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Environmental Perceptions of Rural South African Residents: The Complex Nature of Environmental Concern

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Abstract

The state of the local environment shapes the well-being of millions of rural residents in developing nations. Still, we know little of these individuals' environmental perceptions. This study analyzes survey data collected in an impoverished, rural region in northeast South Africa, to understand the factors that shape concern with local environmental issues. We use the "post-materialist thesis" to explore the different explanations for environmental concern in less developed regions of the world, with results revealing the importance of both cultural and physical context. In particular, gendered interaction with natural resources shapes perceptions, as does the local setting. Both theoretical and policy implications are discussed.

Introduction

Some of the world's most acute environmental problems are in rural developing settings, where natural resources are central to income and meeting daily needs (Koziell and Saunders 2001; Shackleton and Shackleton 2000, 2004). Land-based activities such as farming, livestock husbandry, and consumption and trade in natural resources (e.g., fuelwood, wild herbs) may be significantly impacted by environmental change. The environment also acts as a "buffer" against household shocks such as job loss or mortality (e.g., Hunter, Twine and Patterson 2007). Thus, the state of the local natural environment is central to the well-being of millions of households in rural regions of developing countries. However, we know relatively little about residents' environmental perceptions and concerns in such areas.

To begin filling this void in understanding, we present results from survey data that measured environmental perceptions of residents living in an impoverished rural region in the northeast of South Africa. Results of the analysis have theoretical and practical importance in several respects. First, they offer theoretical insight on the central factors, both physical and cultural, that contribute to environmental concern in developing settings. We make use of existing scholarship to inform this work, but expand upon prior knowledge by considering variation across specific villages within a particular regional setting. In this way, we provide insight into the potential for very local context to shape environmental perceptions and concern. With

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regard to policy, we argue that locals' concerns should help inform policies and shape programs dedicated to mitigating local environmental issues (Hunter 2006).

“Environment” Defined

Within this project, we defined the “environment” broadly as a community’s natural surroundings (air, water, land) that contain the natural resources (e.g., wood for fuel, herbs for dietary and medicinal use) for which availability, accessibility and quality shape rural livelihoods and the overall health and well-being of study area residents. As such, the “local environment” refers to the local setting within which proximate natural resources support rural livelihoods.

The ways in which an individual views and/or evaluates environmental issues are “environmental perceptions,” while the affect or emotion associated with environmental problems such as resource availability, accessibility, and/or environmental quality refer to “environmental concern” (Schultz et al. 2005). Environmental concern, therefore, represents a specific component of broader “environmental perceptions.”

Variation in Environmental Perceptions and Concern

Social scientists have produced a significant amount of research exploring perceptions of, as well as concern regarding, environmental issues in developed countries (e.g., Kempton, Boster and Hartley 1995; Stern and Dietz 1994). Such studies typically demonstrate that individuals who are younger, politically liberal and more educated exhibit relatively stronger environmental concern than their counterparts (Dunlap, Xiao and McCright 2001; Jones and Dunlap 1992; Klineberg, McKeever and Rothenbach 1998; Marshall, Picou and Bevc 2005; Van Liere and Dunlap 1980). In addition, research on gender differences in environmental concern reveals modest distinctions between men and women, with women typically displaying higher levels of environmental concern and behavioral adjustments relative to men (e.g., Hunter, Johnson and Hatch 2004; Stern and Dietz 1994; Zelezny, Chua and Aldrich 2000). This previous literature on gender and environmental concern suggest the importance of including consideration of gender within our analyses, although no existing work has focused specifically on this association within less developed settings. As such, we do not hypothesize a particular direction of association.

International Environmental Concern

Cross national studies of environmental perceptions draw attention to the difficulty of generalizing specific conceptualizations of “environmental concern” across various geographic and cultural contexts. Based somewhat upon Maslow's hierarchy of human needs, some have argued that environmental concern, as related to aesthetics, is a “higher-order” or “post-materialist” value, one that poor people, who strive to sustain basic daily and material needs, cannot afford to express (Inglehart 1998). However, the notion that only rich people and nations can afford to express environmental concern inspired scholarly debate as to whether economic well-being is a prerequisite for environmentalism (Brechin and Kempton 1994).

Drawing on evidence from a number of studies, several scholars demonstrate that residents in both developed and developing nations exhibit high levels of environmental concern (Brechin and Kempton 1994; Dunlap, Gallup and Gallup 1993; Dunlap and Mertig 1995). For example, Dunlap et al.'s (1993) investigation of environmental concern across 24 countries revealed high levels of concern across a variety of nations including both developed countries (e.g., United States, Switzerland) as well as less developed nations (e.g., Nigeria, Philippines, Mexico). In addition, Dunlap and Mertig (1995) found a negative correlation between per capita GNP and measures of support for environmental protection among the 24 countries in

their sample, suggesting that overall national affluence may be negatively associated with citizen concern for environmental quality. Ultimately, Brechin and Kempton (1994) argued that the high levels of environmental concern among poor countries “challenge the conventional wisdom that people in developing countries lack environmental values” (245). Such studies, therefore, have raised doubts about the relationship between post-materialism and environmental concern and have inspired additional research to expand exploration of environmental concern in a variety of settings.

In the face of rising global environmental concern, scholars have begun exploring cross-national correlates. Inglehart (1995) argued that public support for environmental protection is shaped by both subjective cultural factors (post-materialist values) and objective material concerns. In other words, citizens of relatively poor nations are environmentally concerned because they directly experience proximate environmental degradation, while citizens of relatively wealthy countries tend to endorse environmental protection because of cultural shifts to post-material values (Brechin 1999). This “objective problems-subjective values” hypothesis offers one explanation for the rise in global environmentalism; however, scholars generally agree that simplistic explanations are inadequate to fully understand the diverse and complex sources of environmentalism across the world (Dunlap and York forthcoming; Brechin 1999). Rather, consideration must be given to the ways in which context and culture (through social, demographic and economic factors) shape environmental perceptions and concern. This study aims to improve understanding of how these factors shape environmental perceptions in a little-studied setting, low-income rural communities of less developed regions. The following section reviews the existing literature on this topic.

Environmental Perceptions and Concern in Less Developed Regions

While the current study investigates socio-economic demographic factors associated with environmental concern, much of the existing scholarship from less developed settings explores how other factors, such as direct experience of environmental degradation, international discourses and cultural context shape residents’ environmental perceptions. Such studies offer deeper understanding of the complex nature of environmental concern in diverse settings (e.g., Anderson et al. 2007; Campion and Shrum 2002; Gosken, Adaman and Zenginobuz 2002; Harris 2006; White and Hunter 2005; Zimmerer 1993). As a recent example, Anderson et al. (2007) explore perceptions, attitudes and behaviors related to water issues and water pollution among different ethnic and socio-economic groups in South Africa. The authors find 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 general, their results suggest that poor environmental conditions tend to be related to perceiving environmental problems, highlighting the material nature of environmental concern.

Other studies show how cultural and geographic contexts shape environmental orientations, revealing the diverse origins of environmental concern (e.g., Harris 2006; Schelhas and Pfeffer 2005). As an example, in a synopsis of environmental perspectives and behavior in China, Harris (2006) found the Chinese express a very instrumental view of the natural world in which they believe economic development should take priority over environmental protection. Harris argues that such attitudes are rooted in China’s long history of poverty and deprivation, resulting in widespread concern with material wealth and consumption. Another study completed in Costa Rica (Schelhas and Pfeffer 2005) found that environmental perceptions are influenced by international environmental discourses. Based on interviews with rural Costa Ricans living near La Amistad National Park, the authors found that global environmental discourse, with emphasis on eco-tourism and conservation, has played a key role in framing the way local people perceive environmental issues. The fusion of local and global environmental discourse results in a unique blend of environmental perceptions and beliefs

that legitimize both forest conservation as well as resource dependent activities (Schelhas and Pfeffer 2005, 12). As such, the authors argue that while environmental activism and action have increased globally, it has not resulted in homogeneous global environmental values, but rather, distinct environmental beliefs and perceptions socially constructed in different settings. Although not taking a global perspective, our study responds to the call of Schelhas and Pfeffer (2005) for localized research by examining environmental beliefs and perceptions as socially constructed in one particular setting.

In addition, Barber et al. (2003) examined rural regions of Nepal, showing that new neighborhood facilities (e.g., new schools, agricultural cooperatives and bus services) corresponded to increased perceptions of environmental degradation, in particular the depletion of common forest resources, increased chemical fertilizer requirements, and lower water tables (Barber et al. 2003). Thus, new facilities may intensify daily hardships by degrading natural resources, which may disproportionately impact the residents, especially women, who are mainly responsible for gathering firewood, food and water. Our work builds upon Barber et al.'s findings by exploring associations between locational characteristics, environmental perceptions, and gender within a different cultural setting.

The studies that directly examine environmental concerns among residents in developing settings highlight the diverse roots of such concern, providing a springboard for this project. Although we cannot include all previously examined factors shaping environmental perceptions (e.g., global discourse, specific measures of local environmental quality), we do extend existing analyses through consideration of multiple environmental problems to highlight the relative importance of various environmental issues to residents within our study setting. We also extend prior work by considering variation across villages within a specific regional setting – thereby exploring, albeit initially, micro-level spatial variation in environmental perceptions within a poor, rural setting.

Research Setting, Data and Methods

Fieldwork was undertaken during May and June, 2004, in the far northeast of South Africa in the Agincourt Health and Demographic Surveillance System (AHDSS) site operated by the University of Witwatersrand School of Public Health (Wits) and South Africa's Medical Research Council (MRC) (Figure 1). The site incorporates 21 villages and more than 12,000 households within its 400 sq. km. study site. The area is dry (annual rainfall 550–700 mm) and relatively heavily populated (~170 persons per sq km). Household plots are typically too small to fully support subsistence agriculture. The settlement pattern is fairly typical of rural communities across South Africa, and socio-economically it is characterized by a high reliance on remittances from the large proportion of adults who are migrant laborers on commercial farms and in towns and cities across the country. In addition, a significant proportion of households depends on the state pension of an elderly resident as the only reliable source of household income. Residents of these rural communities are typically dependent on the natural environment for a range of uses, including grazing livestock and collecting fuelwood, wild foods, thatching grass, construction timber, and other domestic products for both household consumption and for generating income (Shackleton 1996; Shackleton and Shackleton 2000). Finally, given South Africa's water scarcity, water resource depletion and degradation are also challenging issues (Brooks 1995).

Since 1992, the MRC/Wits Agincourt Unit has collected census data at 12–18 month intervals from the approximate 12,000 households in the Agincourt subdistrict. We undertook a natural resource survey with 240 of these households, and the data collected on resident environmental perceptions and concern are part of a broader study on natural resource use as related to household mortality experience. Due to the broader study's mortality focus, the sample was

stratified by mortality experience, with half of the survey households randomly selected from households having experienced the death of a household member aged 15–49 in the past two years. Half were from households experiencing no such mortality. In addition to environmental perceptions, the survey explored household use and collection strategies for fuelwood and water. Weights are used to ensure sample representation of the broader population.¹ Translators from the local villages were hired to assist with data collection.

The study's 240 households were randomly selected from 12 villages in the central region of the study site (see Figure 1). Not all villages within the AHDSS were included because of logistical and budgetary constraints, although the subset of villages used here was chosen to represent the range of environmental conditions along the region's east-west rainfall gradient. Village representation within our survey varies across the study area, ranging from a minimum of just two respondents to a maximum of thirty-five.

To gather environmental perception data, the interviewer read these instructions: "*Here is a list of environmental problems facing many communities. Please tell me how serious you consider each one to be here in this community – very serious, serious, or not at all serious?*" The list of environmental problems was refined based on pre-testing to best reflect the varied concerns of local residents. The survey respondent was the individual within the household most responsible for the household's natural resource collection. In this way, we aimed to garner feedback from those most engaged on a daily basis with local environmental conditions.² Also, a "don't know" category was available for use by the interviewer although this response was not specifically offered to the respondents.

We used both bivariate associations and multivariate models to explore the associations between household and respondent characteristics and perceptions of particular environmental issues as "very serious" (as opposed to "serious," "not very serious," or responding "don't know"). This approach was based on the response distributions, as the vast majority of respondents noted many issues as "serious" or "very serious," thereby making the distinction between these two categories of particular relevance given our interest in variation in environmental perceptions. Also, given this dichotomous outcome variable, we used logistic regression models.

Following the ranking of individual environmental issues, the interviewer asked, "*Which one of these environmental issues do you see as the most important environmental issue facing this community?*" The sample size available for examination of this question is, unfortunately, smaller (N=149) due to the more frequent response of "don't know."³ Still, as in the case of the analyses of issues perceived as "very serious," our bivariate and multivariate estimates reflect the percentage (or probability) of respondents noting that a particular environmental issue is the "most important" issue facing their community. We analyze only those four issues noted by at least 10% of respondents as "most important" (i.e., dirty rivers/dams, salty/dirty tap water, litter, and soil erosion). The other categories were noted by less than 10% of

¹In addition, we examined differences across mortality/non-mortality households with regard to each of our dependent variables and household-level predictor variables. On dependent variables, a statistically significant difference across the two mortality categories was found for 2 of the 17 outcomes (bushfires $p < 0.02$ and dirty water as priority issue $p < 0.05$). No statistically significant differences characterize these two groups with regard to household size, age or education of head, age composition, or socio-economic status as reflected by the possessions index. Overall, we take this lack of patterned distinction to verify the appropriateness of this sample for our current analyses.

²If the primary resource collector was unavailable, we queried as to their availability and made a return household visit. If entirely unavailable, we spoke with another individual involved in natural resource collection. Non-response is extremely rare in this setting.

³We explored variation between those individuals responding "don't know" and those offering a substantive response. The former were more likely to be members of households of lower SES (statistically significant differences for all 4 outcome variables) and with a less educated household head (statistically significant differences for all 4 outcome variables). Given these distinctions, we felt it important to retain these categories WHAT DOES "retain these categories" MEAN? and focused the analysis on those offering a substantive response to the question of "most important" local environmental issue.

respondents as “most important,” and given the small sample size, estimation of these patterns was inappropriate.

Our predictor variables allow examination of environmental perceptions by socio-economic-demographic characteristics of the household as well as village location and respondent gender. We include household size as a categorical variable based on preliminary analyses and for ease of interpretation (categories reflect household size of 1, 2–5, 6–10, more than 10). Two compositional measures identify a household as having a young age structure if at least one-third of its members are under age 15, while an older age structure means at least one-third of a household’s members are over age fifty. Within this setting, these compositional characteristics of a household (size, age) shape the labor available for households for collection of natural resources. Labor shortage may heighten household impacts of shortages of resources like fuelwood, water, or wild foods by increasing time required for collection by remaining household members. Such shortages may, therefore, increase concern with proximate availability of these environmental resources.

We also include the gender, age, and educational level of household head, because within this setting these characteristics play an important role in shaping household livelihood options such as the potential for engaging in the formal labor market. These income-generating activities shape household reliance on local resources, since wages earned within the formal labor market often allow purchase of substitutes for otherwise collected goods (e.g., paraffin replacing fuelwood for cooking; store-bought food replacing wild foods). Thereby, local environmental shortages may be of less concern to households with members engaged in wage-earning employment.

Finally, a “possessions index” in the AHDSS reflects socio-economic status (SES) which, again, may reflect a household’s dependence upon local environmental resources as substitute for purchased goods. The possessions index ranges from 1 (low) to 5 (high) and has been developed by the MRC/Wits Agincourt Unit through a combination of indicators representing ownership of various physical assets deemed reflective of SES and livelihood options within this setting. These include presence of a pit toilet, as well as ownership of appliances (e.g., radio) and equipment (e.g., wheelbarrow). The possessions index is our primary indicator of household economic well-being, an approach used by others in similar settings (Schellenberg et al. 2003).

Although we lack specific measures of natural resource conditions and availability, village indicators are included to capture variation across villages in environmental context and environmental perceptions and concern. Specifically, we include dummy variables reflecting the 9 study villages for which there were at least 15 respondents. The villages in the study site are generally large settlements (> 400 households) in which homestead yards are laid out in a grid pattern along a network of roads/tracks, much like in urban settings. Each village is surrounded by communal land used for cultivation, grazing livestock, and harvesting natural resources. Within the regression models, “Ireagh A/B” is used as the reference category due to its relative abundance of local fuelwood (a key environmental issue).

Results

Within the sample, household size ranged from 1 to 21, with the average just over six. Sixty-three percent reported a male household head, with an average age of 49 for household head. Mean educational level was just over 5 years. A greater proportion of households was characterized by a young age structure as opposed to an older one. Indeed, members under the age of 15 comprised at least 1/3 of household members in more than half of the study households, while only 10% were characterized by the predominance of members of 50 years

of age. On the SES scale (possessions index), 3.2 represented the mean value and, reflecting our focus on resource collectors, more than 80% of our respondents were female.

Several environmental problems were perceived as “very serious” by the majority of survey respondents (Figure 2). As noted in the methods discussion above, we also asked which environmental problem respondents deemed most important in their community; the grey bars in Figure 2 represent the distribution of these responses. Respondents ranked water quality and availability, soil erosion, bushfires and litter/refuse as the top local environmental concerns. Importantly, a large proportion of respondents replied “don’t know” to the query asking for the most important environmental issue which may, perhaps, reflect difficulty in choosing between the myriad issues perceived as “very serious.”

Bivariate Associations

Little association existed between household demographic profiles and perceived severity of environmental issues (tables not shown). Within the bivariate associations, respondents from female-headed households were less likely to note cooking smoke as “very serious” ($p < 0.02$). The only other statistically significant association with regard to headship characteristics is that households with more educated heads perceived the lack of flush toilets to be a more severe problem ($p < 0.05$). On more general household characteristics, respondents from older households were more likely to note dirty rivers/dams as “very serious” ($p < 0.01$), as were those with higher SES ($p < 0.01$).

As for household characteristics and the “most important” environmental issue, households with female heads were more likely to see salty/dirty tap water as the most important issue ($p < 0.04$).

The bivariate associations of environmental perceptions by village context exhibited statistically significant differences for four environmental issues (see Figure 3 for presentation of percentages for the six most-represented villages in the study sample). As examples, nearly 100% of respondents from the village of Cunningmore A noted “soil erosion” as a “very serious” local environmental issue, while less than two-thirds of respondents from Lilydale A elevated this issue to that level of severity. “Salty/dirty tap water” also rose to prominence among villagers in Cunningmore A, although just 60% of those in Cunningmore B suggested this issue was “very serious.” In general, these bivariate results hint at the association between contextual factors and environmental perceptions and concern.

Multivariate Associations

To explore the association between environmental perceptions, household socio-economic demographic characteristics, respondent, and village characteristics simultaneously, we use multivariate logistic regression. Table 1 presents the coefficient estimates reflecting the association between individual and household characteristics, as well as village location, and the likelihood of each particular environmental issue being noted by a respondent as “very serious” in their local community. To reflect relative perceived priority of the environmental issues, Table 2 presents the coefficient estimates reflecting the association between these characteristics and the likelihood of a survey respondent noting the top four environmental issues as the “most important” facing their community.⁴ The estimates presented in Table 2 do not include consideration of those responding ‘don’t know’ to the question: “Which one of these environmental issues do you see as the most important environmental issue facing this

⁴More specifically, the coefficient estimates reflect the log odds that respondents ?? will note a particular issue as “very serious” (Table 1) or “most important” (Table 2).

community?” As such, different samples are used for the two tables and it is important to keep in mind that comparisons across these sets of results is inappropriate.

On those “very serious” issues (Table 1), household size and age composition had little predictive ability in distinguishing across households⁵. Larger households were less likely to note dirty rivers/dams as “very serious,” perhaps due to their greater number of resource collectors. Older households were more likely to express concern. Household socioeconomic status demonstrated significant positive association with concern with dirty rivers/dams. On the other hand, higher SES households were less likely to express “very serious” concern with lack of flush toilets, perhaps as they are more likely to have sufficient facilities themselves. Characteristics of the household head offer more insight into environmental perceptions, with respondents households with female or more educated heads being more likely to express “very serious” concern about cutting of trees. In general, however, no significant patterns appear in the associations between socio-demographic characteristics and environmental concerns, suggesting relative agreement as to the severity of different environmental issues in the Agincourt field site across different types of households.

On the other hand, village location more consistently predicted environmental perceptions. As discussed, place characteristics are reflected by a series of dummy variables indicating the village location with representation by at least 15 respondents. The chi-square statistics for the model as a whole, and for significance of the village dummies as a group, are presented at the bottom of the table. It is clear that context matters in that the village variables are significantly different from zero in six of the models predicting particular environmental issues as “very serious.”

With regard to specific models, there are many instances in which village is a statistically significant predictor of a particular environmental concern, net of the other predictors included in the models. As examples, residents of Justicia A remain (net of household socio-demographic factors) more likely to note salty/dirty tap water as “very serious,” thereby suggesting that their local water supplies are of relatively lesser quality. Litter/refuse remained of particular concern to residents in Justicia and Kildare B, while rising to less priority for those in Cunningmore B, Kildare A, and Lilydale A. As another indication of villages’ association with concern, residents of Cunningmore B and Croquetlawn were more likely to express “very serious” concern with bushfires, with the former also expressing concern with soil erosion and poor air quality. Together, these three priority issues paint a fairly clear picture of key concerns within the village; as opposed to water issues, Cunningmore B residents appear most concerned with the situations on communal lands surrounding their village. In this way, we find that even within a context characterized by material scarcity, environmental perceptions vary, highlighting the importance of the very local setting in shaping environmental perceptions.

Table 2 presents results of similar analyses but with the outcome reflecting the respondent’s perceived “most important” environmental concern. It is important to remember that these analyses incorporate a different subset of respondents, those not responding “don’t know” to the question of priority environment concern. Only four outcomes are presented since these represent “most important” concerns for at least 10% of respondents. Importantly, many village dummies are not included in these models since they perfectly predict outcomes or too few residents are represented on the particular outcomes for specific villages. For example, no Croquetlawn residents selected dirty rivers/dams as the single most important environmental problem facing their community. The patterns within the findings are similar to those presented in Table 1, although the association with village is perhaps less striking partially since particular villages have a predominance of “don’t know” answers and are, therefore, excluded from these

⁵Please note that we do not discuss statistically significant coefficients within models that are not, overall, significant.

analyses. Only in one case did the village variables as a group reach statistical significance – in the case of salty/dirty tap water. Residents in Cunningmore B were significantly more likely to prioritize salty/dirty tap water relative to other environmental issues, while residents of Croquetlawn were significantly less likely to prioritize this issue. No residents in either Lilydale A or B prioritized salty/dirty tap water; clearly context matters with regard to the relative priority afforded this issue. Less substantial, however, were effects related to rivers/dams, litter/refuse and soil erosion.

In general, as suggested by the bivariate results, a key finding emerging from the multivariate models on environmental perception is that village location matters, often more so than (or at least in addition to) socio-economic-demographic variables

Discussion and Implications

We argue that the survey results presented hint at the material nature of environmental concern, especially within areas of general resource scarcity. The bivariate and multivariate results suggest some associations between household characteristics and environmental perceptions and concerns – but few patterns characterize these associations across the different environmental issues. With regard to physical setting, consideration of village location significantly improved our ability to predict environmental concerns, suggesting that location may shape environmental perception. With regard to culture, our results provide evidence of gendered interaction with the material environment in that respondents from households headed by women expressed greater concern (in multivariate models) with cooking smoke and water quality and quantity. This is not surprising since both cooking and water collection are major parts of women's daily work in the Agincourt field site, as well as in other rural areas of the global south (e.g., Crow and Sultana 2002).

Because our results highlight the importance of the physical and cultural settings in shaping environmental concern, they offer insight on the post-materialist thesis, especially with regard to the material nature of environmental concern in rural developing regions. Environmental concern, as evidenced in less wealthy contexts, is argued to stem from objective problems, such as air and water pollution (Inglehart 1995). Our results may indicate that spatial proximity to objective problems within certain villages correlates with environmental concern for such local issues. Although we lack objective indicators of environmental conditions, we do find differences across villages in environmental concern, even when “controlling” for important household characteristics, which may suggest context-specific environmental correlates. Also important, we find that residents' concern for environmental issues involves a plethora of issues impacting daily resource needs, livelihoods and overall well-being. For example, the issues considered “very serious” by over 80% of the population surveyed included items such as litter/refuse, lack of rain, bush fires and soil conditions, while poor water and air quality ranked closely behind. Such results show that objective problems, as defined by the residents themselves, extend into multifaceted environmental issues. Although logical, there is little empirical validation of this spatial variation in expression of environmental perceptions within developing settings, and the evidence presented here suggests that residents of rural, less developed regions express logically informed environmental concerns. That said, the lack of prioritization of population pressure is interesting and perhaps due to the perception that local population growth is simply a natural process. Still, this is purely conjecture and would require further examination.

Because natural resource scarcity and degraded environmental conditions are directly linked to economic livelihood and overall well-being, it is not surprising that residents express high levels of environmental concern. What is surprising, however, is that the severity of concern with particular environmental issues differs substantially across villages within a relatively

narrow geographic region in which villages are characterized by different environmental constraints (as evidenced by significant chi-square statistics for the cluster of village variables in half of the models). This demonstrates the difficulty in generalizing why individuals may emphasize certain environmental issues and not others.

Clearly, environmental problems around the world are complex, interrelated and embedded within larger social issues. As such, we can expect individual and societal environmental perceptions to be diverse, interrelated and closely tied to social concerns. Brechin (1999) echoed this, arguing environmentalism is “a mixture of social perceptions, local histories and environmental realities, international relationships and influences, and unique cultural and structural features of particular countries and regions” (807). It is not surprising therefore, that expressions of environmental concern have become intertwined with social justice concerns (Brechin 1999, 2003; Hawken 2007). As such, it has become increasingly difficult to conceptually differentiate environmental issues from human rights issues, revealing how multifaceted and complex global “environmentalism” has become.

While global environmentalism may be a complex and hard-to-define social phenomenon, it is this growing complexity that may be the environmental movement’s potential strength. Because organizations, individuals and communities around the world are fighting for the conservation, protection and respect of both human and natural resources, there may actually be more commonality than difference with regard to social and environmental concerns. The “globalization of citizen concern for the environment” (Dunlap and York forthcoming) may be a uniting force -- a force that some argue is the largest and fastest growing social movement in history (Hawken 2007).

Therefore, we propose two important, yet somewhat contradictory conclusions. First, environmental concern across the world *is not* homogeneous, revealing the need to better understand local perceptions and priorities to shape programs dedicated to mitigating local environmental issues of priority (Hunter 2006). The second conclusion is that environmental concern is in fact, *in some respects*, similar – in that citizens across political and geographic boundaries are expressing concern about issues that are environmentally and socially intertwined. Such paradoxical conclusions could be a matter of scale. Local environmental concern revolves around livelihoods, socioeconomics and the individual experience, while widespread international environmental concern exposes the globalization of human concerns. Where these micro and macro environmental perspectives diverge and coalesce is a critical tipping point for unifying environmental and social justice movements under common human goals.

While our results highlight the contextual, gendered and material nature of environmental concern, the analyses are limited by the fact they only highlight residents’ perceptions of local issues. As Dunlap and York (forthcoming, 13) stress, “environmental problems are multidimensional (involving resource exploitation and land degradation as well as pollution) and are thus not limited to the local level.” Our survey did not query as to concern with global issues. Moreover, we did not explore the foundation of environmental values or ask residents why they perceived particular issues as serious. Qualitative data collected through in-depth interviews would likely prove useful.

Despite these limitations, we argue that assessing residents’ environmental concerns is important for several reasons. First, a better understanding of environmental issues, as defined by local residents themselves, is a critical element in the identification and development of programs to address environmental problems (Anderson et al. 2007). Second, understanding the relative priority of various environmental issues should help shape policy priorities by providing insight into the issues with the most salience to the local public. In this way, listening

to the local “voice” may encourage grassroots participation in programs aimed at improving environmental conditions, thereby potentially resulting in more sustainable approaches toward mitigating local environmental problems (Hunter 2006).

Further, given high illiteracy among the study population, the results suggest that formal education is not required for developing localized environmental concerns; rather they emerge from the materiality of daily life. Finally, knowledge of environmental concern across different settings contributes theoretically to our understanding of environmentalism within developing nations, advancing academic insight regarding environmental concern as an international phenomenon with diverse roots.

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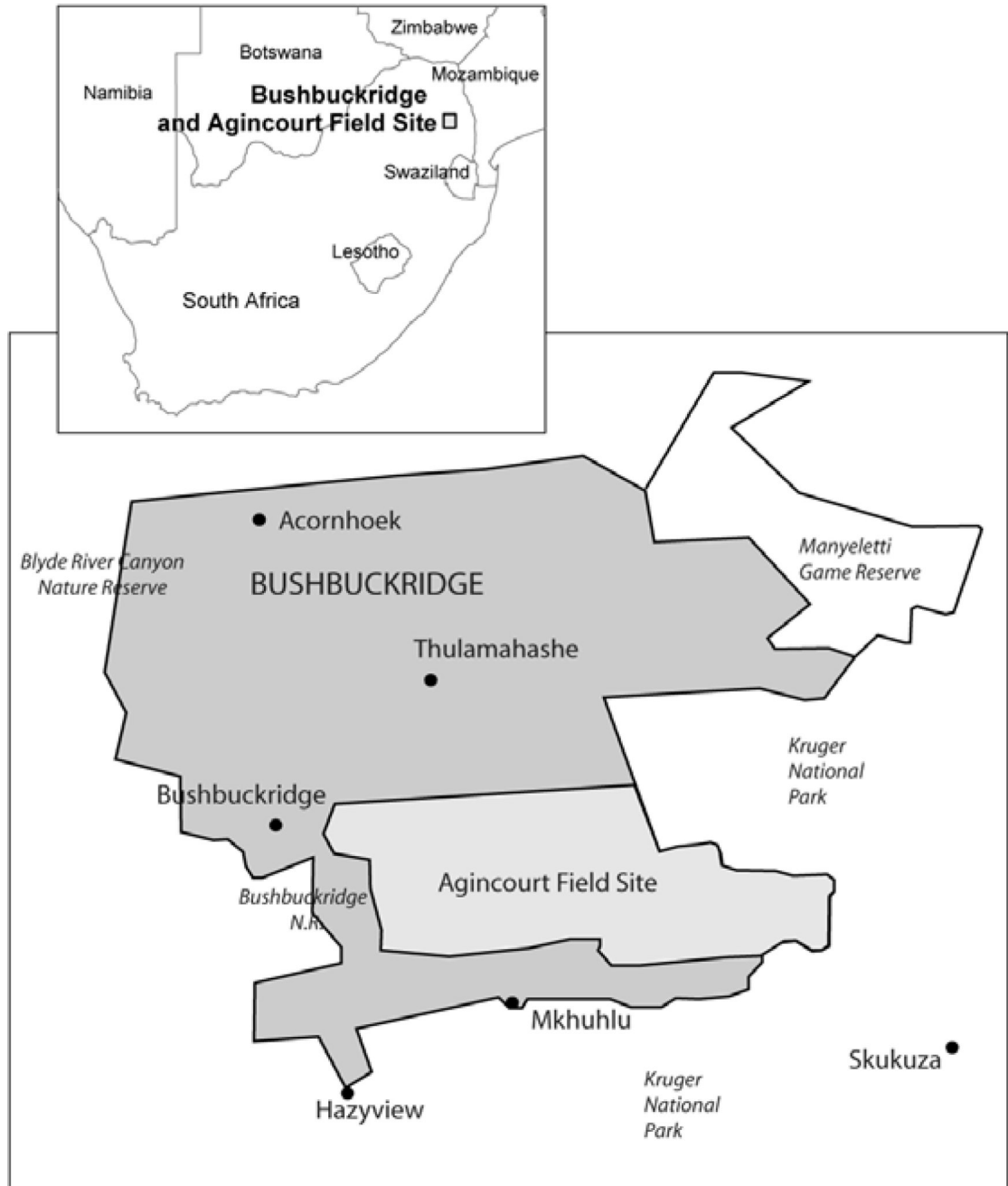


Figure 1.
Study Area, Agincourt Health and Demographic Surveillance Site, South Africa

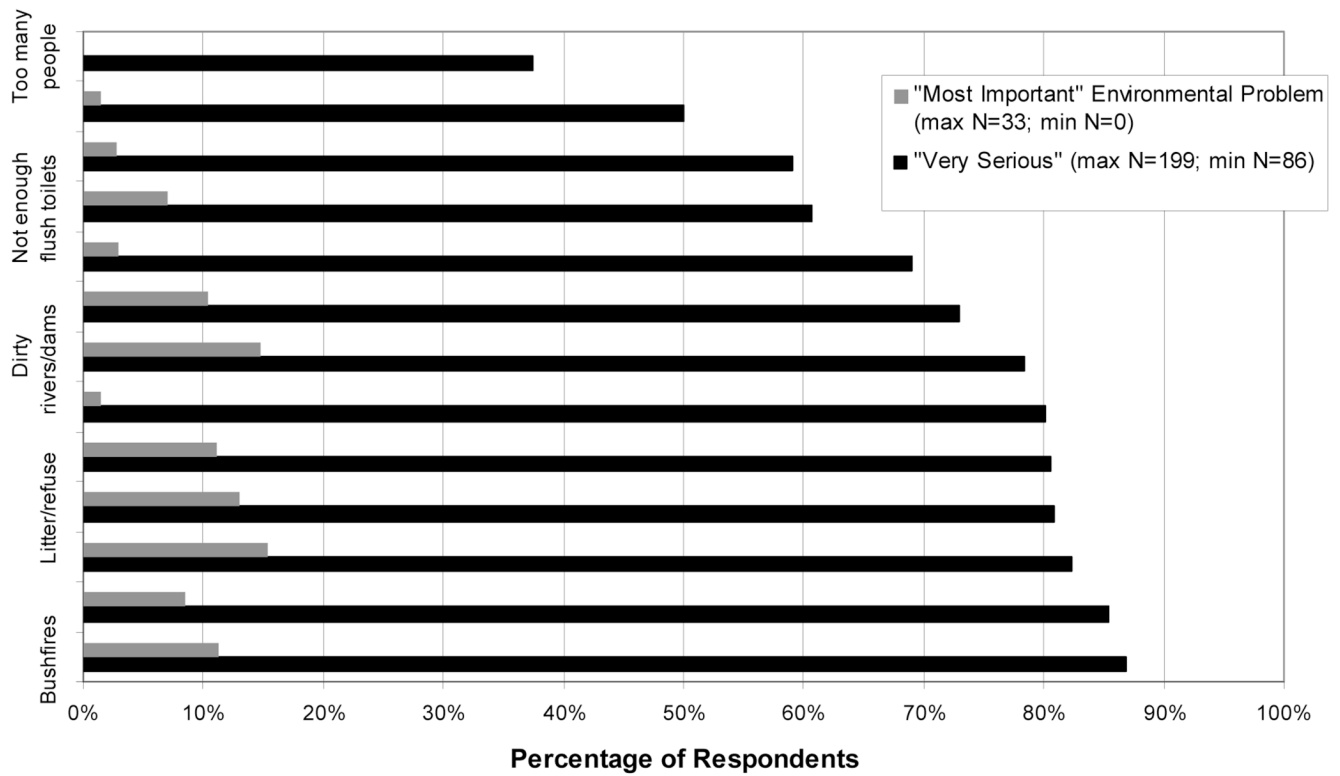


Figure 2. Perception of Environmental Problems, Local Residents, Agincourt Health and Demographic Surveillance Site, Bushbuckridge, South Africa

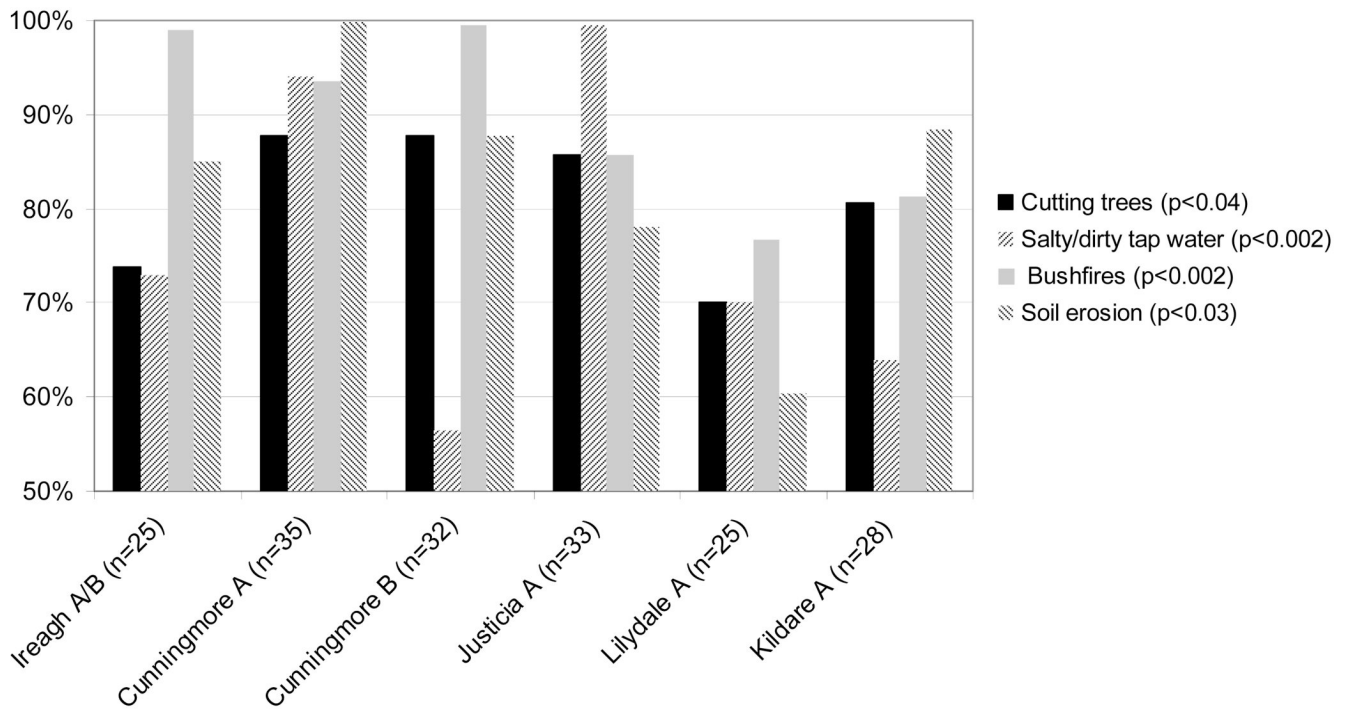


Figure 3. Perception of Specific Environmental Issues as "Very Serious" by Village, Agincourt Health and Demographic Surveillance Site, Bushbuckridge, South Africa*

Table 1

ion of Environmental Problem as "Very Serious," Agincourt Health and Demographic Surveillance Site,

	Salty/dirty tap water	Litter/Refuse	Soil erosion	Bushfires	Not enough rain	Cutting trees	Not enough flush toilets	Poor air quality	Overgrazing	Indoor cooking	Poor soil	Too many people
	-0.03	-0.04	-0.12	-0.07	0.11	0.02	0.04	-0.08	-0.16	-0.08	-0.08	-0.10
	0.58	-0.20	-1.04	-0.85	-0.14	-0.36	-0.39	-1.49	-0.16	1.12	-0.82	-0.36
	0.03	-0.03	0.01	0.00	-0.02	0.03	0.03	-0.01	0.01	0.02	0.00	0.02
	-0.02	0.04	0.02	-0.06	0.03	0.15	0.23	-0.04	0.04	0.04	0.05	-0.01
	-0.85	-0.41	-0.37	-1.08	-0.63	-1.38	-0.20	0.09	-0.58	0.35	-0.13	0.31
	-0.72	-0.86	-0.27	-0.55	4.63	0.95	-1.19	-0.73	-1.03	0.73	0.26	-0.89
	0.06	0.31	-0.05	0.08	-0.34	-0.25	-0.35	0.01	0.12	0.05	0.01	0.02
	-0.17	-1.33	0.23	-0.27	1.39	-0.93	0.39	1.11	-0.11	-0.59	-0.86	0.93
	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
	0.77	-0.35	-1.03	3.32	0.02	0.25	-0.83	1.18	-0.90	-0.81	-0.52	-1.01
	1.91	-0.60	4.78	1.35	0.41	0.25	0.39	1.90	-0.15	-0.16	-0.15	-0.43
	-0.76	-1.83	0.14	3.61	0.04	0.25	0.60	2.34	-0.96	0.31	3.61	-0.94
	4.16	3.64	-0.44	0.11	-0.40	-0.20	1.11	3.16	-0.26	0.28	-0.05	0.04
	-0.46	-1.88	0.26	-0.61	0.43	0.13	0.69	-0.59	0.45	-0.13	-0.43	-1.75
	-0.96	3.61	-1.00	-1.21	3.00	1.29	4.62	4.04	-0.38	-2.38	-0.59	1.16
	-0.16	-1.94	-1.23	-0.85	0.65	-0.98	1.27	0.73	-0.54	0.48	0.12	-0.53
	-0.51	0.54	-1.18	-1.11	-1.31	0.59	0.82	1.37	-0.30	0.12	0.03	-0.19
	0.12	4.25	2.50	3.58	2.14	1.97	-1.86	0.40	1.16	-0.08	2.58	-1.12
	50.99;0.00	43.99;0.00	29.86;0.02	42.02;0.00	25.31;0.06	1.28;0.19	37.39;0.00	38.67;0.00	9.75;0.88	15.50;0.49	36.18;0.00	12.80;0.69
	32.09;0.00	33.00;0.00	26.15;0.00	14.14;0.05	9.88;0.20	3.99;0.68	22.55;0.00	29.38;0.00	2.09;0.95	7.23;0.41	0.67;0.99	6.49;0.48
	73.95	83.26	81.86	80.93	84.98	84.26	89.81	70.7	57.84	66.05	79.72	63.03
	217	217	217	217	215	218	216	217	206	217	214	213

See Nat Resour. Author manuscript; available in PMC 2010 June 1.

**
p<0.01

p<0.001

* models lacking overall significance in grey.

* weights applied to adjust for stratified sampling by household adult mortality experience.

Table 2

Logistic Regression Predicting Perception of "Most Important" Environmental Problem, Agincourt Health and Demographic Surveillance Site, Bushbuckridge, South Africa.*

	Dirty rivers/dams	Salty/dirty tap water	Litter / Refuse	Soil erosion
Household Characteristics				
Household Size	-0.23	0.01	0.09	-0.19
Female head	1.45	0.64	-1.35	-1.55
Age of head	0.01	0.01	0.01	0.01
Education of head	-0.04	-0.06	0.15	-0.03
Young household	0.56	-1.25	-0.34	-0.17
Older household	-2.15	-2.10	...	-4.12 **
Asset Index	0.49	0.02	-0.42	-0.21
Respondent Characteristics				
Female	-1.15	2.72 ***	0.05	1.58 *
Place Characteristics				
Ireagh A/B	ref	ref	ref	ref
Croquetlawn	...	-2.48 *	1.08 **	0.45
Cunningmore A	-0.44	0.08	1.49	1.42
Cunningmore B	...	-4.59 ***	...	...
Justicia A	1.05	-1.10	2.47 *	0.16
Kildare A	2.27 **	...	...	...
Kildare B	...	...	...	...
Lilydale A	...	...	...	...
Lilydale B	...	...	...	...
Constant	-2.45	-4.05 *	-3.79	-1.61
Model χ^2 ; Prob> χ^2	20.67;0.04	23.01;0.02	18.56;0.05	14.54;0.20
χ^2 village variables = 0; Prob> χ^2	3.52;0.32	17.23;0.00	4.95;0.17	2.74;0.43
Percent Correctly Classified	82.31	84.35	86.39	90.48
N	149	149	149	149

* only outcomes noted by at least 10% of respondents are presented

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

* models lacking overall significance in grey.

* weights applied to adjust for stratified sampling by household adult mortality experience.