IBS

INSTITUTE OF BEHAVIORAL SCIENCE ■

ENVIRONMENT and SOCIETY PROGRAM ■

University of Colorado at Boulder
Boulder CO 80309-0484

WORKING PAPER ES2007-0001■

Environmental Perceptions of Rural South African Residents: The Complex Nature of a Post-Material Concern

Lori Hunter
Susie Strife
Wayne Twine

September 2007

RESEARCH PROGRAM ON ENVIRONMENT and SOCIETY
Working Paper ES2007-0001

Environmental Perceptions of Rural South African Residents:

The Complex Nature of a Post-Material Concern

Lori M. Hunter
Institute of Behavioral Science, Program on Environment and Society
Department of Sociology
University of Colorado at Boulder

Susie Strife
Environmental Studies Program
University of Colorado at Boulder

Wayne Twine
Centre for African Ecology, School of Animal, Plant and Environmental Sciences
University of Witwatersrand

Direct correspondence to Dr. Lori Hunter, Lori.Hunter@colorado.edu. This manuscript has been prepared as a working paper for the Annual meeting of the American Sociological Association and is available as a working paper through the Institute of Behavioral Science at the University of Colorado at Boulder: http://www.colorado.edu/ibs/pubs/working_papers.html. The research presented herein has been supported by the Programme on Population, Environment, and Development (PRIPODE) of the Committee for International Cooperation in International Research in National Demography (CICRED). Supplemental funding was received through the Population Aging Center at the University of Colorado at Boulder (NIA 5-P-30-AG017248). We thank Elly Mokoena for his assistance with fieldwork and the staff and residents of the Agincourt Health and Population Unit for their support and participation in this project.

Environmental Perceptions of Rural South African Residents:

The Complex Nature of a Post-Material Concern

Lori M. Hunter
Institute of Behavioral Science, Program on Environment and Society
Department of Sociology
University of Colorado at Boulder

Susie Strife
Environmental Studies Program
University of Colorado at Boulder

Wayne Twine
Centre for African Ecology, School of Animal, Plant and Environmental Sciences
University of Witwatersrand

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 presents analyses of survey data collected in an impoverished, rural region in the northeast of South Africa, with the aim of better understanding the socio-economic-demographic factors that shape concern with local environmental issues. We make use of the Post-materialist Thesis to theoretically explore the foundation of environmental concern, with the results revealing the importance of both cultural and physical context. Also, gendered interaction with natural resources shapes perceptions, as do local resource constraints. Both theoretical and policy implications are discussed (108 words).

Environmental Perceptions of Rural South African Residents:

The Complex Nature of a Post-Material Concern

In rural regions of the world's less developed nations, environmental change has immediate and direct impacts on millions of households since natural resources are often essential in meeting basic living requirements (Koziell and Saunders 2001; Shackleton and Shackleton 2000; 2004). Important land-based activities include arable farming, livestock husbandry, and consumption and trade in natural resources (e.g., fuelwood, wild herbs) and, as such, environmental change holds tremendous potential to impact livelihoods. In addition, while the local environment offers potential means of generating income and/or meeting dietary needs, it also acts as a "buffer" against household shocks such as job loss and/or mortality (e.g., Hunter, Twine and Patterson 2007).

Although the state of the local environment is central to the well-being of millions of households in rural regions of developing countries, little is known about environmental perceptions and concerns of residents in these areas. Indeed, questions remain as to how residents in less developed settings view environmental problems and the relative importance placed on these and other issues shaping household well-being. This paper presents results from recently collected survey data that measured environmental perceptions of residents living in an impoverished rural region in the northeast of South Africa. Through this examination, we seek to contribute to the understanding of environmental concerns in developing and less affluent regions of the world. Such understanding is both theoretically and practically important in several respects. First, this analysis contributes to the paucity of research on environmental perceptions in developing settings, offering theoretical insight on the central factors, both physical and cultural, that contribute to environmental concern. In addition, understanding the relative priority of various environment and development issues should help shape policy priorities (Hunter 2006). The salience of locally-informed policies may encourage grassroots participation in programs aimed at improving development infrastructures and environmental conditions (Barber, Biddlecom and

Axinn 2003). In this way, informing policy with knowledge of local residents' concerns may result in a more sustainable approach toward mitigating local problems. Finally, and in another practical sense, environmental perceptions may serve as useful indicators of environmental degradation and biophysical change, particularly in rural developing settings where limited data on environmental conditions exist (Barber et al. 2003).

In the following pages, we explore the value of examining environmental perceptions within a rural developing region, arguing that residents in such locations are facing the combined challenge of growing dependence on the local natural environment and increased resource scarcity – although these challenges are only a fraction of those shaping household social and economic well-being. We next provide a brief review of contemporary social science literature related to the socio-demographic determinants of environmental concern as well as relevant literature on environmental perceptions in less developed regions. This literature review also presents an excellent opportunity to further explore Inglehart's post-materialist thesis (1977; 1990; 1995; 1997). Finally, we describe our research setting and methods, followed by the results and a discussion of the study's implications.

Background

Some of the world's most acute environmental changes are occurring in rural developing settings, where natural resources are central to income generation as well as meeting daily dietary and energy needs. Unfortunately, high levels of dependence on proximate resources often result in local resource degradation. As an example, evidence suggests that dependence on local fuelwood as a primary energy source perpetuates deforestation, while also disturbing soil composition and local hydrological cycles (Bugaje 2006; Percival and Homer-Dixon 1995). Further, some scholarship also suggests that environmental pressure has been intensified by the AIDS pandemic. The World Heath Organization estimates 28 million people are living with HIV/AIDS in southern Africa, the world's highest prevalence rate (Walgate and Cullinan 2002). As related to the natural environment, adult mortality

may intensify household resource dependence since natural resources act as a "buffer" after the loss of productive household members. Specifically, wild foods may meet dietary needs if purchasing power has declined, while other natural resources provide the potential for income generation as raw materials for market products (e.g., reed mats, baskets) (Hunter, Twine and Johnson 2006; Hunter, Twine and Patterson 2007).

Although social scientists continue to document resource dependence and ecologists continue to model environmental change, we know relatively little about residents' perceptions of such issues. The gap is surprising, since social well-being within these contexts is so clearly intertwined with proximate environmental conditions.

Variation in Environmental Concern

Social scientists have produced a significant amount of research exploring environmental values as well as attitudes toward, and concern with, 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 pro-environmental attitudes 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). Other explorations focus on religion and the ways in which spiritual orientation shape environmental perceptions. As an example, Biel and Nilsson (2005) find religious values influence environmental concern, but only when the topic under consideration requires that individuals must reach to those values within the shaping of opinion (e.g., the moral dimensions of genetically-modified organisms).

International Environmental Concern: The Post-Materialist Thesis

Cross national studies of environmental perceptions draw attention to the difficulty of generalizing specific conceptualizations of "environmental concern" across various geographic and cultural contexts. An intriguing debate in this regard has centered on Inglehart's (1977; 1990; 1995; 1997) post-materialist thesis, which holds that values and the priorities individuals assign to these values are largely shaped by the socio-economic conditions that exist during one's formative years – from childhood to adulthood. Due to changing socio-economic conditions across the 20th century, individuals from different generations emphasize and express different values. Pre-war generations, for example, tend to emphasize material values, such as physical sustenance and safety whereas post-war generations emphasize post-material values such as, freedom, self-expression and quality of life, typically correlated with increasing wealth (Carlisle and Smith 2005; Inglehart 1981;1990).

One of the consequences of the public's shift in attention to quality of life concerns, Inglehart (1995) argues, is an increase in environmental consciousness and a concomitant increase in public interest in environmental protection (Inglehart 1990; 1995; 1997; Dunlap and York forthcoming 2008). Based somewhat upon Maslow's hierarchy of human needs, some have argued that the post-materialist thesis assumes environmental concern is a "higher-order" value, one that poor people, who struggle to sustain basic daily needs, cannot afford to express (Dunlap and York forthcoming 2008). However, the notion that only rich people and nations can afford to express environmental concern has inspired scholarly debate on the question of 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

environmental 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). Moreover, residents in a majority of the developing nations expressed health concerns as related to environmental degradation. Such high levels of both environmental and health concerns suggest environmental problems are not of concern only to post-materialists (Dunlap et al.1993).

Additional cross-country explorations also demonstrate that environmental concern transcends material wealth. Dunlap and Mertig (1995) find a negative correlation between GNP per capita with 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. Furthermore, Brechin and Kempton (1994) argue that the proliferation of grassroots environmental organizations in developing countries and cross-national opinion-surveys showing 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 environmentalism as well as inspired academics to expand explanations of environmental concern in poorer and less developed countries.

In later writings, Inglehart (1995) offered a new explanation as to why environmental concern can be found among residents in poorer countries, arguing 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 and active because they directly experience the by-products of 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" explanation for the rise in global environmentalism has sparked further dispute about the utility of generalizing environmental concern across various economic and geographic contexts. Brechin's (1999, 802) study contradicts Inglehart's

explanation revealing that regardless of the number of post-materialists, citizens of both wealthy and poor countries appear to have subjective values influencing their concerns about the environment. Finally Dunlap and York (forthcoming 2008, 13) argue Inglehart's rationale is a "post hoc explanation for the surprisingly high levels of public concern for the environment in poor nations." As such, scholars agree that universal and simplistic explanations are inadequate to fully understand the diverse and complex sources of environmentalism around the world (Dunlap and York, forthcoming 2008; Brechin 1999).

International Environmental Concern: Less Developed Countries

Several country-specific studies examine residents' environmental perceptions in developing settings, thereby offering more specific insight on the nature of environmental concern within poorer nations (Anderson et al. 2007; Campion and Shrum 2002; Gosken, Adaman and Zenginobuz 2002; Harris 2006; White and Hunter 2005; Zimmerer 1993). Much of this literature explores residents' perceptions of changes in daily living conditions, local natural resource supplies and related development issues as well as how geographic and cultural context shape environmental orientations. As a recent example, Anderson et al. (2007) explore perceptions, attitudes and behaviors related to water issues and water pollution across different ethnic and socio-economic groups in South Africa. The results suggest that living in poor environmental circumstances is generally related to perceiving environmental problems. Succinctly, "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). These findings suggest that specific household conditions may influence environmental perceptions. Moreover, education levels of household heads were positively correlated with treating water for all groups, suggesting "having a relatively well educated household head seems to empower households to take action to alleviate the problem" (Anderson et al. 2007, 157). Such studies offer insight as to the objective nature of environmental concern, highlighting one explanation for increased attention to environmental issues in developing settings.

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) finds the Chinese express a very instrumental view of the natural world, in which they believe economic development should come before environmental protection. Harris argues that such attitudes are rooted in China's long history of poverty and deprivation, resulting in a widespread concern with material wealth and consumption (Harris 2006). Another study completed in rural regions of Northern China highlights local residents' perceptions of environmental risks compared to scientific expert perceptions of land-degrading activities (Lee and Zhang 2005). The lay public ranked cutting trees for fuelwood as the most environmentally harmful activity, while the scientific experts perceived mining of groundwater as the most damaging environmental activity. The authors attribute the lay public's undervaluation of mining of groundwater to the local people's dependency on the activity as well as the limited media attention on negative environmental effects of groundwater mining. Ultimately, the authors argue that "any generalized solutions may not be able to fit into the contextual ecological and socio-economical circumstances of the affected areas" due to the public's diverse environmental perceptions (Lee and Zhang 2005, 721).

Other studies show how local environmental perceptions are the result of a fusion of various environmental discourses, also reflecting the diversity of sources of environmental information and values. Zimmerer (1993) explores the variety of perceptions of soil erosion among different groups in Cochabamba, Bolivia and discovers how different social discourses on the causes of soil erosion shape public perception. The study found that development institutions attributed soil erosion to peasant farmers' livestock and grazing practices during the mid-1980s. The development institution's explanation for degradation was publicly accepted and reinforced by the peasants themselves who accepted blame for the problem. However, younger generations of peasants argued that government economic policies were at the root of the soil erosion problem because they forced previous generations

to live in unfavorable circumstances without successful conservation plans. Despite the diversity of perceptions over one central issue, Zimmerer asserts that local peasant "voices" are critical to democratizing the process of development and implementing successful conservation related development projects.

A more recent study in Costa Rica (Schelhas and Pfeffer 2005) found that environmental perceptions are influenced by international environmental discourses. Based on 67 qualitative interviews of rural Costa Ricans living near La Amistad National Park, the authors found that global environmental discourse, with emphasis on eco-tourism and conservation, plays a key role in framing the way local people think and talk about forests. The fusion of local and global environmental values results in a unique blend of environmental beliefs that legitimize both forest conservation as well as resource dependent activities, ultimately allowing local people to negotiate a path that includes both (Schelhas and Pfeffer 2005, 12). As such, the authors argue that while environmental activism and action have increased across the globe over the last two decades, it has not resulted in homogeneous global environmental values, rather distinct environmental beliefs and perceptions which are socially constructed in different places.

Environmental perceptions in rural regions are also influenced by developmental and social change. Barber et al. (2003) examine rural regions of Nepal showing the impacts that new neighborhood facilities (e.g., new schools, agricultural cooperatives and bus services) have on residents' environmental perceptions. The results indicate a relationship between new development facilities and 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). These findings suggest that the development of new facilities may intensify daily hardships by degrading natural resources. This increased strain on important resource needs may disproportionately impact certain community members, such as women, who are mainly responsible for gathering firewood, food

and water. Thus, the authors conclude that the environmental and social consequences of new facility development must be considered when placing new amenities in rural developing settings.

In all, social scientific investigations on environmental concern and attitudes provide important insight as to the ways in which individuals perceive environmental issues as well as to the nature of this concern. The studies that directly examine environmental concerns among residents in developing settings highlight the diverse roots of environmental concern, providing a springboard for this project. Specifically, we extend existing analyses through consideration of multiple environmental problems to highlight which environmental issues are of greatest salience to these communities. In addition, we emphasize spatial location as associated with environmental concern to more closely examine the association between the materiality of daily life and environmental perception since proximate environmental conditions greatly shape local well-being. In this way, our analyses are designed to critically examine part of the conceptual foundation of the post-materialist thesis and offer insight on global environmentalism in general.

Research Setting and Methods

Our fieldwork was undertaken during May-June 2004 in the far northeast of South Africa in the rural setting of the demographic surveillance site of the MRC/WITS Rural Public Health and Health Transitions Research Unit (Agincourt). Twenty-one villages and over 11,000 households are located in the 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 is characterized by a high reliance on both natural resources and remittances from a large migrant population. Indeed, there is limited formal sector employment and, as such, a large proportion of adults are migrant laborers, working on commercial farms and in towns and cities across the country. Of all males between the ages of 30 and 49, 50% are migrant workers, as are

14% of females of the same age group. In addition, a significant proportion of households depend on the state pension of an elderly resident as the only reliable source of household income. As noted, residents of these rural communities are typically dependent on the natural environment for a range of uses, including the grazing of livestock and the collection of fuelwood, wild foods, thatching grass, construction timber, and other domestic products that are used for both household consumption and for generating income (Shackleton 1996; Shackleton and Shackleton 2000). Finally, since South Africa is a water scarce country, water resource depletion and degradation are also central issues challenging rural residents (Brooks 1995).

(Figure 1 about here)

Information on the socio-economic-demographic characteristics of study site households was available through the Agincourt Health and Demographic Surveillance System (AHDSS). Since 1992, the research unit has collected census data at 12-18 month intervals from the approximate 11,000 households in the Agincourt subdistrict. We undertook a natural resource survey with 240 households in 8 villages in the central region of the study site.[1] Given the focus of the broader study on resource use as related to household mortality experience, the sample was stratified by mortality experience, half of the survey households were randomly selected from village households having experienced the death of a household member aged 15-29 in the past 2 years. Half were selected from households experiencing no such mortality. The survey focused on both fuelwood and water, and queried as to household selection, collection, use, and consumption patterns at present and five years prior.

We also queried as to perceptions of the severity of several environmental problems and these are the data on which the present analyses are based. The interviewer read a list of environmental issues

[1] Geographic restrictions were due to logistical and budgetary considerations. Nonetheless, the study villages were chosen to represent a range of environmental context along the region's east-west rainfall gradient.

following 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?"* A "don't know" category was also available for use by the interviewer although this response was not specifically offered the respondents. Thus, our bivariate and multivariate estimates reflect the percentage (or probability in the case of multivariate regression) of respondents noting that a particular environmental issue is "very serious," as opposed to "serious," "not very serious," or responding "don't know."

Our predictor variables allow examination of environmental perception by socio-demographic characteristics. 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, greater than 10). Two additional variables reflect household composition with a household identified as having a young age structure if at least 1/3 of its members are under age 15, while an older age structure means at least 1/3 of a household's members are over age 50. Finally, a "possessions index" in the AHDSS reflects socio-economic status (SES). The index ranges from 1 (low) to 5 (high) and is derived annually from an asset register including presence of a tap and toilet on the household stand, as well as ownership of appliances (e.g. radio) and equipment (e.g. wheelbarrow).

Village indicator variables are included to reflect contextual variation in environmental perceptions and concern. Specifically, we include 8 dummy variables reflecting villages represented by at least 15 survey respondents. The village Ireagh A/B is used as the reference category due to its relative abundance of local fuelwood (a key environmental concern).

As to our sample, household size ranges from 1 to 21 with the average just over six. Many more households are characterized by a young age structure as opposed to an older one. Indeed, members under the age of 15 comprise at least 1/3 of household members in over half of the study households, while only 10% are characterized by the predominance of members of 50 years of age. Finally, on the SES scale of 1 to 5, 3.2 represents the mean value for sampled households.

Results

Overall, there were several environmental problems perceived as "very serious" by the vast majority of survey respondents (Figure 2). Over 80% of respondents noted litter/refuse, lack of rain, bush fires, soil conditions, and dirty rivers/dams as "very serious" local issues, while salty/dirty tap water and poor air quality ranked only slightly behind. Of lesser concern, but still noted as "very serious" by over half of the respondents was indoor cooking smoke and the lack of flush toilets. Only overgrazing and overpopulation were perceived as "very serious" by less than half of the respondents. We also queried as to which environmental problem respondents deemed as the most important in their community; the grey bars in Figure 2 represent the distribution of these responses. When queried in this manner, respondents ranked water quality and availability as top local environmental concerns.

(Figure 2 about here)

Looking at the bivariate associations between our socio-demographic control variables and the perception outcomes (not shown), household demographic profiles exhibit little association with the perceived severity of these issues. Only two statistical significant associations were found: younger households were more likely to mention overgrazing as "very serious" ($p<0.09$), while older households were more likely to note dirty rivers/dams as "very serious" ($p<0.02$).

On respondent characteristics, male heads stand out as generally noting more issues as "very serious." Indeed, male heads are more likely than other respondents (regardless of gender) to note the following as "very serious": dirty rivers ($p<0.08$), litter/refuse ($p<0.01$), poor air quality ($p<0.06$), cooking smoke ($p<0.08$), too many people ($p<0.02$), bushfires ($p<0.08$), lack of toilets ($p<0.03$) and overgrazing ($p<0.08$). The only outcomes for which there was <u>not</u> a statistically significant association was lack of rain, cutting trees, soil erosion/quality, salty/dirty tap water. Interestingly, these later

outcomes are primarily associated with household duties typically associated with females and/or younger males, such as fuelwood and water collection and maintenance of homestead gardens and fields. As to female household heads, we find much less in terms of statistically significant bivariate associations with environmental perceptions. Indeed, only in the case of cooking smoke was there a strong association ($p<0.03$) whereby female heads are less likely to note cooking smoke as "very serious." This is surprising because, in this context, women do all the cooking and might be expected to demonstrate more concern with wood smoke.

On examining bivariate associations of environmental perceptions by village context, we find statistically significant variation across villages for four environmental issues (see Figure 3). As examples, 100% of respondents from the village of Croquetlawn noted "cutting trees" as a "very serious" local environmental issue while two-thirds of respondents from Kildare A suggested the issue rose to that level of severity. "Salty/dirty tap water" rose to prominence in environmental concern among villagers in Cunningmore A, although less than half of those in Kildare B suggested that this issue was "very serious." Those in Kildare B appear most concerned with soil erosion. Overall, these bivariate results provide early evidence of contextual influences on environmental concern.

(Figure 3 about here)

To explore the association between environmental perceptions, household socio-economic-demographic characteristics, and village context simultaneously, we used logistic regression to predict the probability of a survey respondent noting each particular environmental issue as "very serious" in their local community. As suggested by the bivariate results, a key finding emerging from the multivariate results is that context matters (Table 1). Further, context matters in a very local sense for households whose subsistence is garnered from nearby facilities and communal lands. Although logical, there is little empirical validation of this spatial variation in expression in developing settings and the

evidence clearly suggests that residents of rural, less developed regions express logically informed environmental concerns.

(Table 1 about here)

Interestingly, none of the household demographic characteristics (household size and age composition) distinguish across households the concern expressed with various environmental issues. Neither does household socioeconomic status as reflected by the asset index. These findings suggest relative agreement regarding the severity of the different environmental issues across different types of households in the Agincourt field site.

The factors that do distinguish concern are village location and gender and household position of the respondent, again suggesting that respondents express concerns shaped by their individual experience with proximate conditions. Specifically, as the case in the bivariate associations, male household heads are more likely than others to express the following as "very serious" local issues: dirty rivers/dams, litter/refuse, soil erosion, bush fires, toilets, overgrazing and population pressures. As noted above, concerns with these aspects of the environment reflect gendered experience. As an example, within this cultural context, men and boys care for cattle, therefore shaping concern with grazing issues. Population pressures may also be particularly salient to men, although additional individuals at home tend to be helpful to women with gendered homestead chores.

As discussed, place characteristics are reflected by a series of dummy variables indicating the village location of each survey respondent. The R-squared for the baseline models without place characteristics is presented at the bottom of Table 2, followed by the statistics for the models in which village location is also considered. It is clear that context matters in that the proportion variance explained increases anywhere from 43% to 86% with place characteristics considered.

With regard to specific estimates, there are many instances in which village context is a statistically significant predictor of a particular environmental concern. As examples, residents of

Cunningmore B and Kildare A are less likely to note salty/dirty tap water as "very serious," thereby suggesting that their local water supplies are of relatively better quality. Cutting trees is less of an issue in Kildare A, Kildare B and Lilydale A, interestingly because these are areas whose communal lands are predominantly deforested. Perhaps given the lack of availability of local fuelwood, residents have developed coping strategies considered effective (e.g. fuelwood suppliers from another region). As another indication of context's association with concern, the relatively lower vegetation cover is also reflected in the lower probability of residents in these villages of seeing bushfires as a "very serious" issue. In this way, we find that even within a context characterized by material scarcity, there is variation of environmental perceptions, which highlights the importance of the local context in shaping residents environmental perceptions.

Discussion and Implications

Our survey results provide evidence of the material nature of environmental concern, especially within areas of general resource scarcity. The bivariate and multivariate results suggest that both physical and cultural context plays a role in shaping environmental concerns. With regard to physical context, consideration of village location dramatically improved our ability to predict environmental concerns, suggesting that location shapes environmental perception. With regard to culture, our results provide evidence of gendered interaction with the material environment in that men prioritize environmental issues with which they have more familiarity such as overgrazing. Women, on the other hand, express primary concern with water quality and quantity. According to Crow and Sultana (2002) water collection is a major part of the work of women in rural areas of the global south generally, and this is certainly the case in the Agincourt field site.

Because our results highlight the importance of the physical and cultural context in shaping environmental concern, they offer important insight on the post-materialist thesis, especially with regard to 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 indeed show that spatial proximity to objective problems within certain villages correlates with environmental concern for such local issues. Yet we also find that residents concern for issues goes beyond the simplistic objective problems, which Inglehart (1995) defines as "air and water pollution" and into 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.

Because natural resource scarcity and degraded environmental conditions are directly linked to resident's 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 issues varies across villages within the same region, which are characterized by slightly different environmental constraints. This also demonstrates the difficulty in generalizing why individuals may emphasize certain environmental concerns and not others.

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 2008, 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 nor ask residents why they perceived particular issues as more serious. Follow-up interviews could provide additional insight on the explanations of environmental concern across various regions.

Despite these limitations, we argue that knowing 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, Romani, Wentzel and Tlabela 2007). As stated earlier, environmental perceptions serve as useful indicators of environmental degradation, which offers both natural and social scientists important information regarding natural resource and environmental change over time (Barber et al. 2003). 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. Further, given high rates of illiteracy among the study population, the results suggest that formal education is not required for developing environmental concerns; rather they emerge from the materiality of daily life.

Finally, knowledge of environmental concern across different contexts theoretically contributes to our understanding of environmentalism within developing nations, advancing academic insight regarding environmental concern as an international phenomenon with diverse roots.

Conclusion

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) echoes 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 indeed 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 be actually be more commonality than difference with regard to social and environmental concerns. Indeed, people around the world may share "a basic set of fundamental understandings about the earth, how it functions, and the necessity of fairness and equity for all people dependent on the planet's life-giving systems" (Hawken 2007, 21). As such, the "globalization of citizen concern for the environment" (Dunlap and York forthcoming 2008), can be viewed as a uniting force -- a force that some argue is the largest and fastest growing social movement in history (Hawken 2007).

Therefore, we end with two important, yet somewhat contradictory conclusions. First, environmental concern across the world *is not* homogeneous, thereby revealing the need for greater emphasis on understanding diverse perceptions and creating more ground-up and democratic approaches toward mitigation of environmental problems. The second conclusion is that environmental concern is in fact, *in some respects,* homogeneous – 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 environmentalism revolves around livelihoods, socioeconomics and the individual experience, while widespread international environmentalism exposes the globalization of the 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.

Emphasizing the similar ideological threads regarding the value of both human and natural life is critical in the collaboration of local and global social and environmental protection. Ultimately, voicing environmental concerns across diverse settings helps us become one step closer to revealing both the diversity and the commonalities regarding the human-environment relationship.

Figure 1:
Study Area, Agincourt Health and Demographic Surveillance Site, Mpumalanga Province, South Africa

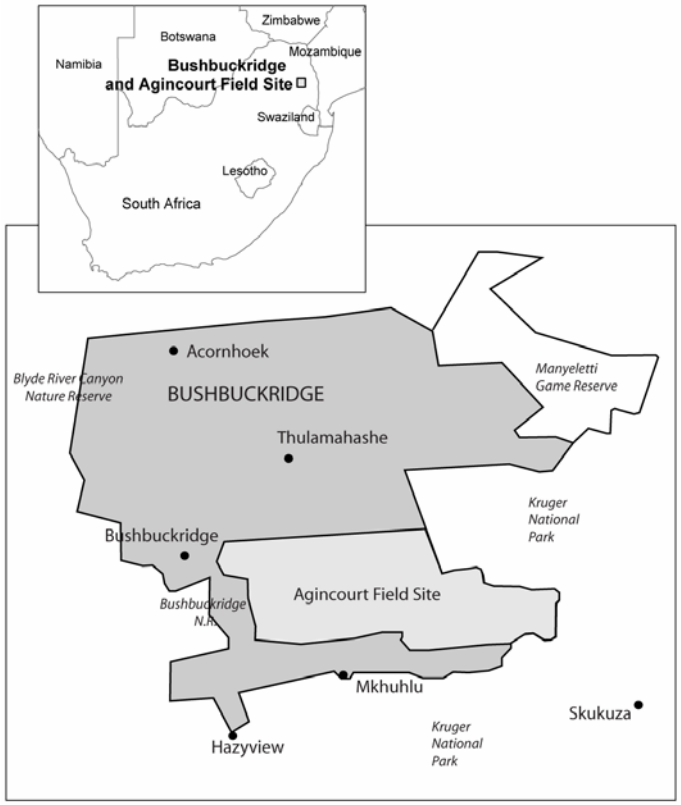

Figure 2: Perception of Environmental Problems, Local Residents, Agincourt Health and Demographic Surveillance Site, South Africa

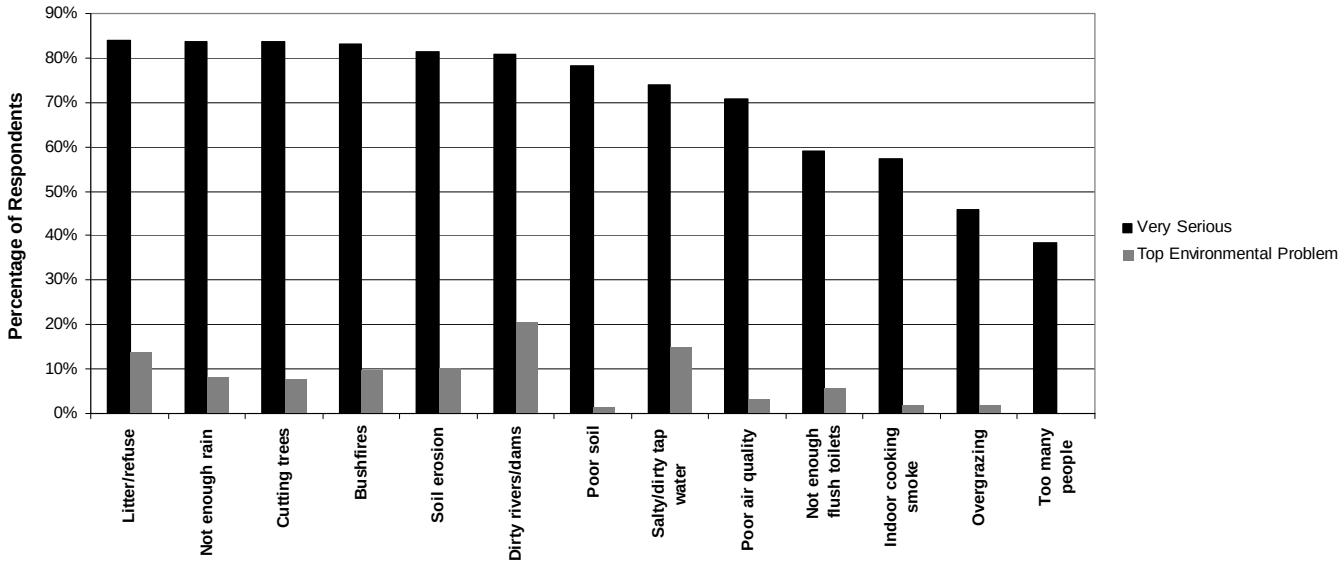

Figure 3: "Very Serious" Environmental Issues by Village, Agincourt Health and Demographic Surveillance Site, South Africa

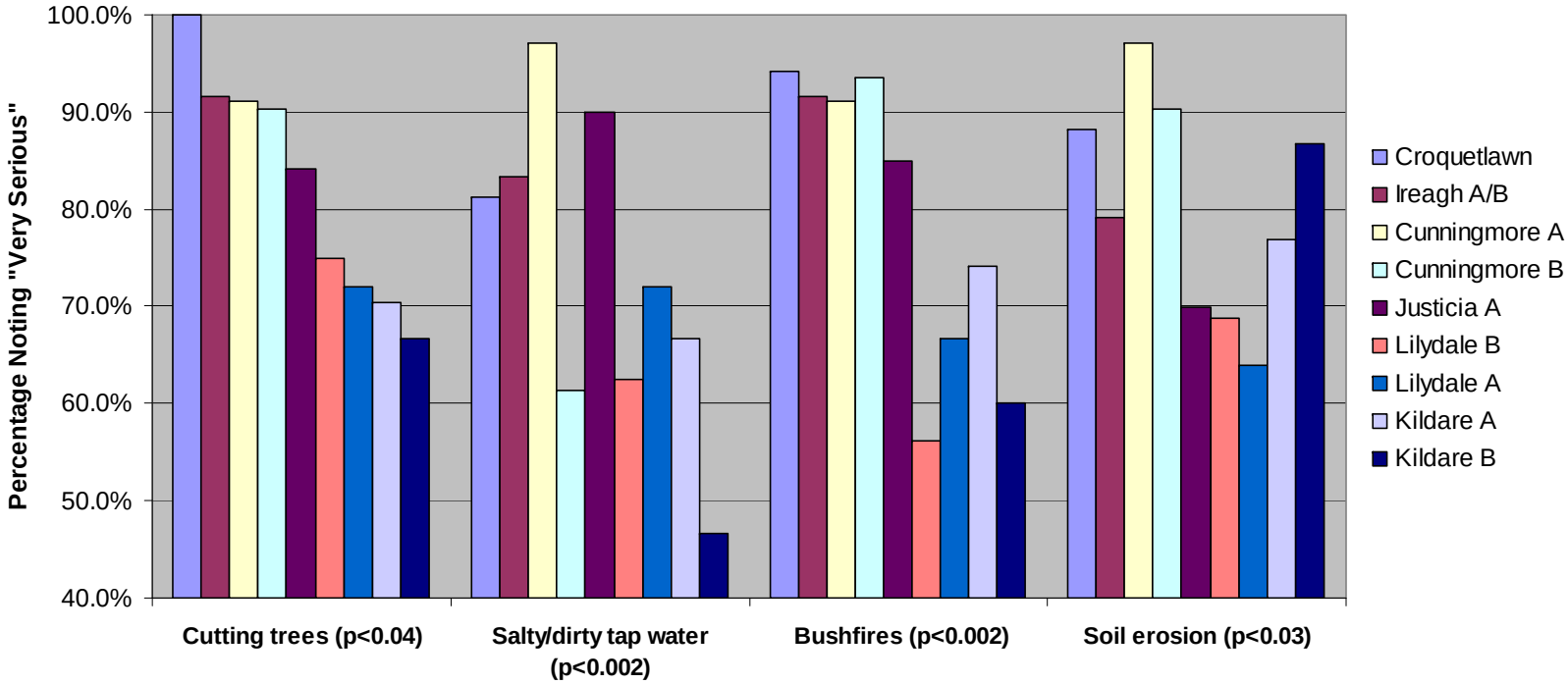

Table 1: Logistic Regression Predicting Perception of Environmental Problem as "Very Serious," Agincourt Health and Population Unit, Bushbuckridge, South Africa.

	Dirty rivers/dams	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
Demographic Characteristics													
Household Size	0.00	0.00	-0.01	-0.01	0.00	0.02 *	0.00	-0.01	0.00	-0.02 **	0.00	-0.01	-0.01
Young household	0.05	-0.09	12.00	0.01	-0.06	-0.07	-0.07	0.06	-0.03	-0.11	-0.07	0.01	0.01
Older household	0.23 **	0.05	0.03	-0.06	-0.03	0.10	-0.09	-0.09	0.13	-0.17	0.14	0.06	-0.13
Economic Characteristics													
Asset Index	0.04 *	-0.02	0.02	0.00	-0.01	-0.01	0.01	0.01	0.01	0.02	0.04 *	0.00	0.01
Respondent Characteristics													
Male head	0.12 *	0.08	0.12 **	0.11 *	0.12 *	0.00	0.08	0.18 **	0.11	0.22 ***	0.06	0.07	0.21 ***
Female head	0.04	0.08	0.02	0.01	0.04	-0.01	0.03	0.06	-0.03	0.17	-0.12	-0.05	0.06
Female respondent	0.02	-0.05	-0.06	-0.04	-0.10	0.09	-0.06	0.03	0.06	0.03	-0.10	0.00	0.07
Place Characteristics (Ireagh A/B=ref)													
Croquetlawn	-0.11	-0.03	-0.03	0.07	0.01	-0.22 *	0.06	0.03	0.01	-0.30 *	-0.03	0.00	-0.14
Cunningmore A	-0.05	0.16	-0.04	0.18 *	0.01	0.00	-0.01	0.13	0.01	-0.06	-0.03	0.07	-0.08
Cunningmore B	-0.04	-0.24 **	-0.17 *	0.10	0.00	-0.01	-0.03	0.20	0.10	-0.21	0.01	0.13	-0.03
Justicia A	0.11	0.03	0.04	-0.13	-0.11	-0.17	-0.11	0.22	0.07	-0.14	-0.03	0.00	0.10
Kildare A	0.02	-0.19	-0.15	0.00	-0.19 *	-0.12	-0.20 *	0.11	-0.23 *	-0.02	-0.04	0.02	-0.18
Kildare B	0.00	-0.38 ***	0.02	0.06	-0.34 ***	0.02	-0.24 **	0.26	-0.02	-0.12	-0.46 ***	-0.04	0.02
Lilydale A	-0.11	-0.14	-0.10	-0.16	-0.26 **	-0.05	-0.22 **	0.17	-0.02	-0.19	-0.01	-0.05	-0.02
Lilydale B	-0.16	-0.24	-0.02	-0.12	-0.38 ***	-0.18	-0.16	0.05	-0.05	-0.20	-0.03	0.07	-0.21
Constant	0.60 ***	0.93 ***	0.88 ***	0.81 ***	1.03 ***	0.82 ***	0.94 ***	0.37 **	0.62 ***	0.65 ***	0.64	0.81 ***	0.35 **
R^2 (baseline, no place characteristics)	0.07	0.02	0.04	0.02	0.04	0.03	0.03	0.03	0.02	0.06	0.06	0.02	0.04
R^2 (full model)	0.12	0.14	0.08	0.11	0.17	0.09	0.11	0.08	0.07	0.10	0.14	0.05	0.09
Percentage diff in R^2	43.32	85.71	48.72	81.31	75.76	65.12	72.07	61.54	70.59	40.71	56.83	57.36	55.51
N	220	223	223	223	223	221	224	222	223	210	223	220	219

* p<0.10; **p<0.05; ***p<0.01

References

Anderson, B. A., J. H. Romani, H. Phillips, M. Wentzel, and K. Tlabela. 2007. Exploring environmental perceptions, behaviors and awareness: water and water pollution in South Africa. *Population and Environment* 28:133-161.

Barber, J. S., A. E. Biddlecom and W. G. Axinn. 2003. Neighborhood social change and perceptions of environmental degradation. *Population and Environment* 25(2):77-108.

Biel, A. and A. Nilsson. 2005. Religious values and environmental concern: Harmony and detachment. *Social Science Quarterly* 86:178-191.

Brechin, S. R. and W. Kempton. 1994. Global environmentalism: A challenge to the post-materialism thesis? *Social Science Quarterly* 75:245-269.

Brechin, S. 1999. Objective problems, subjective values, and global environmentalism: evaluating the post-materialist argument and challenging a new explanation. *Social Science Quarterly* 80:793–811.

Brechin, S. 2003. *Contested nature: Promoting international biodiversity with social justice in the Twenty-first century.* New York: Suny Press.

Brooks, D. May 1995. Field study report: South Africa, Mozambique and East Africa. Ottawa*: International Development Research Centre, Environment and Natural Resources Division* 31:17.

Bugaje, I. M. 2006. Renewable energy for sustainable development in Africa: A review. *Renewable and Sustainable Energy Reviews* 10(6):603-612.

Campion, P. and W. Shrum. 2002. Environmental attitudes of scientists in Ghana, Kenya and Kerlara: Evidence on NGOs and traditional research sectors. *Journal of Asian and African Studies* 37(1):17-42.

Carlisle, J. and E. R. Smith 2005. Post-materialism vs. egalitarianism as predictors of energy-related attitudes *Environmental Politics* 14(4):527-540.

Crow, B. and F. Sultana 2002. Gender, class, and access to water: Three cases in a poor and crowded delta. *Society and Natural Resources* 15:709-724.

Dunlap, R. E. and R. York. Forthcoming 2008. The globalization of environmental concern and the limits of the post-materialist values explanation: Evidence from four multi-national surveys *Sociological Quarterly.*

Dunlap, R. E., G. H. Gallup Jr. and A. Gallup. 1993. Of global concern: Results of the health of the planet survey. *Environment* 35(6–15):33–39.

Dunlap, R. E., C. Xiao and A. M. McCright. 2001. Politics and environment in America: Partisan and ideological cleavages in public support for environmentalism. *Environmental Politics* 10(4):23–48.

Dunlap, R. E. and A. G. Mertig. 1995. Global concern for the environment: Is affluence a prerequisite? *Journal of Social Issues* 51:122-137.

Dunlap, R. E. and A. G. Mertig. 1997. Global environmental concern: an anomaly for post-materialism *Social Science Quarterly* 78:24–29.

Gosken, F., F. Adaman and E. Zenginobuz. 2002. On environmental concern, willingness to pay and post-materialist values: evidence from Istanbul. *Environment and Behavior* 34(5):616-533.

Harris, P. 2006. Environmental perspectives and behavior in China. *Environment and Behavior* 38(1):5-21.

Hawken, P. 2007. *Blessed unrest: How the largest movement in the world came into being,* New York: Penguin Group Press.

Hunter, L. M. 2006. Household strategies in the face of resource scarcity: Are they associated with development priorities. *Population Research and Policy Review* 25(2):157-174.

Hunter, L. M., A. Johnson and A. Hatch. 2004. Cross-national gender variation in environmental behaviors. *Social Science Quarterly* 85(3):677-694.

Hunter, L. M., W. Twine, and A. Johnson. 2006. The natural resource context of the African HIV/AIDS pandemic. *Institute of Behavioral Science Working Paper* EB2005-0004. URL: www.colorado.edu/IBS

Hunter, L. M, W. Twine, and L. Patterson. (2007, in press). Locusts are now our beef: Adult mortality and household dietary use of local environmental resources. *Scandinavian Journal of Public Health.*

Inglehart, R. 1971. The silent revolution in Europe: intergenerational change in postindustrial societies. *American Political Science Review* 65:991–1017.

Inglehart, R. 1977. *The silent revolution: Changing values and political styles among western publics.* Princeton, NJ: Princeton University Press.

Inglehart, R. 1981. Post-Materialism in an Environment of Insecurity *The American Political Science Review*, 75(4):880-900.

Inglehart, R. 1990. *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.

Inglehart, R. 1995. Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science and Politics* 28(1):57-72.

Inglehart, R. 1997. *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies,* Princeton: Princeton University Press, 1997.

Jones, R. E. and R. E. Dunlap. 1992. The social bases of environmental concern: Have they changed over time? *Rural Sociology* 57:28-47.

Kempton, W. M., J. S. Boster and J.A. Hartley. 1995. *Environmental values in American culture.* Boston: MIT Press.

Klineberg, S. L., M. McKeever and B. Rothenbach. 1998. Demographic predictors of environmental concern: It does make a difference how it's measured. *Social Science Quarterly* 79:734-753.

Koziell, I. and J. Saunders. 2001. *Living off biodiversity: Exploring livelihoods and biodiversity.* London: IIED.

Lee, H. and D. Zhang. 2005. Perceiving land-degrading activities from the perspective of lay public in northern China. *Environmental Management* 36(5):711-725.

Marshal, B. K., S. Picou and C. Bevc. 2005. Ecological disasters as contextual transformation: Environmental Values in a renewable resource community. *Environment and Behavior* 37(5):706-728.

Percival, V. and T. Homer-Dixon. 1995 *Project on environment, population and security.* American Association for the Advancement of Science and the University of Toronto: Washington, D.C.

Schelhas, J. and M. J. Pfeffer. 2005. Forest values of national park neighbors in Costa Rica. *Human Organization* 64(4):385-397.

Shackleton, S. E. 1996. The woodcraft industry in the Bushbuckridge district of the Mpumalanga lowveld, South Africa. In *The miombo in transition: woodlands and welfare in Africa*, ed. B.M. Campbell, 163-164. Bogor: CIFOR.

Shackleton, C. M. and S. E. Shackleton. 2000. Direct use values of savanna resources harvested from communal savannas in the Bushbuckridge lowveld, South Africa. *Journal of Tropical Forest Products* 6(1):28-47.

Shackleton, C. M. and S. E. Shackleton. 2004. The importance of non-timber forest products in rural livelihood security and as safety nets: a review of evidence from South Africa. *South African Journal of Science* 100:658-664.

Stern, P. C. and T. Dietz. 1994. The value basis of environmental concern." *Journal of Social Issues* 50: 65-84.

Van Liere, K. D and R. E. Dunlap. 1980. The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. *Public Opinion Quarterly* 44:181-197.

Walgate, R. and K. Cullinan. 2002. HIV/AIDS deepens food crisis in southern Africa. *Bulletin of the World Health Organization* 80(8):687.

White, M. J. and L. M. Hunter. 2005. Public Perception of Environmental Issues in a Developing Setting. *Institute for Behavioral Sciences: Working Paper* EB2005-0003 URL: http://www.colorado.edu/ibs/pubs/eb/eb2005-0003.pdf

Zelezny, L. C., P. Chua, and C. Aldrich. 2000. Elaborating on gender differences in environmentalism. *Journal of Social Issues* 56: 443-457.

Zimmerer, K. S. 1993. Soil erosion and social (dis)courses in Cochabamba, Bolivia: Perceiving the nature of environmental degradation. *Economic Geography* 69(3):312-327.