SUBJECT REVIEW

Governance explains variation in national responses to the biodiversity crisis

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SUMMARY

Growing concern about the biodiversity crisis has led to a proliferation of conservation responses, but with wide variation between countries in the levels of engagement and investment. Much of this variation is inevitably attributed to differences between nations in wealth. However, the relationship between environmentalism and wealth is complex, and it is increasingly apparent that other factors are also involved. We review hypotheses that have been developed to explain variation in broad environmentalism and show that many of the factors that explain such variation in individuals, such as wealth, age and experience, also explain differences between nation states. We then assess the extent to which these factors explain variation between nation states in responses to, and investment in, the more specific area of biodiversity conservation. Unexpectedly, quality of governance explained substantially more variation in public and state investment in biodiversity conservation than did direct measures of wealth. The results inform assessments of where conservation investments might most profitably be directed in the future and suggest that metrics relating to governance might be of considerable use in conservation planning.

Keywords: Convention on Biological Diversity, environmentalism, governance, post-materialism, GDP, social science, psychology, priority setting

INTRODUCTION

It is axiomatic that concern for, and investment in, biodiversity conservation varies greatly both between individuals and between countries, yet the reasons for this variation remain elusive. The current biodiversity crisis has united the world's nations in attempts, thus far

49 with mixed success, to address it (Butchart et al. 2010). It is apparent that the response to the
50 problem is occurring at different rates in different countries and that simple economics are
51 not the sole determinant of this variation. For example, richer countries spend more on
52 conservation but have less biodiversity (McClanahan & Rankin 2016) and national-level
53 success in protecting threatened species is largely unrelated to wealth (Rodrigues et al. 2014).
54 National conservation effort varies by region (Lindsey et al. 2017) and protected area cover
55 appears to depend mainly upon an interaction between democratic strength and inequality
56 (Kashwan 2017). A greater understanding of this variation in state-level responses to
57 biodiversity conservation might help identify means to increase the prevalence of positive
58 conservation efforts (and thereby contribute to Aichi Target 1 of the Convention on
59 Biological Diversity Strategic Plan for Biodiversity 2011–2020; CBD 2010) as well as being
60 useful in conservation planning (Eklund et al. 2011; Lindsey et al. 2017).
61 Although we are not aware of any single overriding theory to explain national-level
62 variation in conservation responses, numerous hypotheses have been proposed to account for
63 the adoption of more general concerns for the environment and pro-environmental behaviour
64 (*environmentalism*), both between individuals and between states (Table 1). The underlying
65 metrics of such analyses are usually factors such as energy use, recycling, responses to
66 pollution, willingness to pay or aesthetic appreciation for nature or 'biospheric' values
67 towards the environment (Steg & Vlek 2009; Raymond & Kenter 2016). Although there is
68 much overlap, the literature examining individual-level variation in environmentalism
69 focuses on personal characteristics and psychological variables such as attitudes, beliefs,
70 values, and norms (Schwartz 1992; Dietz et al. 2005; Schultz et al. 2005; Heberlein 2012). In
71 contrast, national-level variation is usually explained by macro-level socioeconomic drivers
72 (Pisano & Lubell 2017). As the focus of this study is on national responses to conservation,
73 we review these socioeconomic theories and use them as the basis of our analysis.

74

75 ***The roots of environmentalism***

76 At least three (not mutually exclusive) theories have been proposed to explain the
77 development of broad environmentalism in terms of economic growth. Inglehart (1995; 2000)
78 proposed that environmental concerns and corresponding environmental behaviours are the
79 results of post-materialistic values that are likely to be more prevalent in wealthier nations:
80 once a certain level of economic security is met individuals become free to develop post-
81 materialistic values, which include support for movements such as feminism, human rights,
82 animal welfare and environmentalism (Duroy 2008). The post-materialist hypothesis receives
83 empirical support from a number of studies that find a positive relationship between
84 environmentalism and post-materialist values (Abramson 1997; Kidd & Lee 1997). However,
85 this link has been challenged (Dietz et al. 2005). For instance, Davis (2000) found no
86 difference between post-materialists and materialists in their perceived personal effort at
87 conservation or general ecological concerns, while Fairbrother (2013) suggested that
88 environmental concerns are highest in poorer nations. Inglehart (1995) also acknowledged
89 that environmental concerns persist in poorer nations, but suggested that citizens of poorer
90 countries develop environmental concerns over local issues that directly affect them, whereas
91 in wealthy nations environmental concern is more to likely arise as an indirect consequence
92 of affluence.

93 The prosperity hypothesis (Diekmann & Franzen 1999) predicts that environmental
94 concern increases with economic development as a direct consequence of greater income, and
95 not due to the development of new values. This hypothesis is based upon standard economic
96 theory, which reasons that the restoration of a damaged environment is not only a collective
97 good but also a superior good, for which demand rises with income (Franzen & Meyer 2010).
98 Consequently, there should be a positive correlation between a country's wealth and its level

of environmental responsibility. This is supported by evidence that pro-environmental views and willingness to pay for environmental protection increases with wealth both within and between countries (Kemmelmeier et al. 2002; Franzen 2003; Franzen & Meyer 2010). Both the post-materialism and prosperity hypotheses are also used to support the environmental Kuznets curve hypothesis, which proposes that whilst environmental degradation initially rises with increasing income per capita, degradation levels stabilise before reducing at higher income (Grossman & Krueger 1995; Dinda 2004). An environmental Kuznets curve has been identified for some environmental metrics like energy-use, emissions and water quality (Luzzati & Orsini 2009; Orubu & Omotor 2011; Apergis & Ozturk 2015), but has been contested as an empirical illusion (Stern 2004), and fails to appear in other studies with the same or other environmental indicators (Koop & Tole 1999; Kijima et al. 2010; Ozturk & Al-Mulali 2015) including those related to conservation (Dietz & Adger 2003; Mills & Waite 2009).

All economic explanations of environmentalism face the inherent contradiction that while concern for the environment may increase with greater wealth, so too does environmental destruction, since economic development has been identified as one of the strongest correlates of biodiversity loss (Dietz et al. 2007; Bradshaw et al. 2010). Furthermore, these affluence-based hypotheses have been challenged by Dunlap and Mertig (1997) and Dunlap and York (2008), whose globalisation hypothesis posits that environmental concerns are no longer confined to post-materialistic elites within wealthy nations, and that there is no clear correlation between wealth and environmental concern.

Although none can be entirely divorced from economics, numerous other socioeconomic patterns have been proposed to explain environmentalism, both between and within nations (Table 1). Pinker (2011) argues that long-term declines in human violence can be linked to a

number of ‘civilising’ historical and social trends, such as the development of the modern nation state and its associated judiciary, the empowerment of women and advances in education. Closely following the trend of declining violence against humans, Pinker argues, is a decline in violence against animals and, perhaps in the longer term, this extends to a decline in violence against the environment. Pinker’s ideas overlap with the principles of world polity theory – which highlights the global cultural diffusion of accepted institutional structures and modes of thinking (Shandra 2007; Givens & Jorgenson 2013), and how international organisations such as the UN fund and support domestic environmentalism as part of a ‘world environmental regime’ (Longhofer & Schofer 2010). World polity theory might explain why even countries with negligible interest in environmental matters generally have a government department charged with overseeing such issues.

A nation’s linkage to world society is a strong predictor of the number of international environmental treaties it has ratified (Frank 1999), and levels of environmental concern (Longhofer & Schofer 2010). Global institutionalization of the principle that nations bear responsibility for environmental protection may be more influential in driving national conservation agendas than the domestic processes of increasing affluence or environmental degradation (Frank et al. 2000). Both Pinker’s civilising process and world polity theory require significant time over which to evolve, perhaps explaining why the age, or perceived age, of a country is positively correlated with environmentalism (Hershfield et al. 2014).

Developing an over-arching theory may be problematic given that other historical (Grove 1996; Adams et al. 2004), political (Heath & Gifford, 2006; Sapiains et al. 2016) and religious traditions (White 1967; Hand & Van Liere 1984) also shape environmental concerns and values both within and between countries (Manfredo et al. 2016). Moreover, the direction of predictors of environmentalism can vary across countries with different income levels

149 (Nawrotzki 2012), or within countries over time (Kahn 2002; Franzen & Vogl 2013), and it
150 appears that environmental concern does not always predict pro-environmental behaviour
151 (Shultz et al. 2005; Steg & Vlek 2009; Heberlein 2012; Everard et. al 2016).
152
153 We assess the performance of these key hypotheses, developed to explain the variation in
154 broad environmentalism, in explaining country-level variation in the more specific area of
155 biodiversity conservation. While the drivers of variation in responses to biodiversity and
156 wildlife have been explored in local contexts (Johansson et al. 2013; Kansky et al. 2014), and
157 predictors of broad environmentalism have been assessed at a multi-national level (Gelissen
158 2007; Givens and Jorgenson 2013; Nawrotzki 2012; Harring 2013; Hershfield et al. 2014),
159 studies of conservation responses at the national level are sparse. To our knowledge the only
160 conservation-specific response metrics that have been considered on a national level are
161 biodiversity loss (Shandra et al. 2009; Butchart et al. 2010; Rodrigues et al. 2014), domestic
162 conservation spending (McClanahan & Rankin 2016), protected area cover (Kashwan 2017),
163 and a composite of these three metrics specifically with regards to megafauna conservation
164 (Lindsey et al. 2017). As previous studies of environmental behaviours show that different
165 metrics respond to different socioeconomic drivers and influences (Hadler & Haller 2011),
166 we consider multiple metrics of conservation responses. Specifically, we aim to further the
167 understanding of the variation in country-level conservation efforts, by assessing together
168 additional and previously unconsidered metrics of national level conservation responses
169 alongside explanatory socioeconomic variables used in previous studies to predict variation
170 between nations in broad environmentalism (Table 1).
171
172 <Table 1.>
173

Methods

We collected socioeconomic and historical data for each of the world's nation states and used these in a multivariate regression analysis to model a number of variables related to national-level conservation responses or performance. Details of the response and explanatory variables selected, their sources, and the specific hypotheses they were selected to test are given in Table 2. All analyses were conducted in R 3.0.1 (R Development Core Team 2014); model selection was implemented using the package 'MuMIn' (Bartoń 2012). We modelled seven country-level response variables: per capita membership of environmental NGOs, the number of IUCN organisations operating in the country, the extent to which the Aichi Biodiversity Target 11 to protect biomes has been met, an index of ecosystem vitality, governmental spend on domestic conservation, governmental adoption of multilateral environmental agreements and the enforcement of environmental regulations. These variables were selected because they include independent metrics that relate to a range of public and national responses to the biodiversity crisis, which have previously not been considered together in similar analyses. Additionally, data were available for each variable for a sufficiently large number of countries (over 90) to allow multivariate modelling. The seven response variables were not strongly intercorrelated (Table S1). Based on previous studies of variation between nations in broad environmentalism, and the hypotheses already reviewed (Table 1), we initially considered seven explanatory variables: gross domestic product (GDP), per capita GDP (adjusted for purchasing power parity, PPP), country age, the level of globalisation, quality of governance, level of human development and degree of post-materialism (Table 2). The Human Development Index was highly correlated with both per capita GDP and globalisation ($r > 0.8$, Table S2) and therefore excluded, as data were available for fewer countries. The small sample size ($n = 76$ countries) of the only available multinational metric of post-materialism meant that including this variable in analyses would

199 reduce statistical power. Thus we assessed two sets of models: one fitting the five
200 explanatory variables with large sample sizes (GDP, per capita GDP, country age,
201 globalisation and governance), and the other with these five variables plus post-materialism.
202 We included linear and quadratic terms of GDP and per capita GDP, to assess evidence of
203 Environmental Kuznets Curves (Grossman & Krueger 1995). We also tested interaction
204 terms between (i) GDP and governance and (ii) per capita GDP and governance.
205 We used generalised linear models (GLMs) to model each response variable as a function
206 of the two sets of explanatory variables. We standardised all explanatory variables to
207 compare the effect size among explanatory variables, and normalised GDP, per capita GDP
208 and country age using $\log_{10}$-transformation. Because NGO membership and the number of
209 IUCN organisations are likely to vary with population size, and because we could not model
210 per capita values of these because per capita GDP was included as a predictor (thus meaning
211 that population size would appear on both sides of the regression equation, causing spurious
212 correlations), the population size of each nation was also included as a predictor in these
213 models to control for its effect, though we do not report its result. Statistical distributions
214 assumed in the GLMs were based on the type of the response variables: normal for $\log_{10}$-
215 transformed NGO membership; ecosystem vitality and environmental enforcement; negative
216 binomial for the IUCN organisations; binomial for Aichi Target 11 progress and multilateral
217 agreements; and Gamma for square root-transformed domestic conservation spending. We
218 adopted a model selection approach (Burnham & Anderson 2002). We generated a set of
219 models with all possible parameter subsets, which were then fitted to the data using the
220 GLMs and ranked by ΔQAICc (the difference between each model's QAICc and $QAICc_{min}$,
221 that of the "best" model) for binomial GLMs to deal with overdispersion and ΔAICc for
222 others. We report the top 10 models or all models with ΔAICc or ΔQAICc values < 2 for
223 each analysis. To investigate the effect of spatial autocorrelation, we calculated Moran's *I* for

224 the residuals from the full models, using the package 'ncf' (Bjørnstad 2005) in R. The
225 calculated Moran's *I* was small (|Moran's *I*| < 0.3) up to the first 14, 000 km in all the
226 databases, indicating no more than a weak autocorrelation. Thus, we did not consider spatial
227 autocorrelation explicitly in the models.
228 Considering the relatively strong positive correlations between governance, per capita
229 GDP and globalisation (r = 0.71 – 0.77, Table S2), we also adopted a variation partitioning
230 approach (Borcard et al. 1992) to assess the unique and shared contributions of these three
231 explanatory variables to explaining between-nation variation in conservation responses. We
232 used R^2 for GLMs assuming normal distribution (NGO membership, ecosystem vitality and
233 environmental enforcement) and McFadden's pseudo-R^2 for others, and excluded the
234 quadratic and interaction terms of per capita GDP.
235
236 <Table 2.>
237
238 ## Results
239 Model selection yielded strong support for an effect of governance in explaining variation in
240 almost all the response variables modelled. Governance was the only explanatory variable
241 that was included in all models of all response variables with ΔAICc or ΔQAICc values < 2
242 (Table S3). The response variables all showed a strong positive association with governance
243 (Fig. 1a). The results also identified GDP as a significant predictor, as it was included in
244 more than half the models with ΔAICc or ΔQAICc values < 2, including the best models of
245 six response variables (Table S3, Fig. 1b).
246 <Fig. 1>
247 The same key role of governance was found in the models that included a measure of post-
248 materialism, except in the case of the number of IUCN organisations (Table S4). Post-

249 materialism itself failed to explain significant variation in any of the response variables
250 (Table S4). We did not find clear evidence of an environmental Kuznets curve for any of our
251 conservation response variables besides ecosystem vitality, for which there was a weak
252 indication of an environmental Kuznets curve.

253 The variation partitioning showed that the unique contribution of governance was higher
254 than that of per capita GDP and globalisation in accounting for variation in four of the seven
255 response variables. However, for all but one response variable the variation was best
256 explained by the three variables (governance, per capita GDP and globalisation) combined,
257 rather than any one of them alone (Fig. 2).

258 <Fig 2.>

259

260 ## Discussion

261 Our analyses yielded equivocal support for the largely economic hypotheses that have been
262 developed to explain variation in broad environmentalism. GDP received support in models
263 of only some response variables – including for conservation spending, mirroring the results
264 of McClanahan & Rankin (2016). Post-materialism failed to explain variation in any of the
265 variables modelled. Globalisation also failed to garner much support from the data as being a
266 useful predictor. Country age was the best predictor of the number of IUCN organisations
267 within a country, which lends support to the observation by Herschfield et al. (2014) that
268 country age is a predictor of public environmental concern. However, country age was a poor
269 predictor of other conservation metrics, and effective environmental organization may not
270 necessarily reflect underlying public environmental concern (Longhofer & Schofer 2010).
271 Instead, governance was found to be the best predictor across almost all variables, suggesting
272 that world polity theory and Pinker's 'civilising process' might be useful frameworks with
273 which to explore further the between-nation variation in conservation responses and

274 performance. The extent to which governance was a better predictor of responses to
275 biodiversity conservation than was economic wealth was unexpected, and cannot be
276 explained by covariance between governance, per capita GDP and globalisation, since
277 variation partitioning revealed that in four out of the seven response variables, the
278 independent contribution of governance in explaining variation in response variables was far
279 greater than that of the other two variables. Governance has been shown to be an important
280 predictor of biodiversity loss (Smith et al. 2003), deforestation rates (Wright et al. 2007,
281 Umemiya et al. 2010), protected area effectiveness (Barnes et al. 2016) and poaching (Burn
282 et al. 2011), but as far as we are aware, ours is the first analysis to suggest that governance
283 outperforms more purely economic variables in explaining a range of metrics of conservation
284 effort and investment across most of the world's nations.
285
286 Although the causal links between governance and biodiversity conservation remain unclear,
287 there are several plausible mechanisms. The relationship between biodiversity and corruption
288 is complex and poorly understood (Barrett et al. 2006; Smith & Walpole 2005), but
289 willingness to make economic sacrifices for environmental protection appears to be strongly
290 affected by individual political trust (Harring 2013). The over-centralisation typical of
291 countries with lower governance scores may inhibit local conservation actions (Zheng & Cao
292 2015; Everard 2015), and in these states conservation policy may not be supported by the
293 development of legal standards and procedures (Otto et al. 2011). Effective governance might
294 promote the growth of agricultural yields while minimising the spread of uncontrolled,
295 particularly damaging agriculture (Ceddia et al. 2014). Internal strife and conflict, the rates of
296 which are explicitly captured in governance statistics, have generally negative impacts on
297 biodiversity (Dudley et al. 2002). On a local scale, better governance may increase the
298 strength of local institutions and improve common-pool resource management, particularly

where property rights are lacking (Ostrom et al. 2007). Likewise, less effective governance undermines sustainable harvest (Nelson et al. 2013; Schuhbauer & Sumaila 2016) and incentive-based conservation (Ebeling & Yasué 2009; Duchelle et al. 2014). Finally, improved quality of governance may be associated with greater engagement with international conservation agreements. For example, European countries must achieve an acceptable level of governance before they can accede to the European Union, upon which they are bound to strict conservation legislation that has been shown to be successful (Donald et al. 2007); although such legislation is not always enforced (López-Bao et al. 2015). Democracies perform better than other systems of government in joining and implementing international conservation agreements and in protecting land for wildlife (Neumayer 2002a).

Our finding that globalisation correlates with some conservation responses (multilateral agreements and ecosystem vitality) corroborates Neumayer (2002b), who found a positive association between trade openness and the ratification of multilateral environmental agreements. However, the absence of a relationship between globalisation and our other response variables suggests that economic, social and political connectivity alone does not increase conservation efforts. Instead, if conservation responses have spread around the globe, it might be down to the influence of specific actors, such as international environmental organisations (Shandra et al. 2009; Givens & Jorgenson 2013). Given the significance of governance identified here, the influence of world polity on conservation may also have occurred indirectly via the building of conservation capacity through democratic institutions and governance systems (Dunlap & York 2008). This link is supported by the finding that international nongovernmental organizations help reduce deforestation, and do so increasingly at higher levels of democracy (Shandra 2007).

Conservation responses may also be influenced by other forms of capacity however. Environmental organisation for example, appears to depend heavily the availability of financial resources, the concentration of individuals in populated urban areas (Gillham 2008) and levels of education and awareness (Brady, Verba, & Schlozman 1995; Duroy 2008). These factors, which we did not specifically test here, might also account for why the number of IUCN organisations did not correlate with governance as strongly as our other response variables. Furthermore, all these factors identified which occur at the national-level, may overshadow the influence of post-materialist values at the individual level (Kemmelmeier et al. 2002), thus perhaps explaining why we fail to find an effect of post-materialism here. Alternatively, this might be because conservation problems have both materialist and nonmaterialist dimensions in both rich and poor nations (Martinez-Alier & Guha 1997; Dunlap & York 2008). Indeed, the range of conservation motivations is reflected in the many types of (materialist and nonmaterialist) ecosystem services identified across all societies (Crossman et al. 2013; Raymond & Kenter 2016). Moreover, given that post-materialist values and resulting environmental behaviours are supposed to be the product of prosperity (Inglehart 1995; 2000) the lack of a clear relationship between our conservation responses and per capita wealth refutes the post-materialism hypothesis.

We also find no evidence for an environmental Kuznets curve (EKC) for conservation responses. Ecosystem vitality was the only variable that shows a relationship resembling a weak EKC, but this effect may be down to the indices of water pollution and air quality which make up the majority of ecosystem vitality index (Morse 2017), and which have previously been found to follow the EKC, rather than biodiversity. Along with economic growth driving increasing environmental concern and demand, a key tenant of the EKC, is that technological progress eventually reduces environmental degradation. However

technological progress has not yet produced similar results for conservation, owing to slow speciation rates (Dietz & Adger 2003), competitive exclusion of nonhuman species and challenges involved in habitat restoration (Czech 2008), which might explain the lack of an EKC for biodiversity metrics. Indeed, wealth appears only to start reducing biodiversity loss once a minimal level of institutional quality has been achieved (Gren et al. 2016); again, emphasising the significance of governance in determining conservation outcomes. However, our other responses, which relate more to conservation concern and effort, also showed no EKC relationship. This finding suggest that conservation efforts will not readily reduce as poorer nations develop, and that greater wealth does not necessarily inspire greater conservation efforts, despite that richer people may be more willing to pay for conservation (Jacobsen & Hanley 2009; Franzen & Meyer 2010). Lastly, again departing from an EKC, some poorer nations may prioritize conservation for economic reasons (such as ecotourism), and unlike other forms of environmental degradation, the direct links between biodiversity loss and human well-being (Díaz et al. 2006) may be appreciated differently by citizens and policy makers across the world.

We did not identify inequality as being one of the key hypothesized drivers of environmentalism (hence we did not account for it in our analysis), but inequality may also influence conservation responses. Environmental performance of nations appears to increase with equality (Morse 2017) but protected area cover also depends on the strength of democracy (Kashwan 2017). In countries with strong democracies, low inequality is associated with higher protected area cover, but in weak democracies higher inequality is associated with greater protected area cover (Kashwan 2017); possibly because establishing conservation areas may be easier in areas of weaker property rights, greater power associated with elites (including environmental organisations) (Sandbrook 2017) and limited civic

374 ability to contest (Kashwan 2017). This result challenges our findings by demonstrating that
375 some conservation responses can proliferate under less-effective governance. However,
376 protected area cover also associates with remoteness (Joppa & Pfaff 2009) and tourism
377 attractiveness (Baldi et al. 2017), suggesting a degree of strategic planning or opportunism
378 which deserves greater exploration. Besides, the size of protected area coverage is not
379 necessarily indicative of its quality (De Santo 2013), instead local governance seems to be a
380 key driver of conservation and social outcomes (Oldekop et al. 2016).
381
382 Wealthier countries tend on average to have higher levels of governance, but there is a
383 sufficient number of wealthy countries with less-effective governance, and poor countries
384 with effective governance, to justify treating governance as an informative metric in its own
385 right, and not simply a surrogate of wealth. Given the importance of governance in explaining
386 countries' conservation responses and investment, this provides important insights into future
387 changes in global conservation activities. Many countries in biodiversity-rich regions, such as
388 South Asia, Sub-Saharan Africa and Latin America & Caribbean, now have rapidly growing
389 economies, posing serious threats to biodiversity there (Bradshaw et al. 2010). However,
390 governance in these regions is generally low (Fig. 3), suggesting that their levels of positive
391 conservation responses and investment are unlikely to increase in the near future. This
392 suggests a further challenge to achieving the Aichi Biodiversity Targets, which aim to
393 improve the status of biodiversity and enhance the implementation of effective biodiversity
394 strategies and action plans by 2020 (CBD 2010).
395
396 <Fig. 3>
397

Nonetheless, governance is dynamic, and can change within countries over time (Inglehart & Welzel 2005). Whilst the potential for improved governance is encouraging for conservation, periods of instability and armed conflict can easily threaten biodiversity (Loucks et al. 2008; Brashares et al. 2014), and even in wealthy, well-governed states, environmental regulations can readily be disregarded, diminished, discarded (López-Bao et al. 2015; Chapron et al. 2017). Wealthy well-governed states may also appear to superficially improve their conservation performance by transferring the ecological footprint of their consumption and industry to poorer, less-well governed nations in 'unequal ecological exchange' (Jorgenson 2016). Scrutinizing such patterns further and improving the transparency of trans-national supply chains would help tackle this problem. The nature of conservation governance is also subject to change (Agrawal et al. 2008; Duffy 2014); with sometimes unintended negative consequences, such as perverse incentives (Gordon et al. 2015), or stakeholder resentment (Bennet & Dearden 2014). Existing local governance structures can also outperform centralized state regimes (such as protected areas) in some places (Schleicher et al. 2017). These effects should be appreciated when considering new forms of environmental governance, including digital crypto-governance, which has been tipped to improve environmental record keeping and reduce corruption with blockchain technology (Chapron 2017). The digital world is also increasingly offering new ways for individuals to engage with conservation online; presenting opportunities for increased participation (Baynham-Herd 2017) but also new challenges, including for conservation governance (Büscher 2017).

We suggest that metrics relating to governance might also be of considerable use in conservation planning. Like economic costs (Naidoo et al. 2006), governance scores could be used for assessing where conservation investments and capacity building would most profitably be directed and for determining the types of conservation action (capacity

development or practical delivery) that are most likely to bear fruit (Eklund et al. 2011; Garnett et al. 2011). Indeed, there is evidence that international aid for biodiversity conservation is already being targeted at recipient countries that have higher levels of governance (Miller et al. 2013). Wider recognition of the link between governance and conservation may encourage greater collaboration between conservation interests and those working to promote better governance. Environmental NGOs have already contributed to this process, and have helped construct a world polity that speeds the transfer of conservation as a universal principle between nations (Boli & Thomas 1997; Longhofer & Schofer 2010; Givens & Jorgenson 2013). At the local level, working to improve conservation governance might also prove more productive than trying to generate shifts in conservation values (Manfredo et al. 2017). Lastly, we suggest our findings should promote further scrutiny to the notion that through economic growth alone we will escape from this environmental crisis. There is more to conservation than markets: governance must be considered alongside growth.

Supplementary material

For supplementary material accompanying this paper, visit <link>

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None

455
456
457 **Ethical standards:**
458 This study did not involve any human or animal subjects and all data analysed was freely
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460
461
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Legends:

Table 1. Some socioeconomic and societal correlates of broad environmentalism identified at national and individual levels. Numbers in parentheses in the first column link to those listed after the names of the explanatory variables in Table 2 to indicate which factor each explanatory variable was selected to represent in the models.

Table 2. Descriptions and sources of the response and explanatory variables used in the analyses. For the explanatory variables, the numbers in parentheses after the variable name link to those given in Table S1 to indicate which factor previously shown to predict broad environmentalism each was chosen to test. Small or non-independent polities (e.g. San Marino, Gibraltar), and recently created states that are included in the CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/) but for which many variables were missing (e.g. South Sudan, Somaliland), were removed from the analysis (n = 14).

Figure 1. Relationships between seven response variables reflecting conservation concerns and (a) governance, (b) gross domestic product (GDP), (c) per capita GDP, (d) country age and (e) globalisation. Lines represent regression lines based on the estimated coefficients in the best models (Table S3). Lines are not shown for variables not included in the best models. The y-axes differ between response variables.

Figure 2. Results of variation partitioning for (a) NGO membership, (b) IUCN organisations, (c) % Aichi target achieved, (d) ecosystem vitality, (e) domestic conservation spending, (f) multilateral agreements and (g) environmental enforcements, in terms of fractions of variation explained independently and jointly by governance, per capita GDP and globalisation.

Figure 3. The global distribution of the World Bank's Worldwide Governance Indicators (WGI; 2013 values).

797 **Table 1.**

Factor	Relationship with environmentalism	National (across countries)	Individual (within country)
Wealth (1)	Variable, generally positive	GDP or rate of economic development (Gelissen 2007; Givens and Jorgenson 2011)	Personal wealth relative to the national average (Franzen and Vogl 2013; Gelissen 2007) but see Dunlap and York (2008)
Trust (2)	Positive	Governance (Harring 2013)	Interpersonal trust (Franzen and Vogl 2013; Meyer and Liebe 2010)
Post-materialism (3)	Positive	Post-materialism (Gelissen 2007)	Post-materialist values (Franzen and Vogl 2013; Gelissen 2007; Gifford and Nilsson 2014) but see Davis (2000)
Awareness (4)	Positive	Media coverage of environmental issues (Harring et al. 2011); national levels of education (Ignatow 2006)	Individual levels of education (Clements 2012; Franzen and Vogl 2013; Gelissen 2007; Gifford and Nilsson 2014)
Autonomy/Maturity (5)	Positive	Years since independence (Hershfield et al. 2014); autonomy, self expression (Dobewall and Strack 2014)	Sense of control, age, political engagement (Clements 2012; Gelissen 2007; Gifford and Nilsson 2014)
Integration (6)	Positive	Integration with world polity (Boli and Thomas 1997; Frank et al. 2000; Givens and Jorgenson 2013); perceived country age	Sense of control; responsibility (Gifford & Nilsson 2014); civic cooperation

		(Hershfield et al. 2014)	(Owen and Videras 2006)
Environmental experience	Positive	Level of environmental degradation (Givens and Jorgenson 2011)	Childhood exposure to the environment; proximity to environmental problems (Gifford & Nilsson 2014)
Religious or political stance	Variable	Religion (Hand & Van Liere 1984); Political system (Nawrotzki 2012)	Religion (Clements 2012; Wolkomir et al. 1997; Manfredo et al. 2016); Politics (Sapiains et al. 2016)

815 **Table 2.**

Variable name	Description and source
Response variables	
NGO membership	The membership of the national partner of BirdLife International. The use of environmental association as a metric for civic environmentalism follows Dalton (2005) and Longhofer & Schofer (2010).
IUCN organisations	The number of IUCN organisations, taken from the IUCN Members' Database https://www.iucn.org/about/union/members/who_members/members_database/. The use of environmental NGO presence as a measure of environmental concern follows Smith & Wiest (2005) and Givens & Jorgenson (2013).
% Aichi target 11 achieved	The extent (measured as a percentage) to which each country has met Aichi Biodiversity Target 11 of the Convention on Biological Diversity for protecting 17% of each biome at a national level (Convention on Biological Diversity 2010). One of the indices that comprises the wider Ecosystem Vitality Index, which in turn combines with a number of metrics on human health and wellbeing to comprise the Environmental Performance Index (http://epi.yale.edu/epi). We consider this a more comprehensive metric of biodiversity protection than simply % protected area cover (e.g., Kashwan 2017).
Ecosystem vitality	A composite of the previous index with further indices on ecosystem protection and indices on water, agriculture, forests, fisheries, climate and energy. This represents an index of broader ecosystem and biodiversity-influencing issues than the previous index (http://epi.yale.edu/epi)
Domestic conservation spending	Domestic conservation spending in million US$, taken from Waldron et al. (2013), following Vincent et al. (2014) and (McClanham & Rankin 2016)
Multilateral agreements	The number of multilateral environmental agreements (MEAs) signed, from a set of 25. Examples include the International Convention for the Regulation of Whaling and the Convention on International Trade in Endangered Species (CITES). Data are taken from the Environmental-sustainability adjusted GCI (2013-2014 edition). The use of multilateral agreements as a national-level environmental response follows Neumayer (2002b).
Environmental enforcement	Enforcement of environmental regulations. This score is a component in the Environmental-sustainability adjusted GCI (2013-2014 edition). It is obtained from the World Economic Forum, Executive Opinion Survey, 2011 and 2012 editions. Scores are within-country averages of assessments of enforcement from

	1= very lax to 7= among the world's most rigorous. Following Dasgupta et al. (2001) and Rivera & Oh (2013).

Explanatory variables

GDP (1)	Gross domestic product in US$, 2013 estimates (World Bank). Linear and quadratic terms included.
Per capita GDP (1)	Per capita GDP in US$ corrected for Purchasing Power Parity (PPP), 2013 estimates (World Bank; http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD). For the small number of countries without estimates, the uncorrected per capita GDP was entered to maintain sample sizes. Linear and quadratic terms were included.
Country age (5)	Age of country as given in CIA World Factbook
Globalisation (4,6)	KOF Index of Globalisation (Dreher 2006), 2012 values. This index measures a country's level of economic, social and political globalisation and includes data on economic flows and restrictions, information flow and cultural proximity.
Governance (2,5,6)	Worldwide Governance Indicators (World Bank). These indicators score countries on six measures of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. Each measure is scaled in the same way; we used the 2012 average across all six measures. http://data.worldbank.org/data-catalog/worldwide-governance-indicators
Development (1,4)	Human Development Index (United Nations Development Programme). A composite statistic of life expectancy, education and income indices.
Post-materialism (3)	From the International Social Survey Programme (ISSP). Because of the small sample size, this variable was tested in a separate set of analyses (Table S4).

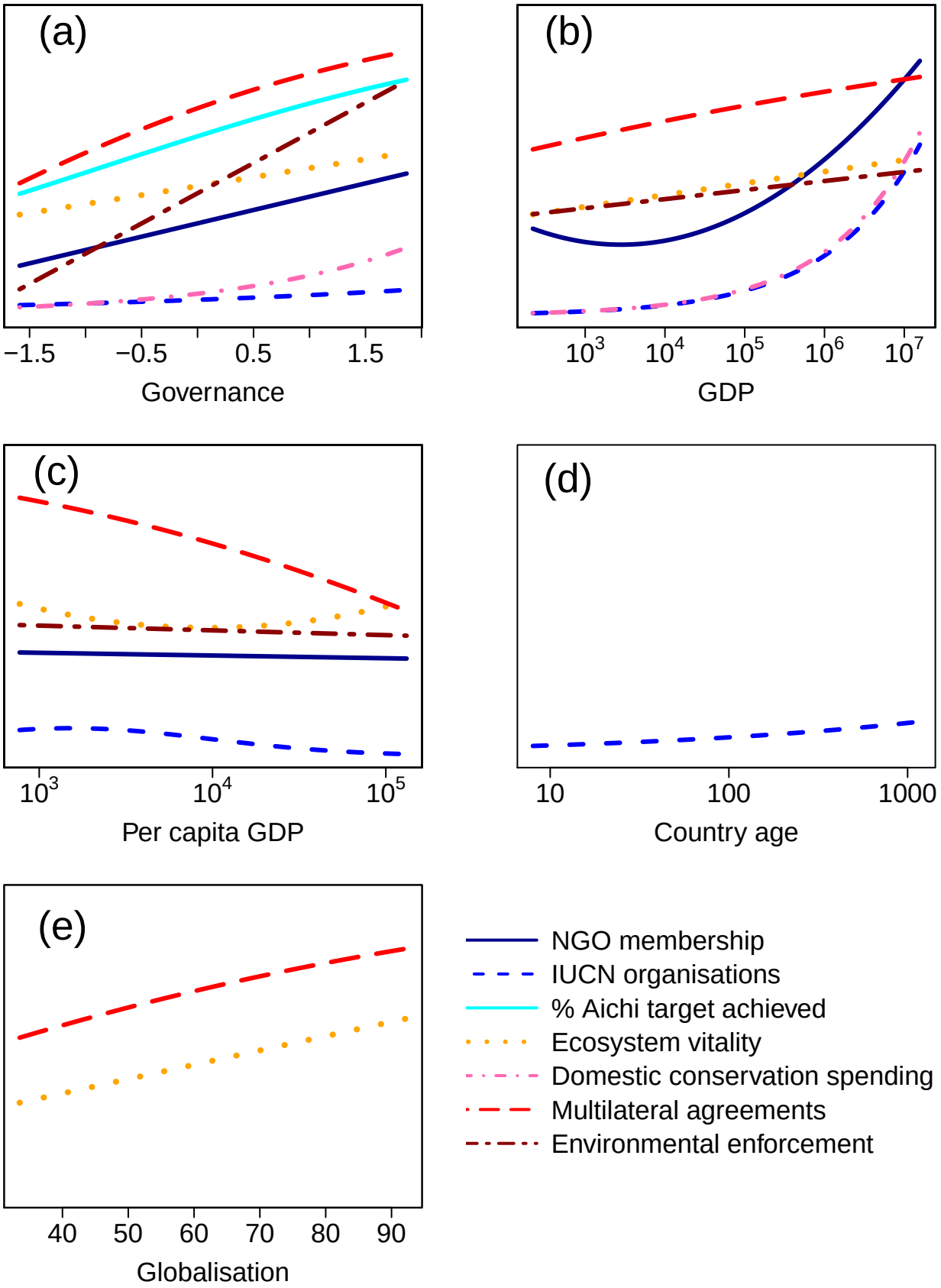
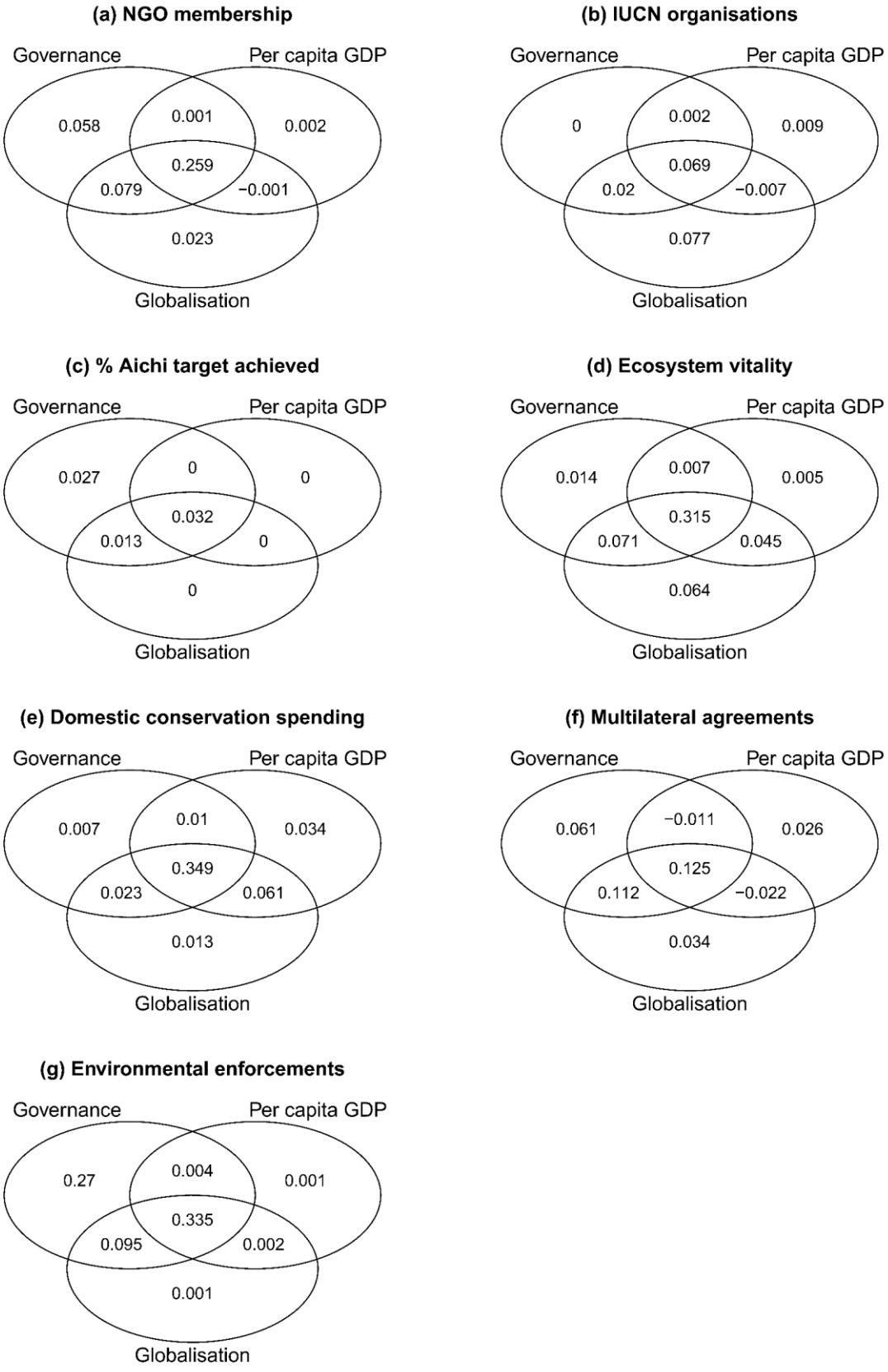
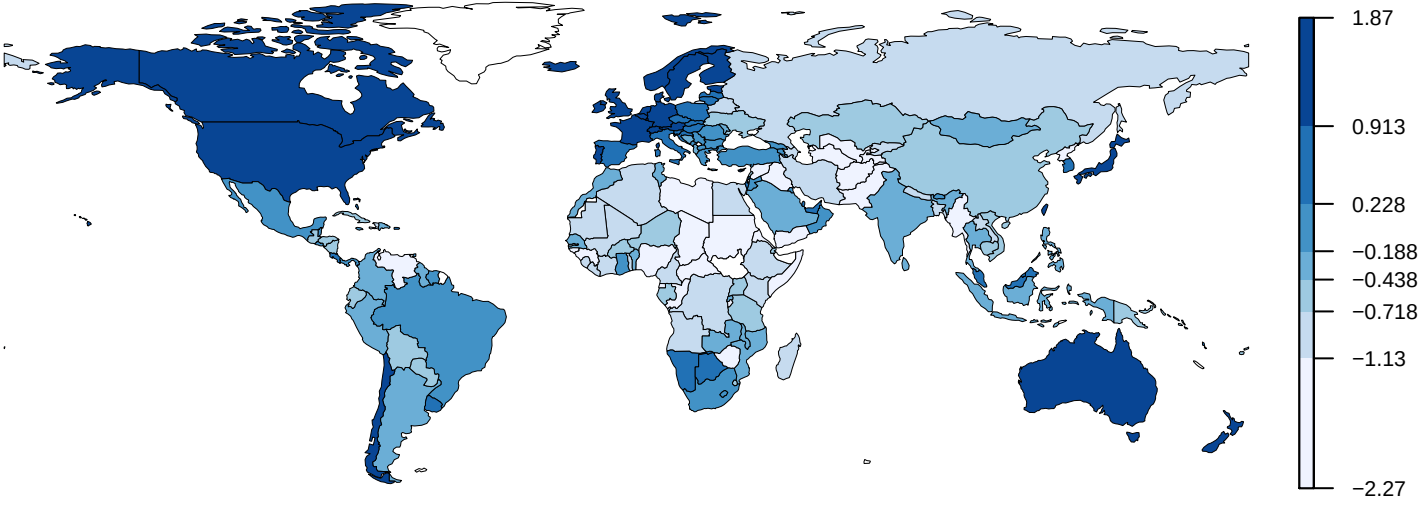

(a)
−1.5
−0.5
0.5
1.5
Governance
(b)
10^3
10^4
10^5
10^6
10^7
GDP
(c)
10^3
10^4
10^5
Per capita GDP
(d)
10
100
1000
Country age
(e)
40
50
60
70
80
90
Globalisation
NGO membership
IUCN organisations
% Aichi target achieved
Ecosystem vitality
Domestic conservation spending
Multilateral agreements
Environmental enforcement

Figure 2.


(a) NGO membership
Governance
Per capita GDP
0.058
0.001
0.002
0.259
0.079
−0.001
0.023
Globalisation
(b) IUCN organisations
Governance
Per capita GDP
0
0.002
0.009
0.069
0.02
−0.007
0.077
Globalisation
(c) % Aichi target achieved
Governance
Per capita GDP
0.027
0
0
0.032
0.013
0
0
Globalisation
(d) Ecosystem vitality
Governance
Per capita GDP
0.014
0.007
0.005
0.315
0.071
0.045
0.064
Globalisation
(e) Domestic conservation spending
Governance
Per capita GDP
0.007
0.01
0.034
0.349
0.023
0.061
0.013
Globalisation
(f) Multilateral agreements
Governance
Per capita GDP
0.061
−0.011
0.026
0.125
0.112
−0.022
0.034
Globalisation
(g) Environmental enforcements
Governance
Per capita GDP
0.27
0.004
0.001
0.335
0.095
0.002
0.001
Globalisation


1.87
0.913
0.228
−0.188
−0.438
−0.718
−1.13
−2.27

Supplementary Material

Table S1 Spearman's rank correlation coefficients between response variables

Table S2 Spearman's rank correlation coefficients between explanatory variables

Table S3 Model selection tables (excluding post-materialism)

Table S4 Model selection table (including post-materialism)

Table S1. Spearman's rank correlation coefficients between response variables.

	NGO membership	IUCN organisations	% Aichi target 11 achieved	Ecosystem vitality	Domestic conservation spend	Multilateral agreements
IUCN organisations	0.41					
% Aichi target 11 achieved	0.24	0.27				
Ecosystem vitality	0.52	0.35	0.57			
Domestic conservation spending	0.77	0.57	0.26	0.63		
Multilateral agreements	0.48	0.33	0.23	0.50	0.48	
Environmental enforcement	0.65	0.29	0.33	0.60	0.64	0.45

Table S2. Spearman's rank correlation coefficients between explanatory variables. Values larger than 0.8 are shown in bold.

	Population size	Country age	GDP	Per capita GDP	Globalisation	Governance	Development
Population size							
Country age	0.44						
GDP	0.73	0.51					
Per capita GDP	-0.08	0.21	0.57				
Globalisation	0.09	0.29	0.62	0.77			
Governance	-0.28	0.14	0.23	0.72	0.71		
Development	-0.07	0.20	0.56	**0.94**	**0.82**	0.78	
Post-materialism	0.02	0.55	0.34	0.43	0.43	0.52	0.49

Table S3. Model selection tables (post-materialism excluded; see text) for each of the seven dependent variables listed in Table 2. Regression coefficients are given for each explanatory variable for each of the ten most highly ranked models (or for all models with ΔAIC<2). Explanatory variables (see Table 2 for further details): **I** intercept, **Gov** governance, **GDP** Gross Domestic Product, **GDPpc** per capita GDP, **Age** country age, **Glob** globalisation.

% Aichi target 11 achieved

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	QAICc	Δ
0.361	0.439									188.737	0
0.364	0.411							0.14		189.554	0.817
0.253	0.445					0.111				189.806	1.069
0.441	0.465		-0.079							190.12	1.384
0.363	0.41	0.098								190.216	1.48
0.263	0.418					0.105		0.134		190.759	2.023
0.361	0.459				-0.028					190.803	2.067
0.361	0.426								0.018	190.823	2.087
0.446	0.436		-0.081					0.141		190.932	2.195
0.334	0.474		-0.09			0.123				191.019	2.283

Ecosystem Vitality

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	AICc	Δ
39.562	4.242	2.978				1.526			6.232	1329.2	0
39.14	3.374	2.476			2.084	1.95			5.657	1329.395	0.195
39.194	2.929	2.063		1.356	2.555	1.447			5.366	1329.952	0.752
40.556	4.15	2.599		1.588					5.807	1329.965	0.765
40.391	3.259	1.994		2.087	2.031				5.133	1330.291	1.091
39.664	4.072	2.773		0.924		1.117			6.121	1330.572	1.372
39.976	4.615	3.128	-0.438			1.548			5.856	1330.965	1.765

41.079	4.611	2.928							5.796	1330.97	1.77
41.226	4.732	2.805	-0.763	1.855					5.145	1330.995	1.795
41.101	3.842	2.187	-0.816	2.394	2.12				4.394	1331.172	1.972
39.885	4.712	3.455	2.225	1.353	-0.706	2.599	1.669				1.988
39.528	4.328	3.171		1.56				-0.388	6.159		1.996

Environmental enforcement

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	AICc	Δ
3.671	0.765	0.118			-0.033		0.201			193.498	0
3.589	0.716		0.069		0.083		0.22			193.914	0.416
3.62	0.75	0.098	0.056		-0.007		0.196			193.961	0.462
3.664	0.816	0.121			0.032		0.21		-0.125	194.286	0.787
3.648	0.727				0.073		0.233			194.565	1.067
3.624	0.791	0.104	0.046		0.038		0.204		-0.095	195.45	1.952
3.641	0.774				0.137		0.242		-0.118	195.496	1.998
3.662	0.768	0.119			-0.024	0.027	0.178			195.57	2.071
3.591	0.749		0.062		0.125		0.228		-0.08	195.612	2.113
3.669	0.767	0.124			-0.036		0.204	-0.012		195.708	2.21

Multilateral agreements

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	QAICc	Δ
1.336	0.379	0.146		-0.219	-0.273		0.173		0.256	386.756	0
1.413	0.428	0.182		-0.116	-0.379				0.276	387.027	0.271
1.365	0.363	0.179			-0.312				0.261	387.521	0.765
1.437	0.41	0.194	-0.072		-0.331				0.222	387.631	0.875
1.45	0.445	0.191	-0.048	-0.088	-0.376				0.246	388.536	1.78
1.378	0.415	0.174		-0.146	-0.346	0.049			0.285	388.67	1.914
1.453	0.523	0.212	-0.092		-0.248					388.756	2

1.363	0.392	0.155	-0.028	-0.194	-0.279		0.159		0.239	388.848	2.092
1.34	0.374	0.131		-0.226	-0.266		0.173	0.031	0.26	388.86	2.104
1.317	0.487	0.155		-0.225	-0.148		0.198			389.052	2.295

NGO membership

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	$log_{10}Pop$	AICc	Δ
2.797	0.399	0.564	0.171		-0.02		0.182				172.831	0
2.775	0.297	0.532	0.195		-0.079		0.18		0.193		172.984	0.154
2.807	0.376	0.512	0.169		-0.003		0.172	0.095			173.546	0.716
2.785	0.27	0.477	0.193		-0.062		0.17	0.098	0.198		173.603	0.773
2.755	0.308		0.201		0.217		0.198	0.115	0.212	0.4	174.562	1.731
2.856	0.392	0.513	0.172			0.081		0.114			174.571	1.74
2.844	0.408	0.573	0.175			0.09					174.659	1.829
2.74	0.344		0.204		0.235		0.214		0.21	0.453	174.687	1.856
2.817	0.256	0.469	0.196			0.097		0.121	0.187		174.76	1.93
2.777	0.424		0.176		0.303		0.203	0.114		0.431	174.844	2.014

Domestic conservation spend

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	AICc	Δ
0.921	0.558	0.83								400.191	0
0.877	0.546	0.824	0.043							401.959	1.769
0.92	0.551	0.804						0.054		402.045	1.854
0.883	0.554	0.836				0.038				402.163	1.972
0.921	0.592	0.852			-0.056					402.25	2.059
0.921	0.585	0.847							-0.044	402.324	2.133
0.918	0.556	0.827		0.009						402.387	2.196
0.877	0.539	0.798	0.043					0.054		403.86	3.669
0.883	0.547	0.811				0.037		0.052		404.079	3.888

0.854	0.543	0.83	0.038			0.029				404.09	3.899

IUCN organisations

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	$log_{10}Pop$	AICc	Δ
1.576	0.239	0.876		0.203	-0.642	-0.215		0.241			921.627	0
1.523	0.261	-0.155		0.255		-0.179		0.26		0.851	921.685	0.058
1.568	0.182	0.849		0.191	-0.697	-0.212		0.242	0.152		922.53	0.903
1.552	0.269	0.355		0.228	-0.34	-0.203		0.249		0.439	922.689	1.062
1.512	0.211	-0.247		0.248		-0.173		0.262	0.13	0.908	922.923	1.296
1.597	0.269	0.883		0.241	-0.662	-0.167	-0.116	0.243			922.997	1.37
1.494	0.26	-0.172	0.038	0.236		-0.177		0.265		0.851	923.465	1.839
1.544	0.212	0.322		0.216	-0.391	-0.199		0.25	0.153	0.444	923.584	1.958
1.592	0.211	0.854		0.233	-0.725	-0.156	-0.135	0.244	0.168		923.637	2.011
1.561	0.237	0.867	0.019	0.194	-0.64	-0.214		0.244			923.741	2.114

Table S4. Model selection tables (post-materialism included; see text) for each of the seven dependent variables listed in Table 2. Regression coefficients are given for each explanatory variable for each of the ten most highly ranked models (or for all models with ΔAIC<2). Explanatory variables (see Table 2 for further details): **I** intercept, **Gov** governance, **GDP** Gross Domestic Product, **GDPpc** per capita GDP, **Age** country age, **Glob** globalisation, **Postmat** post-materialism.

% Aichi target 11 achieved

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	GDPpc^2	GDPpc*Gov	Age	Glob	Postmat	QAICc	Δ
0.315	0.367							0.292			79.93	0
0.309	0.472										79.944	0.014
0.309	0.683				-0.299						80.656	0.726
0.315	0.562				-0.271			0.277			80.995	1.065
0.312								0.344	0.285		81.182	1.252
0.307								0.435			81.224	1.294
0.197	0.348		0.123					0.316			81.618	1.689
0.217	0.476					0.095					81.641	1.712
0.225	0.368					0.094		0.294			81.726	1.797
0.226	0.464		0.084								81.876	1.946

Ecosystem Vitality

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	GDPpc^2	GDPpc*Gov	Age	Glob	Postmat	AICc	Δ
46.021	6.576								5.539		552.756	0
44.233	4.693				2.056		2.599		5.11		554.184	1.428
45.293	6.026					0.738			6.191		554.365	1.61
46.021	6.058								5.531	0.855	554.694	1.938
46.021	6.414	0.696							5.404		554.737	1.982
46.021	6.399				0.943				4.977		554.76	2.005

46.021	6.407							0.385	5.562		554.958	2.202
46.022	6.577		-0.001						5.539		555.058	2.303
45.403	5.741	0.638		1.566					5.832		555.719	2.963
44.993	5.487				1.665	1.042			5.467		555.916	3.16

Environmental enforcement

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	Postmat	AICc	Δ
3.776	0.928	0.191			-0.129		0.203				108.577	0
3.772	1.033	0.17			-0.056		0.208		-0.181		109.12	0.543
3.769	0.924	0.193		-0.065	-0.121		0.244				110.568	1.991
3.772	0.945	0.208			-0.141		0.208	-0.037			110.852	2.275
3.797	0.934	0.195	-0.024		-0.137		0.206				110.915	2.338
3.771	0.934	0.193			-0.125		0.21			-0.018	111.054	2.477
3.774	0.93	0.192			-0.128	0.008	0.195				111.083	2.507
3.764	1.03	0.171		-0.069	-0.047		0.252		-0.184		111.115	2.538
3.811	1.066	0.17				0.119			-0.197		111.336	2.759
3.792	0.899	0.176				0.138					111.386	2.809

Multilateral agreements

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	Postmat	QAICc	Δ
1.501	0.46	-0.007		-0.369	0.021	-0.225	0.488				253.976	0
1.58	0.494	0.008	-0.086	-0.299	-0.02	-0.216	0.453				255	1.024
1.505	0.387	0.012		-0.368	-0.031	-0.213	0.468		0.127		255.873	1.897
1.507	0.438	-0.028		-0.366	0.034	-0.232	0.488	0.044			256.384	2.408
1.507	0.451	-0.009		-0.368	0.017	-0.222	0.477			0.025	256.63	2.654
1.585	0.421	0.028	-0.087	-0.295	-0.073	-0.204	0.431		0.129		256.968	2.992
1.66	0.509		-0.15		-0.075	-0.233	0.284				257.095	3.119
1.579	0.496	0.009	-0.086	-0.299	-0.02	-0.216	0.455			-0.005	257.799	3.823

1.58	0.495	0.009	-0.086	-0.299	-0.021	-0.215	0.453	-0.002			257.801	3.825
1.511	0.367	-0.008		-0.364	-0.017	-0.221	0.467	0.043	0.126		258.389	4.413

NGO membership

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	$log_{10}Pop$	Postmat	AICc	Δ
3.203	0.16	0.616		0.262					0.297			97.294	0
3.204	0.251	0.4		0.259					0.359	0.218		98.21	0.916
3.213	0.197	0.659		0.241	-0.159				0.369			98.411	1.117
3.218	0.411	0.626		0.229								98.744	1.45
3.184		0.652	0.146						0.428			99.42	2.127
3.204	0.155	0.599		0.26				0.038	0.291			99.801	2.507
3.188	0.146	0.617	0.027	0.237					0.311			99.843	2.55
3.205	0.144	0.612		0.257					0.297		0.029	99.871	2.577
3.195	0.152	0.622		0.253		0.012			0.306			99.918	2.624
3.154	0.156	0.665		0.182	-0.114		0.119		0.372			100.2	2.906

Domestic conservation spend

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	Postmat	AICc	Δ
1.603	0.581	0.733									237.796	0
1.491	0.575	0.748	0.105								238.597	0.801
1.596	0.718	0.847			-0.236						238.973	1.177
1.505	0.54	0.799				0.094					239.283	1.486
1.601	0.552	0.705						0.08			239.877	2.081
1.601	0.639	0.741								-0.092	239.93	2.134
1.575	0.556	0.742		0.075							239.993	2.196
1.757	0.879	0.852			-0.323		-0.219				240.237	2.44
1.603	0.611	0.742							-0.04		240.275	2.479
1.475	0.538	0.71	0.117					0.107			240.421	2.625

IUCN organisations

I	Gov	GDP	GDP^2	GDP*Gov	GDPpc	$GDPpc^2$	GDPpc*Gov	Age	Glob	$log_{10}Pop$	Postmat	AICc	Δ
1.898			0.177					0.415	0.332	0.543		463.131	0
1.936		0.719	0.125		-0.623			0.346	0.41			463.136	0.005
2.061		0.803			-0.705			0.309	0.459			463.27	0.139
1.98	0.072	0.774		0.181	-0.688			0.269	0.361			464.485	1.354
1.933	0.293		0.145					0.43		0.524		464.505	1.374
2.058	0.166	0.789			-0.738			0.3	0.349			464.847	1.716
1.902			0.168		-0.123			0.414	0.435	0.552		464.893	1.762
2.059		1.318			-1.052			0.279	0.419	-0.429		464.966	1.835
1.911	0.108		0.162					0.401	0.243	0.548		465.198	2.067
2.08	0.349							0.385		0.586		465.305	2.174