

Quantity does not always mean quality: the importance of qualitative social science in conservation research

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Abstract

Qualitative methods are important in gaining a deep understanding of complex problems and poorly researched areas. They can be particularly useful to help explain underlying conservation problems, as in Rust et al. (2016). However, the significance in choosing and justifying appropriate methodological frameworks in conservation studies should be given more attention to ensure data are collected and analysed appropriately.

We thank Potgieter et al. (2017) for their critical analysis of Rust et al. (2016), but they appear unaware of when, why and how such methods should be used. We clarify the methods described in Rust et al. (2016) and explain sampling strategies in qualitative studies. To improve familiarity with qualitative methods among natural scientists we recommend expanded training in social sciences and collaborating with social scientists. Given the scale of human impacts on the environment, this type of nuanced analytical skill is critical for moving conservation forward.

Keywords human-wildlife conflict, qualitative methods, quantitative methods, social sciences, study design

Choosing the appropriate methodological framework is essential to ensure the results of any study are valid and reliable. We therefore thank Potgieter et al. (2017) for their critique of Rust et al. (2016). They raise some important points on using and justifying methods, sampling and data analyses. However, while they claim to 'appreciate the qualitative approach of the study' (Potgieter et al., 2017: 3) they appear unaware of when, why and how such methods should be used. Thus we do not find their arguments to be persuasive criticisms of the Rust et al. (2016) study, as we explain in more detail below.

There are benefits and costs to any chosen methodological framework and these should be carefully assessed prior to data collection (Rust & Hughes, In Press). Quantitative approaches are more commonly used deductively to test hypothesis-driven questions when there are pre-existing data already available. These studies typically use large sample sizes and statistical analyses to draw generalizable conclusions. However, qualitative methods may be preferred if the research is exploring a topic in depth and trying to preserve the context in which information is gathered. As such, qualitative studies tend to utilise specific case studies for maximum exploration using an inductive approach with smaller, often non-random, subset of a population (Newing et al. 2010).

The focus on depth over breadth in qualitative studies does not mean results are any less robust than quantitative ones (Merriam 2009), nor that quantitative studies are more appropriate. Although biologists often default to quantitative methodologies due to their epistemological orientation, it is incorrect to presume they universally yield more accurate results. Indeed, there are a number of reasons for undertaking qualitative rather than quantitative research. For example, a researcher may wish to explore the views of a small group of avid fox hunters who became activists against blood sports. Given this respondent group is small and hard to reach, snowball sampling would be

appropriate to help locate participants by using in-group referrals between trusted members. While a questionnaire could test an *a priori* hypothesis for this topic, it would have limited utility in contextualizing or dissecting this phenomenon, and would be a weak tool for extracting generalizable information. Qualitative methods provide detailed data about first-hand experiences using insider viewpoints that could be easily missed using pre-designed, structured surveys based on an outsider perspective. If this topic were to be studied quantitatively, it must first be researched qualitatively to identify key themes, questions and viewpoints to develop the questionnaire.

Qualitative methods have been employed in a multitude of conservation studies, including to examine children's perceptions of cheetahs (Hughes, 2012), incentives to poach wildlife (Ghoddousi et al. In Press), and local resistance against tiger conservation (Rastogi et al., 2012). Although there are acknowledged constraints to generalizability, the concepts and theoretical insights from qualitative research can be applied and examined elsewhere, as in Rust et al. (2016). Thus, the aim of qualitative studies, as with Rust et al. (2016), is not to extrapolate findings to wider populations - indeed, small non-random samples do not allow this. Instead the aim is to explore complex phenomena from the participants' point of view more deeply whilst minimising researcher assumptions and biases to potentially discover previously unconsidered issues. This is precisely why qualitative methods were used by Rust et al. (2016).

We applaud Potgieter et al.'s (2017) suggestion to undertake a quantitative study on Rust et al.'s (2016) research; therefore we highlight the follow-up study (Santangeli et al. 2016). Here, the authors quantitatively researched this topic using a larger, random sample and statistically analysed data to determine the extent of poison use on Namibian commercial livestock farms to kill predators. They found poison was more commonly used where farmers reported more negative work relationships with employees. Whilst this does not infer causation, it suggests wildlife management on farms could be influenced by farmer-employee relations, as was inferred by Rust et al.'s (2016) initial study.

Undertaking a qualitative study

When choosing how to collect data, it is useful to first decide on a methodology. Qualitative studies are guided by various methodologies such as phenomenology, ethnography or narrative inquiry (Rust & Hughes, In Press). Grounded theory (Glaser & Strauss, 1967) is also a common and highly regarded methodology, aiming to reduce researcher bias by giving participants a voice, such as found in Rust et al. (2016). Researchers start data collection before hypotheses have been made to develop contextual understanding before directing the focus of research question(s).

Observations are recorded on a particular scenario and immediately analysed to determine if there are recurrent themes that should influence the direction of the research topic (Glaser & Strauss, 1967). For a more detailed description and justification of this approach, along with the methods, interview questions, sampling strategy and data analysis used in Rust et al. (2016), see Rust (2015).

Once a methodology has been decided, the specific methods must be chosen. If a study focuses on sensitive questions (such as asking about illegal behaviour like poaching), researchers can build rapport and trust with respondents through immersion and participant observation (Puri 2010). Additionally, specially-designed methods to ask sensitive questions, such as randomised response technique or unmatched count technique, can be used (Nuno and St John 2014). The latter two methods are most appropriate when preliminary data have been collected and the aim is to verify findings within a wider population, such as the Santangelli et al. (2016) study. However, qualitative methods are by nature exploratory, often used when no prior studies have been conducted, as was the case with Rust et al. (2016).

Qualitative studies often employ non-random sampling, such as snowball sampling, because the research can focus on hidden or reluctant populations such as disempowered individuals, those that conduct secretive behaviors, or people with low trust in researchers (Cohen & Arieli, 2011; Said et al., 2016). These techniques can also be used to investigate unique phenomena to gain a richer, first-hand picture of a topic (Ritchie, Lewis, and El Am 2003). Indeed, snowball sampling has been employed in numerous conservation studies (e.g. Karanth et al., 2008; Goncuoglu Eser & Luloff, 2003). As Rust et al. (2016) gathered data on potentially negative interactions between farmers and workers and on possible illegal behaviour by workers, it was deemed appropriate to use snowball sampling. Potgieter et al. (2017) state that snowball sampling can bias data to produce non-representative samples, but Rust et al.'s (2016) study, by its very nature, was not intending to represent the entire white Namibian commercial farmer population nor did it claim to do so. Instead, the research aimed to identify themes on the farms sampled that had higher and lower levels of reported livestock depredation, livestock theft and game poaching.

Smaller sample sizes are common in qualitative studies because the emphasis is on quality and depth of findings over quantity and generalizability. Rust et al. (2016) sought additional interviews and undertook further participant observation until reaching theoretical saturation (i.e. where no further themes emerged from the data) - an accepted practice in qualitative studies (Creswell 2007). If non-random sampling is used, it is entirely inappropriate to use numerical analyses to present findings for qualitative studies, as suggested by Potgieter et al. (2017). This is firstly because the

population has not been randomly sampled so researchers cannot state their findings equate to a percentage of a population and secondly because the study was based around thematic analysis with the "unit of analysis" being the theme rather than individual perceptions. Rust et al.'s (2016) results are therefore presented descriptively and objectively tested through constant comparative method (Glaser and Strauss 1967). Findings were not extended beyond the population studied but the authors did suggest, with support from cited research, that similar themes might be found elsewhere and could be important considerations in addressing conflicts about wildlife.

The methods, sampling strategy, and analysis used by Rust et al. (2016) are not unique to this topic and we refute Potgieter et al.'s (2017) argument they were inappropriate for a study of this nature. For instance, Khumalo and Yung (2015) studied the hidden impacts of human-wildlife conflict on Namibian women using an extended case method over six months of fieldwork and employing in-depth, semi-structured interviews, participant observation, and document review. Sampling was purposive and included interviews with 69 respondents. Analysis was conducted by reading interviews and coding common themes. Results were written descriptively using key quotes to support findings. Mosimane et al. (2013) also conducted similar research on human-wildlife conflict in Namibia using an analogous qualitative design and sampling strategy.

The devil is in the details

In this section, we provide detailed responses to specific points of criticism raised by Potgieter et al. (2017). Firstly, the premise of Rust et al.'s (2016) study was not based on whether human-wildlife conflict had increased; rather, it questioned why it had not been adequately addressed. Potgieter et al. (2017) stated human-wildlife conflict is not increasing in Namibia; this is correct, insofar as total conflict is concerned, however this is due to declining conflict with herbivores. By contrast, conflict with predators has actually increased over time (Table 3, NACSO (2013)), as cited by Rust et al. (2016).

Rust et al. (2016) interviewed unemployed and employed farm workers, but Potgieter et al. (2017) claimed that this risked "that their status as unemployed [could influence] their opinions of their former employers". This may be true, but equally, interviewing employed farm workers could bias data, as employees might have been reluctant to speak frankly about unfair treatment by their current manager. Unemployed farm workers were also interviewed to help mitigate this bias, as it was assumed they would speak more freely about past negative treatment. Whether in qualitative or quantitative research with human subjects, there will always be some form of reporting bias and researchers should acknowledge this (e.g. Rust 2015).

Potgieter et al. (2017) further stated Rust et al.'s (2016) narrative focused only on farms that were badly managed, but Table 1 from the original paper compared farms with problems to those without. Rust et al. (2016) emphasized farms with greater problems as a way to elucidate this novel finding. At the same time, acknowledgement was given to workers who received negative treatment with the dual aims to advocate for positive change in these otherwise negative situations whilst beginning to give a voice to the historically disempowered.

Potgieter et al. (2017) contend that Rust et al. (2016) misquoted two studies (du Toit 1994, Malekano 2000) as research on racial tensions but the paragraph in Rust et al. (2016) was in reference to poaching and theft rather than racism. It therefore appears Potgieter et al. (2017) misinterpreted the main research findings to assume the article suggested the root of human-predator conflict on Namibian commercial farms was solely due to racism, whereas Figure 1 in the original paper theorizes the underlying non-linear social drivers of conflict without referencing racism. Indeed, the majority of the article, including results and discussion, focused on inequality as the primary social driver of human-carnivore conflict. Racism is only referred to nine times throughout the document, whereas terms on poverty and unfair treatment were referred to 33 times. Whilst Rust et al. (2016) do propose a link between racism and carnivore conflict, they do not say one causes the other, contrary to the criticism of Potgieter et al. (2017). It is unclear whether the conclusions from Rust et al. (2016) could have been discovered using only quantitative methods.

A positivism bias in conservation?

We are now in the epoch of the Anthropocene, where humans have become the greatest driver of environmental change (Steffen, Crutzen, and McNeill 2007). It is no longer sufficient to study ecological phenomena in isolation nor view conservation as a technical problem. Instead it is critical to accept conservation is a social and pragmatic problem. Therefore we must engage all available tools and methods to gain deep, contextual understanding of why and how people are changing the earth in order to conserve it more effectively.

From the experience of the authors of this article, qualitative conservation social science studies are sometimes criticised as inappropriate, largely in the view of natural scientists. However it is worth recognizing that natural and social scientists typically differ in epistemological and ontological perspectives. Critical reflection on the richness, breadth, and rigour of social science methods can help natural scientists appreciate this important dimension of conservation.

We recommend academic institutions and professional societies expand opportunities for training, engagement, and collaboration that exposes conservation scientists to qualitative methods, contextualized data collection and social science researchers. Workshops or training courses could begin to provide transformative skills to a new generation of conservation scientists. At the very least, we advise conservationists and ecologists to study social science theory, methods, and research approaches to help appreciate the ways in which social sciences aim to address the complex problems facing our field. We recommend Bennett et al. (2017) and Newing et al. (2010) as further reading.

If we want to be effective conservationists for the future, we must be innovative and fearless in our pursuit of knowledge - even when it challenges long-held assumptions about approaches and epistemologies. Information is not restricted only to the quantitative and value is not determined solely by generalizability.

References

1. Abrams, R.W., Anwana, E.D., Ormsby, A., Dovie, D.B., Ajagbe, A. and Abrams, A., 2009. Integrating Top *Conservation Biology*, 23(4), pp.799-804.
2. Bennett, Nathan J., Roth, Robin, Klain, Sarah C., Chan, Kai, Christie, Patrick, Clark, Douglas A., Cullman, Georgina, Curran, Deborah, Durbin, Trevor J., Epstein, Graham, Greenberg, Alison, Nelson, Michael P., Sandlos, John, Stedman, Richard, Tell, Tara L., Thomas, Rebecca, Verissimo, Diogo, and Wyborn, Carina. 2017. Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation*. 205. 93-108
3. Berg, S. 1988. "Snowball sampling". In Encyclopedia of Statistical Sciences, vol. 8, edited by S. Kotz and N.L. Johnson, 528-532. Chichester: John Wiley and Sons.
4. Blair, Graeme. 2015. "Survey Methods for Sensitive Topics." *Comparative Politics Newsletter*, 25 (1): 12-16.
5. Cohen, N. and Tamar Arieli. 2011. Field research in conflict environments: Methodological challenges and snowball sampling. *Journal of Peace Research*, 48 (4): 423-435.
6. Creswell, J.W. 2007. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. 3rd ed. Thousand Oaks: SAGE Publications.
7. du Toit, R., 1994. Management of black rhino in Zimbabwean conservancies. In: *Rhinos as Game Ranch Animals*. Onderstepoort.

8. Ghoddousi, A., Soofi, M., Kh. Hamidi, A., Ashayeri, S., Egli, E., Ghoddousi, S., Speicher, J., Khorozyan, I., H. Kiabi, B. & Waltert, M. The decline of ungulate population in Iranian protected areas calls for urgent action against poaching. *Oryx*: in press.
9. Glaser, B. G., & Strauss, A. (1967). *The discovery of ground theory*. Alpine, New York.
10. Gonculoglu Esher, S. & Luloff, A. E. (2003) Community Controversy Over a Proposed Limestone Quarry, *Society & Natural Resources* Vol. 16 Iss. 9, pp.
11. Hughes, C. (2013). Exploring Children's Perceptions of Cheetahs through Storytelling: Implications for Cheetah Conservation. *Applied Environmental Education & Communication*, 12(3), 173-186.
12. Karanth, K. K., Randall A. Kramer, Song S. Qian, Norman L. Christensen (2008) Examining conservation attitudes, perspectives, and challenges in India *Biological Conservation*, Volume 141, Issue 9, pp. 2357-2367
13. Khumalo, Kathryn Elizabeth, and Laurie Ann Yung. 2015. "Women, Human-Wildlife Conflict, and CBNRM: Hidden Impacts and Vulnerabilities in Kwandu Conservancy, Namibia." *Conservation and Society* 13 (3): 232–43. doi:10.4103/0972-4923.170395.
14. King, Gary, Keohane, Robert, and Verba, Sidney. 1994. *Designing Social Enquiry: Scientific Inference in Qualitative Research*. Princeton, New Jersey: Princeton University Press.
15. Malekano, L., 2000. The Social-Economic Impact of Stock-theft and Disease in the Lower Shire Districts of Malawi. In: International Conference on Historical and Social Science Research in Malawi. Zomba.
16. Merriam, Sharan B. 2009. *Qualitative Research: A Guide to Design and Implementation*. San Francisco, CA: Jossey-Boss.
17. Mosimane, Alfons Wabahe, Stephen McCool, Perry Brown, and Jane Ingrebretson. 2013. "Using Mental Models in the Analysis of Human–wildlife Conflict from the Perspective of a Social–ecological System in Namibia." *Oryx* 48 (1): 64–70.
18. NACSO. 2013. "The State of Community Conservation in Namibia - a Review of Communal Conservancies, Community Forests and Other CBNRM Initiatives (2012 Annual Report)." Windhoek: NACSO.
19. Newing, H, C Eagle, R Puri, and C Watson. 2010. *Conducting Research in Conservation: Social Science Methods and Practice*. Book. Abingdon: Routledge.
20. Nuno, Ana, and Freya A. V. St John. 2014. "How to Ask Sensitive Questions in Conservation: A Review of Specialised Questioning Techniques." *Biological Conservation* 189: 5–15. doi:10.1016/j.biocon.2014.09.047.
21. Potgieter, Gail Christine, Florian Johannes Weise, Bettina Wachter, Ingrid Wiesel, Ken Stratford. 2017. "Comment on Rust et Al.: Human – Carnivore

- Conflict in Namibia Is Not Simply About Black and White.” *Society & Natural Resources*. Taylor & Francis. doi:10.1080/08941920.2017.1283077.
22. Puri, R. K. 2010. “Participant Observation.” In *Conducting Research in Conservation: A Social Science Perspective*, edited by H. Newing, C. M. Eagle, R. K. Puri, and C. W. Watson, 85–97. Abingdon: Routledge.
 23. Rastogi, Archi, Gordon M. Hickey, Ruchi Badola, and Syed Ainul Hussain. 2014. Understanding the local socio-political processes affecting conservation management outcomes in Corbett Tiger Reserve, India. *Environmental management* 53 (5):913-929.
 24. Rathbun, Brian. 2008. “Interviewing and Qualitative Field Methods.” In *The Oxford Handbook of Political Methodology*, edited by Janet Box-Steffensmeier, Henry Brady, and David Collier. 685-701. Oxford: Oxford University Press.
 25. Ritchie, Jane, Jane Lewis, and Gillian El Am. 2003. “Designing and Selecting Samples.” In *Qualitative Research Practice: A Guide for Social Science Students and Researchers*, edited by Jane Ritchie and Jane Lewis, 77–108. London: Sage Publications, Ltd.
 26. Rubin, Herbert, and Rubin, Irene. 1995. *Qualitative Interviewing: The Art of Hearing Data*. Thousand Oaks, California.
 27. Rust, N. A. 2015. “Understanding the Human Dimensions Affecting Coexistence between Carnivores and People: A Case Study in Namibia.” University of Kent.
 28. Rust, N. A., Joseph Tzanopoulos, T. Humle, and Douglas C. MacMillan. 2016. “Why Has Human-Carnivore Conflict Not Been Resolved in Namibia?” *Society & Natural Resources* 29 (5).
 29. Rust, N. A. and Hughes, C. (In Press) Social science methods to study human-cheetah interactions. In “The biology and conservation of cheetahs”, Eds: L. L. Marker, L. Boast, A. Schmidt-Kuentzel, Elsevier Publishers.
 30. Said, A. J. Tzanopoulos, D. MacMillan, Bluefin tuna fishery policy in Malta: The plight of artisanal fishermen caught in the capitalist net, *Mar. Policy*. 73 (2016) 27–34. doi:10.1016/j.marpol.2016.07.025.
 31. Santangeli, Andrea, Volen Arkumarev, Niki Rust, and Marco Girardello. 2016. “Understanding, Quantifying and Mapping the Use of Poison by Commercial Farmers in Namibia – Implications for Scavengers’ Conservation and Ecosystem Health.” *Biological Conservation* 204 (B): 205–11.
 32. Steffen, Will, J Crutzen, and John R McNeill. 2007. “The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?” *Ambio* 36 (8): 614–21.