

Public Perception of Environmental Issues in a Developing Setting:  
Environmental Concern in Coastal Ghana

Michael J. White  
Department of Sociology  
Brown University  
Providence, RI 02912  
[Michael.White@brown.edu](mailto:Michael.White@brown.edu)  
T: (401) 863-1083  
F: (401) 863-3351

Lori M. Hunter  
Departments of Sociology and Environmental Studies  
Institute of Behavioral Science, Program on Environment and Society  
University of Colorado at Boulder  
Boulder, CO 80309  
[Lori.Hunter@colorado.edu](mailto:Lori.Hunter@colorado.edu)  
T: (303) 492-1006  
F: (303) 492-1231

**Total word count:** 6143 (body of document)

**Acknowledgements & credits:**

The authors gratefully acknowledge the support of the Macarthur Foundation (Population Consumption, Environment Program), the Mellon Foundation, and the National Institutes of Health (Fogarty International Center R21 TW006508). We thank Cendhi Arias and Kelley Alison Smith for assistance with manuscript preparation.

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**Corresponding author:**

Michael White, Dept. of Sociology-Box 1836, Brown University, Providence, RI 02912

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**Abstract:** Environmental resources in many developing countries are acutely threatened, yet the desire for economic growth is also manifest. Still surprisingly little is known about the relative priority given environmental and socioeconomic issues among residents within developing settings. We undertake survey research with 2500 residents of coastal Ghana on policy issues, focusing on environmental topics. Our analyses reveal a significant amount of environmental awareness, with education and political engagement consistently predicting higher levels of concern. In addition, environmental issues are deemed important even when considered relative to other socioeconomic issues. Beyond substantive findings, this work contributes methodologically by illustrating the utility of survey methods, often used in wealthier settings, for examination of environmental perceptions in a low-income setting. In the end, we argue that research in this vein has important policy implications since insight on local perceptions may help buttress policy responses designed to cope with global change. (147 words)

**Introduction**

The 2002 World Summit on Sustainable Development (WSSD), held in Johannesburg, brought economic and environmental policy debates surrounding issues related to development to Africa. The discussion explored critical challenges of the 21<sup>st</sup> century related to balancing quality of life with environmental and economic security, while meeting demands for food, water, shelter, sanitation, energy, and health services. The Summit provided a forum for expression of continued concern with climate change, biodiversity loss, fisheries depletion and desertification,

with particular attention to the urgency of these matters in developing countries. A key conclusion of the “Johannesburg Summit” was recognition of the importance of broad public participation in decision-making regarding sustainable development. Indeed, as policymakers face competing priorities, and many social and environmental challenges, engaging the local “voice” may improve the ability to respond to concerns most salient for local residents.

Still, few efforts have examined, at the individual level, the perceptions of low-income nationals with regard to environmental and socioeconomic issues. We aim to enhance the knowledge base on this topic by presenting analyses of representative survey data from a rapidly changing coastal region of Ghana. We look both at general perceptions of environmental issues as well as how these issues relate to other socioeconomic concerns. As such our analyses complement research on environmental attitudes for higher-income settings. Moreover, this approach also provides tangible evidence of how socio-demographic factors are associated with the relative priority afforded general policy issues, as well as related to specific environmental concerns such as air and water pollution, fisheries decline, and soil quality.

The following section provides a brief review of contemporary social science research on the global dimensions of environmental concern. Next, we offer an explanation of the relevance of our coastal research setting to these areas of inquiry, followed by presentation of specific research questions and hypotheses. The subsequent analyses offer substantive understanding of environmental and socioeconomic priorities in developing settings, while also considering methodological approaches to capturing perceptions of these policy tradeoffs. We conclude with a general discussion, as well as an interpretation of our results in light of contemporary policy debates. In particular, we argue that this investigation speaks directly to the Millennium Ecosystem Assessment (2003) of the United Nations Environment Program, which calls

attention, in particular, to the need to understand sociocultural values and their role among the determinants of environmental change.

### **Environmental Perceptions in Developing Settings**

The past two decades have seen increasing scholarly attention paid to public concern with human dimensions of environmental issues (e.g., Dunlap, Xiao and McCright, 2001; Dunlap and York, *in press*; Hawken, 2007; Marquart-Pyatt, 2007). The research on public environmental perception has examined the value bases for environmental concern (e.g., Dietz, Fitzgerald and Schwom, 2005), as well as identifying important socio-demographic correlates (e.g., Biel and Nilsson, 2005; Carlilse and Smith, 2005; Hunter, Hatch and Johnson, 2004; Xiao and McCright, 2007).

Until recently, however, the majority of social science research on public environmental perception explored these issues within developed economies (e.g., Dietz, Stern and Guagnano, 1998; Dunlap and Mertig, 1995; Jones and Dunlap, 1992). Yet, recent cross-cultural and comparative perspectives provide especially important foundations for the research presented here (e.g. Marquart-Pyatt, 2007). Generally, these comparative studies reveal high levels of international environmental concern, suggesting the possible emergence of “global environmentalism” (e.g., Brechin and Kempton, 1994; Dunlap, 1998; Hunter et al., 2004; Marquart-Pyatt, 2007). Further evidence of widespread environmental concern is found in analyses of the “Health of the Planet Survey,” (Dunlap, Gallup and Gallup, 1998). These authors explored public perception of a variety of environmental issues (e.g., air/water pollution, species loss, global warming) across a variety of settings, including Mexico, Brazil and Russia. They found that even where knowledge levels are low, concern for environmental issues is often still high. As another example, Hunter et al. (2004) explored environmental concern’s gender dimensions across 22 nations using data from the International Social Survey Programme (ISSP),

with results revealing substantial expression of concern among a high proportion of individuals in many nations at low per capita GNI (i.e., Bulgaria, Hungary, Poland, Russia, Philippines).

More detailed examinations specific to particular cultural settings have also emerged recently, including work in South Africa (Anderson et al., 2007), China (Harris, 2006), and Costa Rica (Schelhas and Pfeffer, 2005). Overall, the results often point to the importance of local environmental conditions in shaping concerns. In South Africa, for instance, “those most likely to be directly affected by water pollution are also most likely to see it as a problem” (Anderson et al., 2007:157). In Costa Rica, global discourse on eco-tourism and conservation has influenced local perceptions of environmental issues in their forests (Schelhas and Pfeffer, 2005). And widespread poverty and deprivation in China is argued by Harris (2006) to have shaped the instrumental view of the natural world held by many Chinese, including less emphasis on environmental preservation.

Such findings relate to an intriguing theoretical debate taking place over the past several years around the issue of environmental concern in lower-income settings. Some scholars have argued that concern with environmental quality is a “postmaterialist value” associated with a greater emphasis on quality of life issues typically correlated with higher levels of wealth (Inglehart, 1995). Per the postmaterialist thesis, residents of lower-income countries may express *general* concern with environmental issues, especially as related to proximate objective environmental conditions, but when repositioned as involving costs (e.g., an economic tradeoff), environmental issues receive less support relative to other social and economic concerns. As described by Inglehart, “the crunch comes when a difficult choice is needed between roads or trees, dams or endangered species, to burn fossil fuels that may lead to global warming or to remain nonindustrialized” (Inglehart, 1995:59). When such choices must be made, Inglehart argues, environmental protection becomes political.

The link between objective environmental conditions and environmental concern has, indeed, been made within several studies (e.g., Anderson et al., 2007; Harris, 2006; Hunter, Strife and Twine, *in press*; Johnson, Brace and Arceneaux, 2005; Newig, 2004; Schelhas and Pfeffer, 2005). For example, in Nepal, research suggests that women are more likely than men to express concern with deforestation. Such concern is grounded in objective conditions since, as primary fuelwood collectors, women are most likely to suffer deforestation's consequences (Barber, Biddlecom and Axinn, 2003). In South Africa, parallel survey-based research finds that "those most likely to be directly affected by water pollution are also most likely to see it as a problem" (Anderson et al., 2007:157). In a cross-national study, Franzen (2003) found a positive correlation with support for global environmental protection and national GDP, suggesting less environmental concern within less wealthy settings.

Yet Inglehart's "objective problem and subjective value" thesis has critics (e.g., Dunlap, Gallup and Gallup, 1993; Dunlap and Mertig, 1995, 1997; Brechin and Kempton, 1994). Brechin and Kempton (1994) suggest that the proliferation of grassroots environmental organizations in lower-income regions provides evidence of the high levels of committed environmental concern characterizing residents of these areas. They also provide evidence that, while less likely to favor economic tradeoffs, individuals in poorer settings express relatively more willingness than wealthier counterparts to volunteer time to improve the environment. As such, these authors argue that observed reluctance to pay for environmental protection by socio-economically disadvantaged individuals is due not to a lack of environmental concern, but to the monetary bias inherent in the tradeoff measures (Brechin and Kempton, 1994). Other work, at the national level, suggests that overall national affluence is more often negatively related to citizen concern for environmental quality (Dunlap and Mertig, 1995). Again, the outcome is dependent on the

measure used, with residents of poorer nations less likely to support environmental choices in environment-vs-economy tradeoffs (Dunlap and Mertig, 1995).

The analyses presented here are situated squarely within these bodies of literature while offering several important extensions to our understanding of environmental concern in less developed contexts. First, the bulk of prior work on environmental perceptions in less developed regions has presented patterns at the aggregate level for cross-national comparisons. As such, little is known about the socio-demographic correlates of the environmental perspectives expressed by individuals in developing settings. At the same time, these populations and their immediate natural surroundings are so often implicated in global environmental debates. Second, the majority of prior work on environmental concern either measures concern generally, or as positioned as a tradeoff with regard to other environmental issues.<sup>1</sup> The work presented here positions environmental issues relative to other important social and policy concerns.

### **Study Site: Ghana's Central Region**

Ghana offers an informative location for this research since it represents precisely the kind of developing setting where contemporary environmental and socioeconomic tensions are played out. A country of about 20 million persons, with land area the size of the United Kingdom, Ghana sits in the bottom quartile of nations in national per capita income (World Bank, 2005). Recent economic progress has been made. Ghana has been through a Structural Adjustment Program, and since the mid-1980s, economic growth has been fairly steady (World Bank, 2005). Ghanaian literacy is relatively high as compared to sub-Saharan nations, with approximately 63% of women and 80% of men aged 15 and older literate; this compares to 53% and 69% in

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<sup>1</sup> A notable exception is Dunlap and Mertig (1995) who positioned environmental concerns relative to other “national problems,” although they undertook an aggregate examination of national wealth as related to expressed environmental concern.

sub-Saharan Africa more generally (PRB, 2002). The impact of the HIV/AIDS epidemic has been less in Ghana than other settings; The prevalence of HIV infection among adults ages 15-49 is estimated at about 2.2% , and overall life expectancy stands at 58 years (PRB, 2004). The country has also experienced a marked shift in political regime. After many years with a dominant head of state, Ghana moved toward democracy, culminating in 2000 in a contested election that brought in the opposition party.

Ghana's coastal region is especially appropriate for this research. Although the nation's Atlantic Ocean coastline has long been an area of settlement, the region has witnessed increasing economic activity and human impact in recent years. These activities span traditional farming and fishing, large-scale industrial activities, and newer sources of economic development, such as historical and ecological tourism. For the Central Region in particular, promotion of eco-tourism and related beachfront development is likely to bring environmental pressure.

Based on the above social science literature and contextual background, we ask the following questions with regard to residents of coastal Ghana.

### **General Environmental Awareness and Concern**

1. What is the level of awareness of environmental quality? Does this vary by scale? How are socio-demographic characteristics associated with level of environmental awareness?
2. What is the level of concern with environmental quality? Does this vary by scale? How are socio-demographic characteristics associated with level of environmental concern?

### **Environmental Issues and Tradeoffs**

3. What is the perception of the relative importance of environmental and socioeconomic issues? How are socio-demographic characteristics associated with perception of the relative importance of environmental and socioeconomic issues?
4. How are socio-demographic characteristics associated with the perception of the relative importance of particular environmental issues (e.g., drinking water quality)?

### **Data and Methods**

*Data:* We make use of household and individual data from the 2002 Population & Environment Survey conducted in the 6 coastal districts of the Central Region, 1 of 10 major administrative

regions in Ghana. In 2000, the Central Region's population was about 1.6 million, representing 4% of Ghana's total population (GSS, 2002:1:17).

The survey was representative, household-based, and collected information on a variety of demographic, health, and attitudinal characteristics, particularly as related to environmental issues. The overall response rate was 93% , with a sample size of 2505 for the individual sample (population age 15+). We followed conventional practices for a multi-stage stratified sampling design. Our primary sampling units (PSUs) were enumeration areas (EAs) drawn from the 2000 Ghana census, and 3 EAs were sampled from each of 4 strata (urban, semi-urban, rural) as identified by the Ghana Statistical Service (GSS). The EAs were sampled with probability proportional to size. Across the 6 coastal districts, this generated 54 PSUs, and 24 households were randomly sampled from each. Men and women aged 15+ within these households were surveyed. In the descriptive analyses, the data are weighted to adjust for equal sizes of the strata samples, errors in the original EA population values used to select EAs, as well as non-response. Regression results are unweighted. Comparison of population profiles based on the census and survey, as well as follow-up fieldwork, yield confidence in the sample's representativeness.

The household survey instrument contained four sub-questionnaires on 1) community, 2) household, and for 3) men and 4) women. Data were collected on current household composition and economic characteristics, as well as household member characteristics. In addition, more detailed individual-level data were collected on respondents' socio-demographic backgrounds and environmental attitudes and awareness. Most of the following analyses are based on data from the individual-level questionnaires, although relevant household-level details are appended to individual records.

**Methods:** The analyses below integrate a variety of methods. First, we invoke simple tabulations (weighted for differential sampling) to draw a statistical portrait of the range of

environmental attitudes. At various points, we also make use of attitude indices (described below). We are also interested in the survey approach's applicability in a West African setting and, as such, several attitude questions closely follow those used in international surveys.

Among outcome variables, we first focus on general environmental awareness and concern. Our approach is a straightforward tabulation and, as will become clear, we find it particularly informative to examine "don't know" as well as substantively valid responses.

In order to get at environmental tradeoffs, we juxtapose environmental concern with alternatives using two techniques. First, we directly ask a standard economic tradeoff question taken from the ISSP and used in surveys in other high-income settings:

*With which one of these statements about the environment and the economy do you most agree?*

- (a) Protecting the natural environment should be given priority, even at the risk of slowing down economic growth.*
- (b) Economic growth should be given priority, even if the natural environment suffers to some extent.*

We subsequently modeled the environment/economic choice with a conventional logit model as a function of several personal characteristics. We then constructed an index – actually a difference between two indices – designed to reflect concern with environmental and social issues, as well as the relative importance of environmental issues. To construct this *environmental tradeoff index* we used 8 questions: 4 eliciting concern with environmental conditions, and 4 with social issues.<sup>2</sup> For all 8 items the respondent was asked to report whether he or she considered the issue "very serious," "serious," or "not at all serious." Coding as 2-1-0,

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<sup>2</sup> The question asked how serious the respondent considered these issues within Ghana. The 4 social items were: hunger, crime and violence, poor health care, and ethnic/religious prejudice and discrimination. The 4 environmental items were loss of forest/deforestation, drinking water availability and quality, fisheries depletion and water pollution.

we then have a concern scale for each issue. (“Don’t know” is another possible response, and we assign it a value of 0 for index construction; alternative strategies gave similar results.) The distribution across response categories was reasonable for each issue, so our survey elicited a range of opinions. In addition, although responses across issues were correlated, they were far from identical, suggesting that respondents differentiated across topics. For each cluster of 4 responses (environmental and social) we formed a simple index by summing the values from 0 to 2, thereby creating a 0 to 8 scale. We then subtracted the social index from the environmental index to achieve the final scale [-8, +8] which represents the respondent’s perception of the relative importance of environmental and social issues. This difference scale exhibits a fairly symmetric distribution centered on zero and the advantage of this approach is that it grounds the response set in multiple indicators tied to conditions in the local community.

Equally important, this index reveals the relative importance of respondent environmental concerns. For instance, the person who finds all 8 issues “serious” in the community has an index score of 0 since the sum of the environmental component equals the social component. The person who rates environmental issues “very serious” while rating social issues “serious” would score 4, reflecting 1 unit greater concern on each of the 4 environmental issues. Since we obtain a sensible distribution on this difference scale, we have confidence that even in this relatively challenging setting, the instrument has teased out relative concern. Also, benchmarking one cluster to the other allows the measure to reflect *differences* across environmental and social clusters without being influenced by overall level of concern.

In several parts of the following analyses, we conduct multivariate analyses of environmental attitudes as reflected by either the index values or index components. We conduct OLS regression on the difference index and conventional binary logit analysis on the expressed tradeoff between environment and economic growth. We conduct ordinal logit on the 4

questions marking the perceived seriousness of environmental conditions (the constituent opinions in the environmental index). In all cases, our regressions use the Huber-White sandwich estimator to adjust for the effect of potential multiple observations per household. This robust estimator leaves point estimates unchanged, but generally increases standard errors slightly, since observations are not as independent as simple random sampling. In such circumstances standard errors are generally inflated, only slightly in our case, and the correction gives improved inferential tests of significance.

Independent variables were also taken from the survey and almost all covariates were measures of individual or household traits. Several variables closely parallel information commonly solicited in household-based social surveys (e.g., sex, age). To reflect schooling, we ascertained literacy through a standard question on reading ability. Direct measures of educational attainment added little beyond the literacy dichotomy. To gauge media exposure, we asked about daily newspaper reading and radio listening; radio is available throughout the region, although only via battery or hand-crank in some rural communities. We also collected information on residence history and generated a “lifetime resident” variable for those who reported always living in current community. To reflect SES, we used a possessions index since conventional measures of income and status in highly industrialized societies are not readily replicated in this setting. After exploring the components, we constructed a simple index based on the sum (present = 1) of 11 household possessions, ranging from a bed with mattress to a refrigerator. The mean value was 3.01 (standard deviation 2.51). Civic engagement was reflected through participation in the last election. Finally, we identified urban residents as those in an “urban” primary sampling unit as identified by the Ghana Statistical Service. We investigated other variables (e.g., television-viewing, recent-migrant status) in alternative specifications but these added little beyond those included in the final models.

## Results

To structure presentation of results, we return to our research questions.

***General Awareness and Concern:*** With regard to general environmental awareness, we asked: *What is the level of awareness of environmental quality? Does this vary by geographic scale?* We also asked: *What are socio-economic correlates of environmental awareness?* Here we are interested in whether or not an individual expressed an opinion with regard to the quality of the natural environment. Those responding “don’t know” are categorized as “unaware.”

As presented in Table 1, the vast majority of respondents (96%) expressed an opinion with regard to quality of their local community’s natural environment. Such awareness clearly declined, however, as the geographic referent expanded; when queried on Ghana’s natural environment, 77% offered an opinion, while less than half articulated an opinion about the state of the world’s environment.

(Table 1 about here)

In the multivariate analysis of cumulative awareness level, we scored “1” for each response (other than “don’t know”) regarding environmental conditions for each geographic scales and summed the results. The index therefore had an interval [0,3] and our OLS estimate used robust standard errors. Only 4% of respondents scored zero, saying they “don’t know” about environmental conditions at all 3 geographic scales (i.e., community, Ghana, world). At the other end, 49% of respondents offered an opinion at all scales. Obviously, these responses were nested, as the vast majority of those expressing an opinion on world environmental conditions also had opinions on the state of the community and nation.

Table 1 presents our OLS results in which the larger values of the dependent variable indicate greater issue knowledge. Several personal characteristics were associated with environmental awareness; Men, literate individuals, those who recently voted, and regular radio

listeners were much more likely to have formed an opinion (at multiple geographic scales) about the state of the environment. Any one of these traits predicted a 0.1 to 0.2 increment in knowledge. Individuals with higher SES were also more likely to express an opinion. Older individuals and lifetime community residents scored lower and, in practical terms, this indicated they are more likely to have environmental views only on the local community and perhaps the nation. This is noteworthy in its implication that that the oldest and most settled community members linked environmental concern to local issues, while higher status and more educated individuals tended to offer opinions on broader geographic scales. Also, as noted, men are more likely to voice an expanded opinion. Unfortunately, it is impossible with these data to determine if this is due to gender differences in expression of concern or gender role pressure on overall expression of opinion. Finally, once these personal traits are controlled, there is no urban-rural difference in expression of environmental awareness. This finding is explored further below.

On the second question, *What is the level of concern with environmental quality?*, descriptive results (see Table 2) reveal that a low proportion of respondents considers the quality of the natural environment “very good,” regardless of geographic scale. In general, the local environment is perceived to be of slightly better quality than the national environment, although approximately one-third of respondents suggested the local, national, and global environments were of “poor quality.”

(Table 2 about here)

Table 2 presents regression results predicting the 3 category outcome as a function of individual covariates. Three covariates were fairly consistent in their association with more negative perceptions of environmental quality. Voters, literate, and urban residents were more likely to perceive the national and global environment of poor quality and lifetime residents were more likely to perceive the local and national environment as poor. Only 3 significant negative

coefficients emerged. Radio listeners tended to have more optimistic interpretations of the local and global environments, while individuals in wealthier households tended to have more positive views of the local environment.

It is clear from these first steps that local residents in developing settings can, and do, form ideas about environmental conditions. Further, these opinions vary with geographic scale. It is also clear that a set of personal socioeconomic traits and behaviors helps predict those perceptions. We now turn to an analysis of the depth of feeling for environmental issues by posing the potential tradeoff with social concerns and economic growth.

***Environmental vs. Social Concerns:*** While it is relatively easy to express some level of environmental concern, this entails little “cost” when offered against no alternative benchmark. Ideally, it is most instructive to contrast environmental concern with that for other issues. This is perhaps especially challenging in a low-income setting, for several reasons. First and most obviously, levels of education and literacy are low. Second, since survey research is less pervasive in developing settings, respondents may be less familiar with such questions as part of public discussion. Finally, questions about monetary value and monetary tradeoffs are less likely to have salience in societies that are not fully market-oriented. To respond to these concerns, we developed the strategy discussed above of requesting responses to a concrete set of social and environmental issues, then creating an index to measure relative concern level. To recap, this index represents the simple difference between the environmental and social components each with a range [0,8]. Thus, the overall index has a 16-point span with range [-8, 8] and 0 reflects equal expression of concern with environmental and social issues.

(Table 3 about here)

We find that the distribution of concern for environmental versus social issues is remarkably symmetric and unimodal (see Table 3). About 32% of respondents had positive

index values, indicating relatively more concern for environmental issues, while about 45% of respondents had negative scores, indicating relatively more concern for social issues.

Approximately 23% of respondents had values at zero. While the distribution had many features similar to a normal distribution, the ways in which it differed were also informative. Of those who emphasized one realm of concern over the other (77% overall), respondents tended to express more concern about social issues than environmental. On the other hand, several respondents (about 2%) were found in the upper tail [6,8] of the index, expressing substantially more environmental concern.

Table 3 presents OLS regression results predicting score on the difference index as a function of individual traits. Positive coefficients indicated greater relative concern for environmental issues. Several personal traits contributed significantly to prediction of the relative weight placed on environmental over social concerns. All variables were dichotomous, except for age, so their coefficients are directly comparable. Literacy demonstrated the strongest effect, with literate individuals much more likely to express relatively high environmental concern. Alternative models, which included formal educational attainment, indicated that persons with primary and secondary education were more likely to voice environmental concerns. Voting in the most recent election was also strongly associated with greater environmental concern. In the face of several other controls (and under alternative specifications), this civic engagement indicator was consistently significant. The gender effect was contrary to expectation based on much environmental sociology literature from which we might anticipate women to express higher levels of environmental concern. Several other covariates – age, duration of residence, possessions index, and urban residence – failed to achieve significance.

Somewhat surprising and counter to initial expectation, media exposure was negatively related to environmental concern. As mentioned earlier in our study area, radio is quite widespread although once literacy is controlled, radio exposure may actually tap individuals of lower household resources since higher status households may prefer television. Daily newspaper reading was fairly correlated with literacy ( $r=0.48$ ) and moderately with radio listening (0.24).<sup>3</sup> Also, men were more likely also to report themselves daily newspaper readers. These associations make disentangling covariates quite difficult, but in the end it appeared that media exposure, net of literacy, gender, and household SES, was associated with placement of environmental concerns in somewhat lower priority than social concerns.<sup>4</sup>

***Economic Growth vs. the Environment:*** One of the most contentious counterpoints in environmental policy is the perceived choice between environmental quality and economic growth. To be sure, the environment-economy tradeoff plays out in global environmental debate, as first-world economic growth is often criticized as driving worldwide resource depletion. At the same time, within national boundaries, the choice between economic growth and environmental quality is often explicitly raised in public debate. We turn now to assessing the perception of this tradeoff and the potential for balance between the economic and environmental issues among Ghana's coastal residents.

In our sample, of those with valid responses ( $n=2203$ ), 70.4% favored environmental protection, while 29.6% favored economic growth. To examine the association between personal traits and the relative priority given environmental protection vs. economic growth, we

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<sup>3</sup> A simple OLS regression of the dichotomous indicator for newspaper reading on the dummy variables for literate and male explained 25% of the variance. An alternative model excluding newspaper reading retained high positive significance for literacy, a moderate negative effect for radio, and the effect of gender dropped to non-significance.

conducted a logit analysis (see Table 4). Positive coefficient values indicated a greater likelihood of favoring environmental protection and the results confirm some evidence from previous analyses.

(Table 4 about here)

Men, literate individuals, those who recently voted, and those in higher SES households were more likely to express priority for environmental preservation. Again radio listeners, probably a correlate of lower socioeconomic background, were more concerned with economic growth. As in the case of environmental awareness, the results reveal that lifetime community residents were more concerned about economic issues. Residents of urban settings were less likely to prioritize environmental concerns, logical since urban dwellers are less likely to be engaged in resource-based livelihoods (farming, fishing, forestry) and may therefore see fewer direct adverse environmental consequences of economic growth.

***Social and Environmental Issue Specificity:*** In this final empirical section, specific social and environmental issues are examined. The focus is on determining the association of individual traits with concern for specific environmental conditions relative to social ones. We first look at simple descriptive statistics (Table 5). For 3 of the 4 social issues (hunger, crime, health care), at least 94% of respondents offered an opinion. Of these, crime clearly weighed more heavily in respondents' minds since nearly 90% described the level of concern as "somewhat" or "very serious." While Ghana's level of crime and violence is low by comparison to many low- and moderate-income countries, the pervasive security concern is noteworthy. Concern with hunger and health care was more evenly divided. Finally ethnic and religious

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<sup>4</sup> A simple media index (sum of the radio and newspaper indicators, created to help address collinearity) also pointed in this direction. The coefficient (0.33) was significant when included in place of its two components.

prejudice registered only a moderate level of concern; Forty percent regarded the issue as “not serious” while 11% did not offer an opinion.

(Table 5 about here)

On the 4 environmental issues, the modal response categories for each fell in the “somewhat serious” to “very serious” range. Greatest concern, as evidenced by mean value, was expressed for depletion of fisheries, a mainstay of the local economy. Deforestation was regarded with the next greatest level of concern, although nearly 12% did not offer a knowledgeable response on this issue. The 2 remaining questions concerned water and these produced similar outcomes. The modal category for both was “somewhat serious.” Most notably, twice as many respondents responded “don’t know” to the query on water pollution, as compared to the level of “don’t know” regarding perception of drinking water availability.<sup>5</sup>

We now extend the analysis to prediction of the level of perceived seriousness for each environmental issue (see Table 6). Importantly, we include the key personal traits used earlier, and also the level of concern for the other three environmental issues as well as the respondent’s value on the social concerns index. In this way, the models provide a better understanding of the interrelationship of social and environmental concerns, while still allowing for independent effects of personal traits on specific environmental concerns.

(Table 6 about here)

The results indicate that those adults with greater social concern were more likely to express concern about environmental issues. Equally telling, perhaps, is that the level of concern for each of the environmental issues is positively related to the other three. Collectively these

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<sup>5</sup> These two questions overlap, but are far from identical. Since this is a coastal area, much of the water is in estuaries and lagoons, although there is also some access to fresh water. Thus, the question about water pollution applies implicitly not only to fresh water drinking supplies, but also to brackish water for fishing.

four rotating regressors capture a large portion of the explained variance. This is to be expected, since these attitudes (social and environmental, as well as within-environmental) are correlated, and the further analysis of Table 6 helps disentangle the contribution of various components.<sup>6</sup>

The ways in which selected personal traits alter the predictions were informative. Literacy and civic engagement, so important in regressions seen earlier, were not significant here. The explanation likely rests in the strong contribution of those traits to the social index (included among the regressors) and concern for other environmental issues generally; therefore, these characteristics offered no further differentiation across issues. Among the patterns of deviation, urban residents were much less concerned with deforestation, all else controlled. This points not only to the obvious relevance of resource proximity, but also the potential differences in action or political mobilization across community settings. Newspaper reading further differentiated attitudes, but not in the same direction across the three issues for which it was significant. Regular newspaper readers expressed more concern with deforestation and water pollution and less about fisheries depletion. This is likely due to – net of other traits – some aspect of localism versus general concern. Newspaper readers are tapped into national news discussions, which are more likely to connect to geographically broader environmental issues. Fisheries depletion is more clearly linked to the local economy; thus, the newspaper reading variable and the significant negative effect of the possession (SES) index point to the deeper concern for this environmental resource that is more closely linked to the economic fortunes of some of the less well-off coastal residents.

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<sup>6</sup> Deforestation and fisheries depletion were clearly linked with fairly high values (0.81, 0.81) of cross-coefficients. Drinking water availability and water pollution were also intertwined, with cross-coefficient values (1.00, 0.99) indicating high levels of concern on one predict a higher value for the other. There was also a moderate link

Taken together, these results point to cognitive coherence in the patterns of attitudinal responses. Some individuals are appreciably concerned with both social and environmental issues, but our technique allows us to detect intertwined issues and identify issues that attract greater concern. Some particular environmental issues were intertwined in ways consistent with local ecology and economy. Overall, these results point powerfully to the ability of coastal Ghanaians – residents of a region experiencing economic transition and believed to be environmentally threatened – to perceive specific environmental issues, as well as to differentiate across environmental and social issues.

### **Conclusions and Implications**

The research we have presented was motivated by a general interest in measuring and interpreting public perceptions of environmental conditions in a developing country setting. Such work is important since environmental resources in many developing countries are acutely threatened, yet the need for economic growth is also clear. Continuing debate following the 2002 World Summit for Sustainable Development provides further evidence of the importance of understanding local perceptions on these issues.

Our research contributes to both method and substance with regard to these topics. Methodologically, we provide further evidence that the examination of environmental attitudes is feasible in a low-income setting. Our survey instrument obtained meaningful results about specific environmental issues and environmental tradeoffs, even with questions formatted much the same as asked in high-income settings. Our work also demonstrates the utility of measuring environmental concern relative to social issues. Further, our effort at using joint scales illustrates ways in which to discern a deeper understanding of relative environmental concern.

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between concern for water pollution and fisheries depletion, and deforestation and fisheries were slightly more strongly predicted by the social issues index.

Our research also contributes substantively. First and fundamentally, the results reveal a significant amount of environmental awareness in Ghana, and that awareness level varies by geographic scale. Almost all residents have opinions about local environmental conditions; about half have views of global conditions. Furthermore, the oldest and most settled members of the community link environmental concern to local issues, while higher-status and more educated individuals tend to also offer opinions on broader geographic scales. Individual traits also help predict relative concern for environmental over social issues, and opinion on the environment-economy tradeoff. Most importantly, education and political engagement are consistently associated with greater environmental concern. Although there are some urban-rural differences in attitudes, these tend to be outweighed by personal traits. Also, those adults with greater social concern are more likely to express concern about environmental issues generally, although there are discernable differences in concern over specific environmental resources.

Our results have implications beyond this setting. While specific levels of concern (i.e., statistical point estimates) and specific environmental issues (e.g., fisheries depletion) may be of somewhat more local relevance, we argue that the relationships discovered, (e.g., effects of education and civic engagement) are likely operating beyond coastal Ghana in the wider set of low- and moderate-income countries.

Although some scholars have argued that prioritizing concern with environmental issues represents a postmaterialist value, the analyses presented here suggest that residents of less-wealthy nations also often prioritize environmental issues. These findings suggest that, like “Johannesburg Summit” delegates, lay persons also recognize that environmental issues cannot be considered in isolation from other social problems such as poverty, hunger, and access to health care. As we argued at the outset, it is when choices such as these must be made that environmental protection becomes a consideration in the political arena. Indeed, our results

suggest that capturing the local “voice” within the political agenda within developing settings may shed valuable insight into issues that residents perceive as most critical to their communities’ well-being and their own livelihoods.

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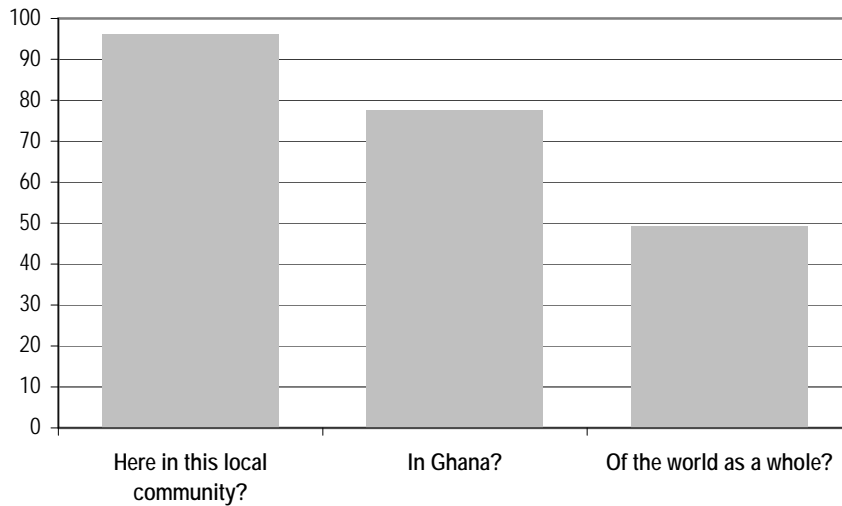
**Table 1**

**Level of Awareness of Environmental Quality at Local, National, and Global Levels**

Analyses based on question:

"Overall, how would you rate the quality of the natural environment -- very good, good, or poor?"

Percentage with Valid Response, Demonstrating "Awareness," to Questions Regarding Quality of the Natural Environment.



Multivariate Estimation of Awareness of Quality of Natural Environment, by proximity.

Outcome measured as number of valid responses (NOT "don't know") given to the three questions regarding quality of natural environment)

Voted in last election	0.19 ***
Listen to radio	0.11 **
Read newspaper	0.08 *
Literate	0.15 ***
Male	0.12 ***
Age	0.00 ***
Life-time resident	-0.14 ***
Possessions Index	0.04 ***
Urban community	-0.07
Constant	2.01 ***
R <sup>2</sup>	0.10
N	2209

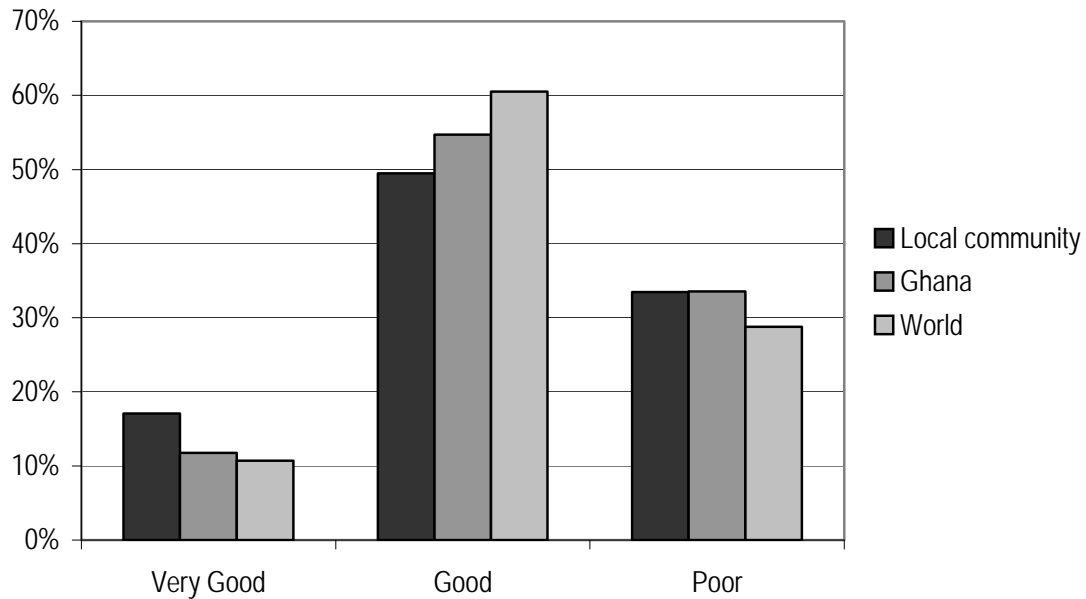
\*\*\*p<0.01; \*\*p<0.05; \*p<0.1

Table 2

Level of Concern with Environmental Quality

Analyses based on question:

"Overall, how would you rate the quality of the natural environment -- very good, good, or poor?"



Ordered Logit Estimation of Response to Question Regarding Perceived Quality of the Natural Environment, by Proximity. (outcome measured 1=very good, 2=good, 3=poor)

	<i>Local</i>	<i>Ghana</i>	<i>World</i>
Voted in last election	0.15	0.20 *	0.42 ***
Listen to radio	-0.32 **	-0.06	-0.35 **
Read newspaper	0.14	0.22 *	0.21
Literate	0.31 **	0.28 **	0.33 **
Male	0.13	0.09	0.16
Age	0.00	0.00	0.01 **
Life-time resident	0.22 **	0.38 **	0.09
Possessions Index	-0.05 *	-0.02	0.00
Urban community	0.43 ***	0.44 ***	0.30 **
R <sup>2</sup>	0.01	0.02	0.02
N	2130	1776	1083

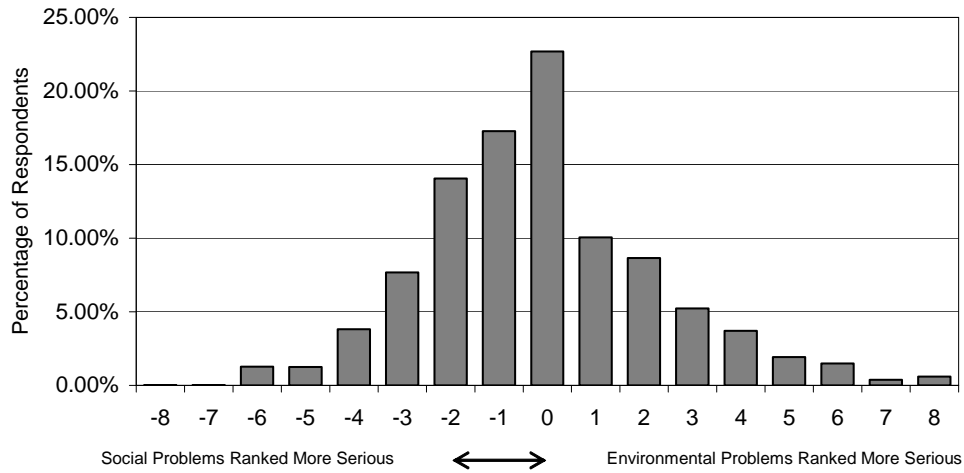
\*\*\*p<0.01; \*\*p<0.05; \*p<0.1

\* Those responding "don't know" excluded from calculations.

**Table 3**

**Relative Frequency of Ranking of "Serious" or "Very Serious" for Social and Environmental Issues**

- \* Social Problems: Hunger, Crime/Violence, Poor Health Care, Prejudice
- \* Environmental Problems: Deforestation, Water Pollution, Drinking Water Quality/Availability
- \* Responses of "very serious" = 2, "serious" =1
- \* Sum of "very serious" and "serious" for social problems subtracted from sum for environmental problems



Multivariate Estimation of Relative Frequency of Ranking  
"Serious" or "Very Serious" for Environmental and Social Issues

Higher value reflects perception of environmental problems as relatively more serious than social problems

Voted in last election	0.38 ***
Listen to radio	-0.15 **
Read newspaper	-0.29 *
Literate	0.57 ***
Male	0.18 *
Age	0.00
Life-time resident	-0.08
Possessions Index	0.00
Urban community	-0.13
Constant	-0.05
R <sup>2</sup>	0.02
N	2207

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1

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**Table 4**

**Perception of Tradeoff with Regard to Economic Growth and Environmental Protection**

With which one of these statements about the environment and the economy do you most agree?

Protecting the natural environment should be given priority, even at the risk of slowing down economic growth.	70.41%
Economic growth should be given priority, even if the natural environment suffers to some extent.	29.59%

**Logit Estimation of Response to  
Question Regarding Tradeoff between Economic Growth and Environmental Quality\***  
(outcome measured 1=priority should be given to natural environment)

Voted in last election	0.60 ***
Listen to radio	-0.47 ***
Read newspaper	-0.13
Literate	0.29 **
Male	0.26 **
Age	0.00
Life-time resident	-0.45 ***
Possessions Index	0.08 ***
Urban community	-0.33 ***
Constant	0.72 ***
Pseudo R <sup>2</sup>	0.04
N	2203

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1

\* Those responding "don't know" excluded from calculations.

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Table 5: Perception of the Relative Importance of Environmental and Social Issues

	<i>Not at all Serious</i>	<i>Serious</i>	<i>Very Serious</i>	<i>Don't Know</i>
<i>Social Problems*</i>				
Hunger	23.61%	28.89%	<b>45.13%</b>	2.38%
Crime & Violence	8.43%	30.17%	<b>58.35%</b>	3.06%
Poor Health Care	26.36%	<b>43.18%</b>	24.91%	5.56%
Ethnic & Religious Prejudice	<b>39.08%</b>	32.84%	17.55%	10.53%
<i>Environmental Problems*</i>				
Deforestation	15.80%	<b>37.57%</b>	34.96%	11.66%
Fisheries Depletion	12.39%	34.09%	<b>44.90%</b>	8.62%
Water Pollution	25.03%	<b>37.83%</b>	24.15%	12.99%
Drinking Water Availability/Quality	25.49%	<b>40.14%</b>	27.57%	6.79%

\*modal category presented in bold

**Table 6**  
Ordered Logit Estimation of  
Perceived Seriousness of Environmental Problems  
(outcome measured 1=not at all serious, 2=serious, 3=very serious)

	<i>Deforestation</i>	<i>Fisheries Depletion</i>	<i>Water Pollution</i>	<i>Drinking Water Quality/Availability</i>
Voted in last election	0.15	0.16	-0.09	-0.05
Listen to radio	0.07	0.11	-0.08	-0.01
Read newspaper	0.26 *	-0.32 **	0.40 ***	-0.15
Literate	0.19	-0.07	-0.08	0.17
Male	0.18	0.04	-0.17 *	0.16 *
Age	0.00	0.00	0.00	0.00
Life-time resident	-0.17	-0.02	0.27 ***	-0.04
Possessions Index	0.04	-0.09 ***	0.06 **	0.00
Urban community	-0.38 ***	0.12	0.06	-0.06
<i>Other Policy Issues</i>				
Social Issues	0.12 ***	0.12 ***	0.09 ***	0.06 **
Deforestation	---	0.81 ***	0.41 ***	0.58 ***
Fisheries depletion	0.81 ***	---	0.65 ***	0.28 ***
Water pollution	0.37 ***	0.62 ***	---	0.99 ***
Drinking water	0.59 ***	0.31 ***	1.00 ***	---
Pseudo R <sup>2</sup>	0.14	0.13	0.15	0.13 ***
N	1854	1854	1854	1854

\*\*\*p<0.01; \*\*p<0.05; \*p<0.1

\* Those responding "don't know " excluded from calculations.