the UGS supply of a municipal local district divided by the number of people living that district: *RecreationPotential[i]=UGS[i]/∑people[i]*
Carbon mitigation	Above ground carbon storage [$MgCO_2$]	Above-ground carbon was estimated based on field data collected for the Leipzig region (Strohbach und Haase, 2012). Trees were sampled in 190 plots stratified over 19 land-cover classes (10 plots per land-cover classes) and above ground biomass was estimated with allometric equations. The carbon content of the trees is roughly 50 % of the biomass. For transferring the above-ground carbon values to the CORINE land cover, we first intersected the two land cover layers in a GIS. Then we calculated the new storage values for the CORINE land cover classes as the area weighted averages of the values from Strohbach and Haase (2012) that fell into them. The resulting carbon storage values are shown in table S3.
Biodiversity potential	Habitat potential for bird species [index]	Breeding bird species that indicated diverse agricultural and forest habitat types listed in Achtziger et al. (2004) and shown in table S3 were selected from existing surveys from Leipzig and Halle (Saale) (Schönbrodt & Spretke, 1989; STUFA, 1995). Habitat models were developed for each species. The models built on the statistical relationship between environmental data, the land cover and the presence or absence of the indicator species. RandomForest machine learning algorithms (Liaw and Wiener, 2002) were used to predict the probability of a certain cell to be inhabited by a bird species. By combining the results from several species, the biodiversity potential for 1990 was estimated as a value between 0 (no potential) and 1 (high potential). The habitat models were then applied to the whole

		region and to the 2000 and 2006 land cover.
Food supply	Food supply [GJ/ha]	Regression models see below

Table A1.2. Pearson's correlation coefficients (r) between the crop yield and soil fertility of different crops in 1991, 2000, 2007 with n = 24 districts of Saxony and Saxony-Anhalt.

	Yield										
	Year	Winter wheat	Winter rye	Winter barley	Oat	Triticale	Potatoes	Turnips	Rape seed	Silage maize
Soil fertility index	1991	0.52**	0.22	0.52**	0.47**	0.31	0.12	0.3	0.29	0.03
	2000	0.58**	0.64**	0.76**	0.29	0.48**	0.25	0.16	0.09	0.23
	2007	0.57**	0.33*	0.51**	0.03	0.44*	0.14	0.29	0.03	0.61**

*p<0.05; **p<0.01

Table A1.3. Above-ground carbon storage in trees for the CORINE land cover classes. Values were transferred from Strohbach and Haase (2012). Numbers in brackets are standard errors based on sampling and usage of allometric equations but not on uncertainties from transferring the original values to CORINE land cover.

CORINE land cover class	Above-ground carbon storage [Mg C ha^{-1}]
Continuous urban fabric (111)	9.66 (± 5.04)
Discontinuous urban fabric (112)	12.83 (± 4.52)
Industrial or commercial units (121)	7.5 (± 4.39)
Road, rail networks and associated land (122)	2.23 (± 1.25)
Airports (124)	0.9 (± 0.16)
Mineral extraction sites (131)	2.99 (± 0.91)
Dump sites (132)	7.36 (± 1.54)
Construction sites (133)	4.66 (± 0.67)
Green urban areas (141)	29. 67 (± 5.25)
Sport and leisure facilities (142)	12.59 (± 3.46)
Non-irrigated arable land (211)	2.2 (± 0.46)
Fruit trees and berry plantations (222)	4.01 (± 1.25)
Pastures (231)	5.73 (± 0.95)
Complex cultivation patterns (242)	7.36 (± 1.5)
Deciduous forest (311)	62.21 (± 9.09)
Coniferous forest (312)	58.18 (± 5.64)
Mixed forest (313)	63.54 (± 7.56)

Table A1.4. Indicator species for agricultural land and forests from Achtziger et al. (2004) used as basis for calculating the habitat potential.

Biodiversity indicator species from Achtziger et al. (2004)	
agricultural land	forests
Alauda arvensis (Skylark)	*Dendrocopos medius* (Middle Spotted Woodpecker)
Emberiza citrinella (Yellowhammer)	*Dendrocopos minor* (Lesser Spotted Woodpecker)
Lanius collurio (Red-backed Shrike)	*Dryocopus martius* (Black Woodpecker)
Miliaria calandra (Corn Bunting)	*Sitta europaea* (Eurasian Nuthatch)
Milvus milvus (Red Kite)	*Phylloscopus sibilatrix* (Wood Warbler)
Vanellus vanellus (Northern Lapwing)	