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### Attitudes Toward Wildlife and Conservation Across Africa: A Review of Survey Research

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# Attitudes Toward Wildlife and Conservation Across Africa: A Review of Survey Research

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*Human–wildlife conflict is increasing across Africa and enlisting the support of local people is critical to conflict mitigation and conservation efforts. Information from attitude surveys can inform management and policy decisions particularly in situations of human–wildlife conflict. Our review of survey research in Africa revealed a wide range of methods. We discuss the challenges in obtaining valid, reliable, and generalizable data and consider the feasibility of transferring Western-based methods and theory to African settings. We examine how the reviewed studies address methodological issues as they relate to the basic tenets of scientific inquiry and make recommendations for a framework of standards of best practice. Using social science research tools, it is important to build upon this growing body of human dimensions research in Africa. Researchers need to recognize cultural variation while implementing consistent methodological and theoretical frameworks to ensure valid and reliable information is informing decision-making processes.*

**Keywords** Africa, attitudes, conservation, methods, surveys, wildlife

## Introduction

Human–wildlife conflict is increasing across Africa (Ngure, 1992; Waithaka, 1993; Hoare, 1995; Tchamba, 1995; Barnes, 1996; Madden, 2004). As human populations and demands for land increase throughout the continent, human–wildlife conflict will continue to increase and less land will likely be available for parks and protected areas. Outside of protected areas, wildlife will increasingly depend on dispersal areas occupied by people; therefore, enlisting the support of local people is, and will continue to be, critical to management and conservation efforts. Part of this process entails understanding people’s attitudes and beliefs, as they are posited to influence human behavior (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980); therefore, understanding individuals’ attitudes can help managers better predict the response and support of local people to wildlife policies.

Data gathered from attitudinal surveys give guidance to management decisions and act as a baseline to test the effects of policy decisions. This information has shown to be effective in assessing the success of experimental policies such as increasing benefits to communities and using locally recruited game-guards (Lewis, undated). Information that

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describes the origin and links between public attitudes toward wildlife and the acceptability of management actions provides wildlife officials and stakeholders with the data needed to discuss competing public beliefs, address potential misunderstandings, and develop solutions (Vaske & Donnelly, 1999; Zinn et al., 1998). Key to the successful application of survey data is to ensure the rigor of the methodology.

This article examines the use of attitude survey research in Africa, particularly in East and southern Africa where conservation attitude research is increasingly utilized. We focus on Africa for a number of reasons. First, this review was originally part of the preliminary research for a project examining the attitudes of local people toward elephants in a human–elephant conflict area in Kenya (Browne-Nuñez, in prep). Second, the original literature review revealed a variety of methodological approaches in previous studies, which led to several questions regarding the basic canons of empirical research such as measurement, testing of theories, reliability, and validity. Third, we found that it is common practice in much of the literature to compare or lump findings from previous studies across cultures, regions, and countries leading to questions about their comparability or generalizability. This seems to be especially true of any discussions of Africa, scientific or otherwise. One often hears blanket statements about the continent, rather than specifics about a country, region, or culture. Another important issue that arose was that of sufficient disclosure to allow a study to be fully evaluated and replicated. Finally, with the growing body of literature in this area, we ask if it is possible, given the variation, to develop a standardized methodology for attitude research in Africa that can be extended to other developing regions.<sup>1</sup>

Although survey research in Africa is not new (Schapera, 1935), it has only become a common tool in African wildlife conservation in the last few decades (Table 1 and Table 2). It has been suggested that data from attitudinal studies such as these are useful for comparing attitudes toward conservation in different regions and under different conditions (Hackel, 1990; Harcourt, Pennington, & Weber, 1986). However, we caution that often only general trends in the data should be considered. Researchers face several difficulties when conducting social surveys in Africa—language barriers and cultural differences between researchers and the local people, population dispersal, lack of census information, transportation limitations, respondents' lack of experience with survey research and willingness to participate in surveys, and security concerns. Each of these concerns may affect methodology. Making meaningful comparisons when the specificity of methods and constructs vary or are unknown across studies may lead to misinformed decisions and recommendations.

This review of attitudinal studies from different parts of Africa should reveal the strengths and weaknesses of survey data thus far and identify future research needs. We begin with a brief overview of scientific principles and methodological issues in survey research in general. We then examine if and how the studies in this review address these issues. Additionally, we will attempt to answer the aforementioned questions raised during the literature review for the preliminary research (Browne-Nuñez, in prep) using insight gleaned from the studies reviewed here and by looking to the expertise of researchers from various fields of social science inquiry.

## Methods

As part of the first author's preliminary research, a search was initially performed in 2001 in the Web of Science database using the keywords "attitudes," "wildlife," "conservation," and "Africa." No limitations on time frame were implemented. The initial search identified

**Table 1**  
Comparison of use of concept and theory in attitudinal research studies conducted in Africa

Citation	Attitude object, Country	Define attitude concept	Theory	Measurement of attitude	Sample indicators
Pennington (1983)	Wildlife and conservation, Tanzania	No	No	7 Likert-scale <b>belief</b> statements	-National park budgets should be increased -National parks cost the government too much money -Even if there were no tourists, national parks should continue -Termites serve no useful purpose in the forest -I agree with the person who says he dislikes lions -I feel cattle are more important than wild animals
Mordi (1987)	Wildlife, Botswana	Yes	Yes	51 agree/disagree statements to form 11 attitude types	-Is protection of animals a good or bad thing? -It is important to keep a place where animals & plants can live -The Conservation Area is a waste of land -It would be good to give the Conservation Area to the people who need land ?
Infield (1988)	Conservation & conservation area, South Africa	No, recognized complexity of attitude concept and used several questions for measurement	No	8 fixed-response questions were used to create an index of general conservation attitude, 7 questions were used to create and index of attitude toward the conservation authority	
Parry & Campbell (1992)	Wildlife and wildlife utilization, Botswana	No	No	?	

(Continued)

**Table 1**  
(Continued)

Citation	Attitude object, Country	Define attitude concept	Theory	Measurement of attitude	Sample indicators
Newmark et al. (1993)	Protected area and PA employees, Tanzania	No	No	3 open-ended questions, 1 question for ea. attitude object in question	-How would you feel if the park was abolished? -What good things do people from the park do? -Do poachers break the law? -How would you feel if all of the animals were removed? -Are elephants the most dangerous animals? -Should the park be abolished? -What would you say about wildlife? -Do you consider national parks/reserves as being of any value? -What does the wildlife authority do?
Kangwana (1993)	Wildlife and national park, Kenya	No	No	2 questions ea. for attitude toward wildlife in general and elephants, 3 questions for attitude toward park, all open-ended	-Wildlife conservation is an appropriate use of land -National park is an asset to the family -Park should be degazetted ?
Omondi (1994)	Wildlife, PA, & wildlife authority, Kenya	No	No	3 open-ended questions, 1 question for ea. attitude object in question	-Wildlife conservation is an appropriate use of land -National park is an asset to the family -Park should be degazetted ?
Akama et al. (1995)	State wildlife conservation programs, Kenya	No	No	5 yes/no <b>belief</b> items, no scale created	-Wildlife conservation is an appropriate use of land -National park is an asset to the family -Park should be degazetted ?
De Boer & Baquete (1998)	Maputo Elephant Reserve, Mozambique	Indicated a positive attitude being expressed as "liking"	No	?	?

Hill (1998) Elephants, Uganda	No	No	3 open-ended questions	-Should elephants be protected in Uganda? -Would you like to see elephants living in Budongo? -Are elephants dangerous? -Important to protect wildlife for children -People who poach should be punished -Does wildlife benefit Tanzania, local people, you/your household? -What the people and their livestock need are more important than saving plants and wild animals -It is important to protect the animals and plants so that our children may know and use them
Gillingham & Lee (1999) Wildlife and management institutions, Tanzania	No	No	5 yes/no <b>belief</b> items (4 were opposite statement pairs) and 3 open-ended belief questions, no scale created	
Infield & Namara (2001) Conservation and Lake Mburo National Park, Uganda	No	No	9 agree-disagree "attitude" statements about park and conservation, scored 1 or -1, combined all to create an attitude index; 1 open-ended question regarding feelings about the park	
Holmes (2003) Katavi National Park, Tanzania	No	No	1 open-ended question	-What are your feelings about Lake Mburo National Park? -How would you feel if Katavi National Park was degazetted?
Sitati (2003) Elephant conservation, Kenya	No	No	3 closed questions, no index created	-Benefits from elephants -What is the future of elephants in the area? -Do you wish to continue living with elephants as before?

**Table 1**  
(Continued)

Citation	Attitude object, Country	Define attitude concept	Theory	Measurement of attitude	Sample indicators
Weladji et al. (2003)	Wildlife policy and Bénoué Wildlife Conservation Area, Cameroon	No	No	Series of closed and open-ended questions, number and wording not reported	?
Dickman (2005)	Wildlife in general, protected area, carnivores, Tanzania	No	No	3 open-ended questions, 1 for each attitude object	-What do you think about wild animals living in the area around your village? -What do you think of Ruaha National Park -What do you think of the following [carnivores]? -Are there any good things about or benefits that you personally receive from elephants? -Are any animals causing problems in your area? -Indicate how you feel about having [species X] on your property -Indicate the degree to which you like [animal]
Gadd (2005)	Wildlife/elephants, Kenya	No	No	?	
Lindsey et al. (2005)	Wild dogs and other carnivores, South Africa	No	No	Various questions regarding beliefs about wildlife 1 scale question per species (6 species) scored from 0 (very negative) to 5 (very positive)	
Kaltenborn et al. (2006)	Wild and domestic animals, Tanzania	No	No <sup>1</sup>	5-point Likert scale questions for 21 species (do not like at all to like very much)	

<sup>1</sup>Although the authors were not explicit in defining a theoretical framework, they do cite the relevant literature.

**Table 2**  
Comparison of methodology use in attitudinal research studies conducted in Africa

Citation	Attitude object, Country	Pretest	Reliability & validity	Sampling	Study length
Pennington (1983)	Wildlife and conservation, Tanzania	?	No	n = 800 secondary school students from schools in 2 regions	15 mos. (part of larger study)
Mordi (1987)	Wildlife, Botswana	Yes	Yes	original n = 1,279—urban areas oversampled, new sample = 555, 44 from urban area divided into 103 areas, using random number assignment, 31 areas selected, every 5th house selected, age-stratified schedule used to select interviewee	7 mos.
Infield (1988)	Conservation & conservation area, South Africa	No	No	37–89 from ea. of 9 rural areas, houses randomly selected, interviewee selected by predetermined age-sex schedule	7 mos.
Parry & Campbell (1992)	Wildlife and wildlife utilization, Botswana	No	No	38 from a university every 4th student selected from list n = 151, households selected through 2-phase random sample, study area divided into numbered blocks, from 14 selected blocks, 13 households randomly selected	1 mo.
Newmark et al. (1993)	Protected area and PA employees, Tanzania	No	No	n = 231, Site 1—every household w/adult present, Site 2—all households w/in randomly selected clusters (aerial photos were avail for this site) n = 866 around 3 national parks and reserves, proportional random sampling stratified by park, interviewees selected on basis of chance encounter	2 yrs.

(Continued)



**Table 2**  
(Continued)

Citation	Attitude object, Country	Pretest	Reliability & validity	Sampling	Study length
Kangwana (1993)	Wildlife and national park, Kenya	Yes	No	n = 175, households randomly selected from list of households in 2 group ranches bordering park, 1 elder, 1 warrior, 1 woman	2 mos.
Omondi (1994)	Wildlife, PA, & wildlife authority, Kenya	Yes	No	n = 500 randomly selected heads of households from 5 of 13 group ranches near protected area—randomization not explained	6 mos.
Akama et al. (1995)	State wildlife conservation programs, Kenya	No	No	n = 201 from perimeter of 2 parks (157 locals, 44 park officials), 1 individual of a household (selection process not provided)	11 mos.
De Boer & Baquete (1998)	Maputo Elephant Reserve, Mozambique	No	No	n = 200, 50 randomly selected households in ea. of 4 villages	3 wks/ village
Hill (1998)	Elephants, Uganda	No	No	n = 116, from 3 villages, chosen upon encounter—1 person of any household	1 week/village
Gillingham & Lee (1999)	Wildlife and management institutions, Tanzania	No	No	n = 202, 190 local people, local leaders from randomly selected households from 4 of 11 villages in district. Mostly men because of Muslim faith	4 mos.
Infield & Namara (2001) <sup>1</sup>	Lake Mburo National Park, Uganda	Yes	No	n = 243, 2 phase sample: 1st sampled enumeration areas, 2nd sampled households within areas within 6 km of park (avg. of 30 households per area) household heads or other senior members	3 mos.

Holmes (2003) Katavi National Park, Tanzania	No	No	n = 201, households randomly selected from generated lists of households in 3 villages	5 mos.
Sitati (2003) Elephant conservation, Kenya	Yes	No	n = 251, from areas experiencing elephant problems, 25 of 54 sub-locations randomly sampled with a minimum of 10 households per sub-location, any household member $\geq 18$ selected in 2 larger settlements, all available households selected in small settlement	?
Weladji et al. (2003) Wildlife policy and Bénoué Wildlife Conservation Area, Cameroon	No	No	n = 114 across 3 communities, 20% of households randomly selected in 2 larger settlements, all available households selected in small settlement	4 mos.
Dickman (2005) Wildlife in general, protected area, carnivores, Tanzania	Yes	No	n = 60, 15 villages/sub-villages in three clusters, "as many as possible" households were visited, most senior member of household present was interviewed, mostly males	$\leq 1$ mo.
Gadd (2005) Wildlife/elephants, Kenya	Yes	No	n = 74, 34 herders selected via convenience sample (no census data available), 40 individuals at 2 other locations (every 10th household)	2 mos. (1999) 2 mos. (2002)
Lindsey et al. (2005) Wild dogs and other carnivores, South Africa	Yes	No	n = 209 across 6 areas in South Africa and Zimbabwe, in each area "as many ranchers as possible were interviewed," contact information obtained from telephone directory	7 mos.
Kaltenborn et al. (2006) Wild and domestic animals, Tanzania	Yes	No	n = 590 from 6 villages across 3 districts, 3 villages near protected area and 3 further away	?

<sup>1</sup>Methods for this study were not included in this citation. We referred to Marquardt et al. (1994) and Namara et al. (1998) for details.

five attitude studies, with the earliest published in 1990. A follow-up search was conducted in 2006 to obtain the most recent literature. Citations in the published studies were used to identify unpublished findings. Where possible, copies of unpublished documents were solicited from the respective authors. Articles were excluded if they did not specifically use the term “attitude” (ie, papers were excluded if they used “opinion” or “perceptions”), if the researcher(s) did not use a questionnaire, and if the sampled population did not include local people. Cases were also excluded if they failed to provide an adequate account of their methods. Studies were then compared across several categories related to survey development and implementation.

## The Science of Survey Research

The many disciplines in the social sciences offer a wide variety of research methods, but perhaps none is more widely shared than the survey. With its origins in sociology, scientists from numerous disciplines employ the questionnaire survey in their research today. Some key features of Western survey research have been random samples, standardized questions measuring demographic and sociological variables, trained interviewers, and statistical analysis (Heath, Fisher, & Smith, 2005). As with all data collection techniques, survey research has advantages and disadvantages. Some strengths associated with surveys are that they permit large samples representative of populations; have the same questions and meanings, at least in theory, being applied to all respondents making results more reliable; and provide quantitative data allowing for efficient and rigorous statistical analysis. On the down side, standardization limits flexibility, not only limiting what you ask, who you ask, and how you ask, but, more broadly, the research design must stay the same throughout, even if field conditions warrant adjustment. For these and other reasons, the survey may not always be the method of choice. Awareness of the strengths and weakness of a chosen method is the first step in selecting the best method and in mitigating threats to the quality of research. Our objective here is not to argue that one method is better or more appropriate than another, as it is up to the researcher to determine the best methods depending on the research. Rather, we believe that the rapid increase in survey research in African wildlife conservation and its varied approaches warrants a review so that we may examine survey quality and consider the implications for policy decisions for managing human–wildlife conflict and wildlife conservation in general.

As in all areas of empirical investigation, researchers conducting surveys must work under the central tenets of scientific inquiry and strive to obtain data that is reliable, valid, representative, and generalizable. In doing so they can ensure that findings will not only stand up to scrutiny, but also contribute to well-informed decisions and practices. Other important issues of empirical research are conceptualization and the use of theory. Specific to survey research are the additional issues of survey quality such as coverage error, sampling error, non-response error, and measurement error (Groves, 1987). What constitutes quality survey research has largely been defined by Western researchers, particularly those in the United States (Harkness, 1999). Although survey research has a longer history in the West, there still remain quality issues requiring ongoing refinement. In cross-cultural research these issues must also be considered as they relate to translation and cultural appropriateness (Harkness, 1999). Although a thorough discussion of these concepts is not within the scope of this article, we provide a brief overview, consider how quality issues can be exacerbated in developing countries, and examine these concepts in the context of the studies we review.

### ***Reliability and Validity***

We start with the concepts of reliability and validity as good research must be reliable and valid (Nunnally & Bernstein, 1994). Data that is neither valid nor reliable is also not generalizable. Reliability refers to “whether a particular technique, applied repeatedly to the same object, would yield the same result each time.” (Babbie, 1995, p. 124). A general definition of validity “refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration” (Babbie, 1995, p. 127). Several types of validity need to be considered that include, but are not limited to internal, external, content, and construct validity. Reliability and validity are important in all disciplines that engage in scientific inquiry and are considerations in every aspect of the research process.

### ***Conceptualization and Theory***

Carefully defining what is being measured, grounding research in theory, and developing measurement items that are reliable and valid are important first steps in attitude research. Deciding how to measure something depends on how we define it. Conceptualization is the “process through which we specify what we will mean when we use particular terms” (Babbie, 1995, p. 114). Many concepts measured in the social sciences are broad and varied in how they are defined. If we are to communicate logically about a given concept it is important that we agree on its meaning and how to measure it. Conceptual definitions are most valuable when they are linked together to support theories that help to explain research results (Bernard, 2002).

The concept of attitude has been defined many ways, but a commonality among definitions is that attitudes are evaluations or feeling states about an attitude object. Individuals may hold attitudes toward a wide variety of objects, including social issues, natural resource issues, categories of people or situations, specific individuals, animals, and physical objects (Fazio, 1995). Depending on how one defines attitude, there are several ways to measure this construct. Bem (1970) defines an attitude using a simple evaluative statement such as “I like apples” or “I don’t like oranges.” Under this definition, a survey could have a single indicator for an attitude. Responses to a single item indicator as measures of attitudes are suspect, because they do not have the built-in potential of scales for reducing measurement error (Heberlein, 1981). Moreover, these types of items merely ascertain single beliefs, rather than the organization of beliefs and affect that comprise an attitude. Another definition, which captures the complexity of attitude, refers to it as the organization of beliefs, evaluative beliefs, and affect about the attitude object (Rokeach, 1968). Under this definition, a combination of items, each measuring a different facet of attitude, would be used. A multiple-item indicator or scale approach provides a more valid and reliable measurement.

The definition of the concept being measured and the indicators being used in measurement are often determined by theory. For instance, many attitude-behavior studies in the United States are based on the Theory of Reasoned Action (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Theory is important as it extends the generalizations of findings, enhances the rigor and confidence of research, offers structure for building on earlier findings, and enables researchers to move beyond descriptive studies. An underlying assumption of many attitude studies in Africa is that there is a direct link between attitudes and behaviors. Therefore, it is important that attitude research is based on a theoretical framework that helps explain the various cognitive processes that influence behaviors (Decker, Brown, & Siemer, 2001; McCleery et al., 2006).

Survey research is not new to Africa; nor is it limited to a specific discipline. Today, researchers in business and marketing, health sciences, especially related to HIV/AIDS, political science, education, and other fields frequently use the questionnaire survey to understand the values, knowledge, beliefs, attitudes, and behaviors of African peoples (Åstrom & Okullo, 2004; Jemmott et al., 2007; Murray-Johnson et al., 2000–2001; Orkin, 1998; Rani, Bonu, & Diop-Sidibé, 2004; Uzoka, Shemi, & Seleka, 2007). With this global expansion in survey research, researchers are becoming more aware of the challenges of transferring measurement techniques developed in monocultural settings to cross-cultural research (Johnson, 2006). We must consider the issues associated with exporting survey methods to other cultures, such as consistency of quality and, in the case of cross-cultural comparisons, equivalence of meaning (Heath et al., 2005).

Although there has been extensive attitude research and theory development in the United States regarding wildlife management/conservation, the transfer of theory developed in the West to wildlife conservation studies in Africa has not been widely tested. However, other disciplines (e.g., tourism, health sciences, psychology) have successfully applied theories such as the Theory of Reasoned Action (Lepp, 2007), the Theory of Planned Behavior (Åstrom & Kiwanuka, 2006; Jemmott et al., 2007), and the Theory of Basic Human Values (Schwartz et al., 2007). In their study of the cross-cultural validity of the Theory of Basic Human Values, Schwartz et al. (2007) found that although the theory did not prove applicable to rural areas of less developed countries, the use of a different measurement instrument proved the theory “more nearly universal than previous findings had suggested.” Although theories may not be completely universal, further research is needed to clarify the limits of their applicability (Schwartz et al., 2007).

Most of the studies of attitudes toward wildlife and conservation in Africa are not based on theory and most do not define what is meant by the term attitude (Table 1). One exception is a study of local peoples’ attitudes toward wildlife in Botswana (Mordi, 1987). In this study, the researcher recognized the multiplicity of definitions of attitude in existence and offered a generic definition in an effort to “facilitate communication and promote shared usage.” Kellert’s (1985) typology of attitudes toward animals served as the conceptual framework (e.g., naturalistic, moralistic, utilitarian). The rationale for selecting Kellert’s typology over several others employed in the West was that its categories are “both mutually exclusive and collectively exhaustive of the universe of attitudes toward wild animals in Africa.” As an African, Mordi found this framework lacking in one dimension—fatalism—which he states is ever present in most African cultures. Therefore, he added an eleventh dimension he termed “theistic attitude.” Although his study was grounded in Kellert’s typology, Mordi used two theories on which to base his hypotheses: Roger’s Diffusion of Innovation and Maslow’s Hierarchy of Needs.

Mordi’s (1987) original survey instrument contained ten agree-disagree statements for each item. Three pretests were conducted, and items that failed to yield consistent results were dropped. A different group of respondents was used in each pretest. The remaining fifty-one items reliably differentiated among respondents in a consistent manner (Table 2). Standard measures of reliability, such as the internal-consistency method and the split-halves method, were not performed. Measures, such as the split halves method and the test-retest method, involve using the same group of respondents.

The other studies reviewed here (Table 1) did not define the concept of attitude nor ground their research in theory. For example, in a study of human–elephant conflict in Amboseli, Kenya, Kangwana (1993) included an examination of the attitudes of the Maasai toward wildlife and Amboseli National Park. Although the term attitude was used, the concept was not defined. The study was exploratory and, therefore, was not based on findings

of previous work or on theory. The researcher recognized other attitude studies done in Africa, but stated that these surveys “were carried out with other peoples,” implying that no comparisons could be made. Because of the exploratory nature of the research, Kangwana does not test hypotheses but puts forth four predictions.

Of course, the most important consideration in question development is, “Are you measuring what you think you are measuring?”—validity. Although there is no statistical procedure for measuring validity (Bernard, 1995), factor analysis can be used to identify the number of constructs being measured by a set of items. Nevertheless, it is up to the researcher to define the nature of each construct. In Mordi’s analysis, factor analysis indicated that his eleven attitude types could only be explained by eight factors. The ecologicistic, humanistic, and naturalistic attitudes were not identified as independent types. He offered possible explanations for this outcome: (1) some questions may have measured more than one attitude type and (2) some indicators may have had stronger links to factors other than those they were intended to measure. As Mordi pointed out, this could have been avoided had the instrument been more intensively pretested. In the end, the issue of validity is left to the researcher’s judgment and a review by recognized experts in the field of study. There are several ways to improve validity concerns that can be standardized across studies, such as improving external validity by drawing a random sample from the population, replicating the study, and so on.

Prior to developing her questionnaire, Kangwana (1993) conducted a pilot survey, which involved group interviews using an interview schedule and free discussion. During the pilot survey the Maasai were unwilling to answer Likert-scale, true/false, or agree/disagree questions. Some responses to these types of questions were, “That is a question without a head or a tail” and, “That depends...” therefore, questions on the final survey were open ended and the responses taken down in longhand. No tests for reliability were performed. Two questions each were asked to determine attitudes toward wildlife in general and elephants in particular, and three questions were asked to determine attitudes toward the park (Table 1). As was mentioned earlier, attitudes are complex constructs, and, in order to obtain a more comprehensive representation of attitudes, questions need to be asked that examine the various facets of an attitude, so, in this case, where there is a limited number of items measuring attitudes, results may be limited in contributing to the understanding of Maasai attitudes toward wildlife and Amboseli National Park.

Pennington (1983) used seven Likert-scale questions to measure attitudes (Table 1). No pre-testing was undertaken, nor were any checks for reliability and validity performed. Throughout the thesis, Pennington refers to attitude toward wildlife and conservation when all of her items are belief and opinion statements about Tanzania’s national parks. To derive an aggregate attitude score, students were given points for their responses to each item, ranging from 2 (strongly agree) to -2 (strongly disagree), with “not sure” responses being assigned 0 points. No reliability analysis was conducted to test the internal consistency of this scale to ensure that all items were measuring the same concept.

Newmark et al. (1993) and Parry and Campbell (1992) used a combination of fixed response and open-ended questions. Parry and Campbell (1992) used eight questions to develop an attitude index in their investigation of attitudes toward animal wildlife in Botswana. Newmark et al. (1993) employed one question each to measure attitudes toward protected areas, protected area employees, and poaching.

Infield (1988), Akama, Lant, and Burnett (1995), Gillingham and Lee (2003), Infield and Namara (2001), and Kaltenborn et al. (2006) are examples of research that used a fixed-response format. Infield (1988) selected this format for ease of interpretation of the data. He used two yes/no questions, ten agree/disagree statements, and five paired

statements giving contradictory views in which the respondent was asked to pick the one with which they most agreed. In a study in Kenya (Akama et al., 1995), respondents were asked five questions related to their attitudes to an adjacent park. The questionnaires were supplemented with informal conversations.

Several researchers used an open-ended question format, including Omondi (1994), Hill (1998), De Boer and Baquete (1998), Holmes (2003), and Dickman (2005). Holmes (2003) only used one indicator to measure attitude toward a national park. De Boer and Baquete (1998) determined a positive attitude associated with the term "liking." Daily observations were conducted by De Boer and Baquete (1998) to validate the survey responses given by the local population. Hill's (1998) rationale for the open-ended format was to "elicit more extensive discussions of some of the issues raised." This reasoning is similar to Kangwana (1993) in wanting to "minimize the loss of information" (Kangwana, 1993, p. 26).

### ***Coverage and Sampling Error***

The level of coverage of a study depends on its sampling frame. Coverage can be a significant issue in any study, but may be an exceptional challenge in the developing world. Cost can be a limiting factor in the West and developing countries. It limits some studies to individuals with telephones or, for face-to-face interviews, can limit access to distant or hard to reach areas. A frequent limiting factor in the developing world is lack of any population registers. The primary issue when there is lack of coverage is whether the sample differs from the non-sampled portion of the population.

Sampling error reflects the effect of chance in the sampling process and is a measure of the degree to which a sample is unrepresentative of the target population. Confidence intervals and levels illustrate the degree of sampling error by relating how confident the researcher is that the sample statistics actually reflect the entire population's characteristics. Adequate sample size provides greater confidence of representativeness so that conclusions drawn to inform policy are more likely to reflect the attitudes of the population rather than a minority or select few. When samples are smaller, the sampling error increases and this limitation needs to be recognized in many studies conducted in rural locations of developing countries.

Our review highlights the challenges in following standard sampling procedures in Africa (Table 2). Ensuring external validity may be one of the biggest challenges in developing appropriate sampling procedures. The challenge lies in dealing with variables such as seasonal and long-term migration (e.g., moving with the rains) and lack of census information in developing countries. Unlike the typical U.S. survey, where an interview is conducted by phone or a mail survey is sent, in rural Africa where a majority of people do not have a phone, or a mailing address, researchers have to go directly to the respondent for personal interviews. For several studies examined in this article, the sample unit was the household or family unit, with one person from each surveyed. The availability of population information varied, depending on location of the study. The following examples exemplify the variability in how researchers have addressed these issues.

Mordi (1987) sampled eleven sites in an attempt to obtain a representative sample of the economic, ecological, geographical, and cultural diversity of Botswana. The sites were the city of Gaborone, the University of Botswana, and nine rural areas. The population was stratified into age and gender subgroups. Each site required a different sampling method. Gaborone was divided into 103 geographical areas, of which 31 were randomly selected. In each area, every fifth house on each street was selected, and, at each selected

house, an age-stratified schedule was used to select the target interviewee. At the university, one in every four students was selected from a composite list of all students. In large villages in the rural areas, one household in five was selected, and, in smaller villages, one in three was selected. At each hut, the respondent was selected if he/she met the statistics on a pre-defined questionnaire based on gender and age.

Kangwana (1993) had a listing of Maasai elders who were heads of homesteads around Amboseli National Park in Kenya. The list of homesteads was divided into two economic activity categories, predominantly pastoralist and predominantly agriculturalist. Using random sequential sampling, homesteads were selected from the lists. Six homesteads were selected for a reserve list because of the fluid nature of Maasai settlement. To obtain a cross-sectional point of view, interviews were conducted with members from three sections of traditional Maasai society: elders, moran (warriors), and women. On arriving at a homestead, the elder was interviewed first, out of respect for the structure of Maasai society. The first moran encountered was interviewed next. Moran were not always present and, in the end, were under-represented. Finally, the first woman encountered was interviewed.

Pennington (1983) selected 14 of "20 or so" secondary schools in 2 regions. She did not explain how these 2 regions, or the 14 schools, were selected. Because the Tanzanian government promotes de-tribalization, a bussing program mixes students from different regions/tribes; therefore, students at each school are not necessarily from that region. No further explanation of sampling methods was provided (e.g. selection of students within each school), although by the large sample size ( $n = 800$ ), it appears that each student present in each school was surveyed.

Newmark et al. (1993) investigated conservation attitudes of people living adjacent to five protected areas in Tanzania. An estimate of population for each area was available from a census conducted five years before the study, but dispersal information was not available. A proportional random-sampling design stratified by park was employed to obtain the sample size from each park and interviewees were selected by way of chance encounter.

Hill (1998) examined attitudes toward elephants in an area where elephants no longer reside. Similar to the previous example, Hill (1998) obtained the total population count from a census conducted a few years prior to her research. She interviewed 3.4% of the local population, locating each participant by chance encounter while walking through the three villages in the study area, interviewing one adult per household.

Akama et al. (1993) in Kenya did not have any knowledge of population size or dispersal. Their study involved surveying people living adjacent to two national parks regarding their attitudes toward the state wildlife conservation program in Kenya. They chose areas that were attracting new settlers and selected interviewees by chance encounter at homesteads, on foot-trails, and in crop fields and livestock pastures.

Parry and Campbell (1992) examined attitudes of people in rural communities toward wildlife and its utilization in two different areas of Botswana. In one area, recent aerial photographs were available. Using the photographs, all household clusters were identified and clusters were then randomly selected. All of the households within the selected clusters were surveyed. No photographs were available for the other area, therefore, all households in which a resident was at home were surveyed.

Infield (1988) did not report the availability of population information in his study of attitudes of a rural community in South Africa toward conservation and a local conservation area. He established a study area 10-km wide around the conservation area, with the idea that "attitudes resulting from either positive or negative influences emanating from the conservation area will generally be most pronounced in those communities living in



close proximity” (p. 25). After dividing the study area into 140 numbered blocks, a simple random sample was taken. Thirteen households from each of the fourteen selected blocks were randomly selected.

Some samples were driven by availability of villages/households/people (Dickman, 2005; Gadd, 2005) or by wildlife activity (Lindsey, du Toit, & Mills, 2005). Sitati (2003) selected sampling areas by presence of human-elephant conflict areas and then randomized selection of households within these areas. All but two of the remaining studies under review (Omondi, 1994; De Boer & Baquete, 1998; Gillingham & Lee, 1999; Holmes, 2003; Weladji, Moe, & Vedeld, 2003) randomly selected households across villages or ranches (Table 2).

Given the challenges of sampling in Africa, including obtaining an adequate level of coverage and large sample sizes, it is imperative that researchers carefully assess at what level their results will be meaningful in informing policy. As is evidenced here, various degrees of population information are available throughout Africa and researchers have to be resourceful in developing appropriate sampling designs for their studies that are based on the experience of previous research and theory. As we strive to standardize methodology where possible, we must ensure the highest level of randomization and representativeness. Maintaining this standard enables us to have confidence that our data is valid and generalizable.

### ***Non-response Error***

Another survey quality issue is non-response bias, which occurs when researchers generalize to a population without recognizing differences between respondents and non-respondents in attitudes, beliefs, and other related concepts. This weakens the validity of the information collected from a sample and limits the generalizability of the results. Response rates in the United States are declining (Heath et al., 2005) and the resulting non-response bias is a major concern. It is common practice in the United States to document non-response, but there is generally not good documentation in the global context (Heath et al., 2005). Most of the studies in this review did not address non-response, but of the few that did, the number of potential respondents that were unavailable or refused to be interviewed was low in each case.

Given that surveys in Africa are most often done through one-on-one interviews and therefore may have low refusal rates (Browne-Nuñez, in prep), documentation may seem less important, but non-response should be accounted for in all contexts. Documentation of the number of contacts, refusals, unattainables, and so on needs to be maintained in order to determine the occurrence of non-response bias. If it is an issue during the analysis, several statistical methods (e.g., weighting) are available to adjust the results so they are still valid and useful.

### ***Response Bias***

In addition, response bias can also impact survey results. It occurs when respondents perceive social pressure to provide responses that they think the researchers want to hear and therefore their answers may not reflect their true beliefs. Or respondents may be wary of who or what organization the researcher represents and may alter their responses accordingly, thereby biasing survey results. For example, in areas where conflict exists between local communities and the wildlife authority, respondents may fear retribution if they provide truthful responses when they believe the researcher is a representative of the wildlife authority. Newmark et al. (1993) state that some respondents in their study may have

believed their interviewers, who were students and instructors at the College of African Wildlife Management, were affiliated with the wildlife and national parks officials. This sort of situation can be mitigated by establishing rapport and building trust in the community prior to data collection.

### ***Interviewer Bias***

Interviewer bias can also affect survey results. It occurs when respondent answers are influenced by interviewer characteristics such as appearance, behavior, and sex. In Africa, where researchers are often from another culture, this issue may be more pronounced. For example, women in rural Africa will likely feel more comfortable with a female enumerator; traditional people may be suspicious of people in Western clothing or those whose clothing is similar to government/wildlife officials; or when enumerators receive insufficient training, they are more likely to behave in ways that are inappropriate such as body language, prompting methods, and recording responses.

Interviewer bias can be limited by first being aware of its potential sources. The researcher(s) should have a thorough understanding of the local culture. A standardized program should be provided to each enumerator on the research team. Training should cover topics such as the purpose of the survey, explanation of the questionnaire, interviewing techniques, and how to record answers.

### ***Other Error***

Finally, there are other potential sources of error. For example, we note that there is a high degree of variation in study length (<1 month to 2 years) across the studies reviewed here (Table 2). The duration of the data collection period is a concern in attitude research because the integrity of the data can be compromised. The longer the data collection period, the more likely it is for other variables, such as stochastic events, immigration, and emigration to influence or bias study results. For example, Kangwana's (1993) interviews had to be completed before the Kenya Wildlife Service disbursed park revenue sharing benefits and started a new extension program.

### ***Equivalence, Comparability, and Cultural Sensitivity***

The globalization of survey research not only brings additional challenges to standard measurement protocols, but also requires special attention to other cultural considerations. Equivalence is increasingly recognized as a critical concept in cross-cultural research and lately has received significant attention by researchers across disciplines (Bulmer 1998; Heath et al. 2005; Johnson 2006; Peña 2007; Willgerodt 2003). Unfortunately, there is not a broad consensus on what this entails. Johnson (2006) provides a brief overview of various forms ( $n = 62$ ) of the concept he located in the literature. Examples include construct equivalence, cultural equivalence, linguistic equivalence, measurement equivalence, scale equivalence, and theoretical equivalence.

To demonstrate the importance of equivalence, we consider one of the broader conceptualizations, equivalence of meaning or linguistic and conceptual equivalence. In exporting home-grown instruments, researchers working cross-culturally need to consider if a term or a concept used in one society has the same meaning in another, how equivalence issues affect the validity of research results, and if the issues under investigation are culturally

relevant. These are not new considerations. Scheuch (1968) called for functional equivalence rather than literal conversion, but given the abundant recent literature on the issue, it is an ongoing concern. Due to the “considerable disagreement, ambiguity, overlap, and contradiction among these various conceptualizations” there is obviously a need for further research and discussion among those conducting cross-cultural research (Johnson, 2006, p. S17).

Awareness or cultural sensitivity is the first step in dealing with equivalence and finding mechanisms for overcoming problems. For example, in cases without an equal term or concept, equivalence may have to be achieved through circumlocution. A somewhat related topic often discussed in Western survey research is question wording. Survey researchers have found that even slight variations in question wording can produce dramatic changes in the distribution of answers (Weisburg, Krosnick, & Bowen, 1996).

Given the challenges and limitations associated with survey research in the typically rural African settings we are dealing with in our review, we must consider the validity of cross-cultural comparisons. It is likely safe to say that most of these studies are not designed with the intention of future comparisons with other studies. Even studies that are intended to be cross-national, with standardized instruments, face the same difficulties highlighted in this article, such as equivalence and sampling (Bulmer, 1998; Harkness, 1999; Heath et al., 2005; Jowell, 1998; Kuechler, 1998; Scheuch, 1989). With this in mind, we believe only broad comparisons can be made and, when doing so, variations and the resulting limitations of such comparisons should be reported.

A disregard for culture by researchers has been observed in various settings around the world (Rogler, 1999). This disregard may take many forms such as when foreign researchers visit an area, collect their data, and return to their home countries to publish their findings with little or no benefit to the local culture. Another example is when researchers utilize Western concepts, theories, and methods in a culture different from where they were developed. Rogler (1999) discusses how such practices as relying on “expert opinion” in the case of developing content validity, standardizing instruments, errors in translation, and transferring concepts are acts of cultural insensitivity. Citing Manson (1997, p. 251) he states that “[standardized] instruments may be ‘incomprehensible’ and ‘unacceptable’ to respondents from a different culture, and sometimes they are downright ‘irrelevant’” (Rogler, 1999, p. 427). Considerations of cultural insensitivity not only fall under the scope of our methodological interests in this article, they also require us to consider the ethics of some cross-cultural research (Schooler et al., 1998). Adaptations must be made “that span the entire research process” (Rogler, 1999, p. 430). Many of the considerations we propose in this article should be part of this process.

## Discussion

Good progress is being made in developing an understanding of Africans’ attitudes toward wildlife and wildlife conservation. The growing body of knowledge in this realm confirms the need for including social science research in African wildlife conservation and more specifically in mitigating human–wildlife conflict. Although there has been a strong and concerted effort to better understand peoples’ values, perceptions, knowledge, attitudes, and tolerance toward wildlife and conservation, the lack of a consistent methodology limits the generalizability of results.

Some methodologies that have been successful in the West may have varying application in developing countries, as was exemplified in Kangwana’s (1993) pre-testing of question format and Mordi’s (1987) question modification. Given the existing global body of work on attitude research, we should avoid reinventing the wheel with each new

attitude study. Future survey research in Africa should build on existing theory and methods, use the lessons learned in the reviewed studies, and incorporate the recommendations provided herein to develop a rigorous theoretical and methodological framework for human dimensions of wildlife research.

The adaptability of the researchers discussed in this review speaks to their resourcefulness in uncharted territory. However, this also speaks to the challenge of ensuring these efforts are useful in the long term, both practically and in terms of improving and building on theoretical frameworks. What does this variability in methodology mean for future research and application of information? This review highlights the varying conditions in which survey research is taking place, which can lead to differences in survey quality (Heath et al., 2005). It also highlights the many challenges when attempting to develop a standardized methodology and points to the need for a framework for standards of best practice. For instance, it should be standard practice in survey research to include procedures such as pre-testing measurement instruments and checks for reliability and validity. Additional procedures such as sampling and the development of questionnaire items should also be a part of this framework. The more complex components of the framework will always have variability in culture and landscape, and require researchers to adapt accordingly. Again, any adaptations need to be grounded in theory and previous research. They also need to be well documented to allow for evaluation, comparability, and replication in order to ensure long-term validity of the body of research that is being developed in Africa.

We have established that survey research has limitations that can be more pronounced in cross-cultural research. Using multiple methods is one way to strengthen a study. For example, focus groups can be used to develop culturally relevant instruments (Willgerodt, 2003); Schumann and Presser (1981) recommend the use of supplementary open-ended questions; and, in dealing with equivalence, King et al. (2004) propose the use of fictional vignettes. There is a whole literature on innovative, participatory methods that can be used by the survey researcher to bolster a study (e.g., Slocum et al., 1998). An example from one of the reviewed studies is provided by Infield and Namara (2001) who used a suite of methods, including rapid rural appraisal, key informant interviews, and “other qualitative methods to provide supporting information for a deeper analysis of the questionnaire data” (Infield & Namara, 2001, p. 51).

It is important to build a cohesive and enduring body of knowledge that can provide greater insight in conserving Africa’s natural resources for the long term. Often attitude studies in Africa are conducted in isolation. In order to achieve a comprehensive and robust understanding that will contribute to more effective conservation measures in both the short term, for which many projects are designed, and the long term, it is paramount for attitude studies in Africa to address the methodological issues we have discussed here. As described there are indeed challenges, but the groundwork has been laid by a multidisciplinary group of researchers who have conducted attitude surveys in numerous cultures around the world, including Africa. For example, scientists who conducted a survey in rural Mali concluded that “it is possible to carry out in a rural, preindustrialized, non-Western setting, using a representative sample of generally nonliterate respondents, a survey that parallels complex ones carried out in the United States and other industrialized countries” (Schooler et al., 1998). This finding is confirmed by our own experience conducting an in-depth survey in rural Kenya.

## Conclusions

As outlined earlier, human–wildlife conflict situations are increasing and several methods and tools need to be developed and applied in an attempt to decrease and resolve these

management challenges (Madden, 2004). Effective policy decisions rely on reliable and valid data. Especially in contentious conflict situations, the evidence to support decisions becomes even more important. As human dimensions research in Africa continues to develop, it is a critical to ensure rigor is incorporated so that effective and informed decisions can be applied. The goal is to make the collected information useful in effectively influencing human–wildlife conflict situations. Coordinated efforts will be needed to ensure these goals of garnering valid and reliable long-term data can be attained and have an impact on addressing human–wildlife conflict in Africa.

To further the science of human dimensions investigations in Africa, future studies should strive to attend to the most prominent characteristics of scientific inquiry: reliability, validity, representativeness, and generalizability. Additionally, more attention should be paid to survey quality that is guided by a framework for standards of best practice. The merit and integrity of studies in this realm of research will be judged on their ability to address these characteristics and their application in informing and driving policy.

In addition to addressing methodological issues, researchers should strive to understand “the why,” that is, the underlying constructs, of peoples’ attitudes, as knowledge of attitudes alone is limited in its application. Most of the studies reviewed here examined the relationship between attitude and demographic variables such as education and sex. Some included prior experience (Kangwana, 1993). Attitudes are based on beliefs about the attitude object. Therefore, gaining a complete understanding of peoples’ responses to wildlife and conservation requires looking at how all of these variables collectively influence attitudes. Developing a common theoretical framework will facilitate this understanding and allow for improved evaluation and comparison across studies.

This review highlights the necessary knowledge needed for conducting human dimensions of wildlife research in Africa. As most managers of human–wildlife conflict are not trained in the social sciences, there is a growing call for increased collaboration between social scientists and ecologists in managing wildlife, especially as it relates to human–wildlife conflict (Heberlein, 2004; Manfredo & Dayer, 2004; Mascia et al., 2003; Treves et al., 2006). Therefore we believe that the growing field of human dimensions of wildlife, with its interdisciplinary specialists, offers opportunity to carry out this social science research within the realm of African wildlife conservation, particularly in mitigating human–wildlife conflict.

### ***Recommendations***

Based on this review and borrowing from researchers in other disciplines, we offer a few recommendations for addressing the methodological issues covered in this paper. These suggestions are not intended to serve as a comprehensive list, but rather we propose them as a starting point for dialogue on methodological issues in cross-cultural human dimensions of wildlife research. Additionally, we do not purport them to be original suggestions, only that they have not been applied on a consistent basis. Many of them are basic components of scientific inquiry.

As already stated in this article, we need to build on the knowledge and experience of researchers not only within wildlife conservation but also in the respective fields of social science investigation. In doing this, we need to avoid continuously reinventing the wheel (Scheuch, 1989), while recognizing that some “re-engineering” is needed (Harkness, 1999).

Given the growing call for attention to be given to survey quality at the national and cross-national level (Harkness, 1999; Lynn 2003), we recommend the adoption of a

framework for standards of best practice in survey research (Harkness, 1999; Heath et al., 2005; Lynn, 2003). The framework should include, but is not limited to the following components: conceptualization, use of theory, standards for question development; use of appropriate sampling techniques, pre-testing, interviewer training; attention to reliability, validity, and generalizability; documentation for monitoring, evaluation, and replication (Harkness, 1999; Peña, 2007); use of multiple methods; inclusion of researchers from the culture being investigated, attention to cross-cultural issues (e.g., equivalence, establishing rapport in communities sampled), and others.

Researchers with social science training have the capacity to contribute information essential for the design of policies for mitigating human–wildlife conflict. For this to be realized, human dimensions researchers need to demonstrate the rigor of their methodology and the validity of their data. We believe this review provides key considerations for this area of research.

## Note

1. Although it is beyond the scope of this article to include survey research from other developing regions of the world, we believe the issues raised here are applicable in the global context.

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