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Participatory Rural Appraisal and Compensation Intervention: Challenges and Protocols While Managing Large Carnivore–Human Conflict

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When large carnivores cause socioeconomic losses in a community, conflict increases, retaliatory killing of the carnivore can occur, and conservation efforts are undermined. We focused on Participatory Rural Appraisal (PRA) and economic compensation schemes as approaches for managing conflict. PRA is a tool for collecting data on the large carnivore–human conflict and economic compensation schemes for those affected negatively by carnivore presence. We reviewed published papers and reports on large carnivore–human conflicts, PRA, and compensation schemes. This article details insights into common pitfalls, key lessons learned, possible solutions including new approaches for compensation and protocols to be followed while managing large carnivore–human conflict. We hope to contribute to a meaningful dialogue between locals, managers, and researchers and help in effective implementation of conservation programs to mitigate large carnivore–human conflict around the protected areas.

Keywords PRA, large carnivores–human conflict, compensation, livestock depredation, data collection protocols

Introduction

Large carnivores are often regarded as indicator or umbrella species. The presence of their viable populations is a “stamp of quality” certifying the integrity, sustainability, and health of larger ecosystems and hence there is a great emphasis on their conservation (Linnell, Swenson, & Andersen, 2000). Globally, however, large carnivore populations continue to decline. For example, jaguars are experiencing extirpation in 37% of their historic range, tigers have lost 41% of their range in the last decade, and lions have become scarce in western and central Africa (Bauer & Van Der Merwe, 2004; Sanderson et al., 2002). Large home ranges that span varied habitats make large carnivore conservation a challenging task for wildlife managers (Athreya, Odden, Linnell, Krishnaswamy, & Karanth, 2013; Karanth & Madhusudan, 2002; Mech, 1995; Rahalkar, 2008).

Conflict with humans is a worldwide issue in large carnivore conservation (Bagchi & Mishra, 2004; Cromsigt et al., 2013; Goswami et al., 2013; Nowell & Jackson, 1996). Carnivores often cause serious economic and social losses by preying on livestock, causing damage to property, general community insecurity, and sometimes human injury or death

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(Cromsigt et al., 2013; Distefano, 2005; Lee, 2011; Loe & Röskaft, 2004; Madhusudan & Mishra, 2003; Mishra, 1997; Mishra et al., 2003; Ogra & Badola, 2008; Patterson, Kasiki, Selempo, & Kays, 2004).

The antagonism arising from conflict with carnivores pushes people toward retributive killings, which have a substantial impact on the carnivore populations and undermines conservation efforts (Cromsigt et al., 2013; Dickman, 2008; Goswami et al., 2013; Hazzah, Borgerhoff Mulder, & Frank, 2009; Woodroffe, Thirgood, & Robinowitz, 2005). Reducing antagonism caused mortality is an important strategy for conservation of carnivores (Lee, 2011).

Approaches to Mitigate Large Carnivore–Human Conflict

Remedial Measures Implemented Through Participatory Planning

In the last decade, large carnivore conservation has moved from “fences and fines” to the integration of local people in conservation (Hazzah, 2006; Hulme & Murphree, 1999, 2001; Kiss, 1990; Wells, Brandon, & Hannah, 1992; Western & Wright, 1994). Participatory Rural Appraisal (PRA) is a common conservation tool for measuring perceptions of local people on wildlife–human conflict (Bagchi & Mishra, 2006; Bauer, de Iongh, & Sogbohossou, 2010; Jackson & Wangchuk, 2004; Mishra et al., 2003; Mwebi, 2007; Nugraha & Sugardjito, 2009). Varied implementation approaches, however, affect success and hinder the formulation of effective conflict resolution and conservation management (Bagchi & Mishra, 2006; Cromsigt et al., 2013; Madhusudan & Mishra, 2003).

We reviewed the literature on large carnivore–human conflicts and identified common problems associated with using PRA and the recommended strategies/solutions. We noted the most salient problems and key lessons learned. Interviews were also conducted with wildlife researchers, biologists and managers. In this article, we offer protocols for collecting data on large carnivore–human conflict using the semi-structured interview technique of PRA.

Protocols for Assessing the Status of Large Carnivore–Human Conflict Using PRA

- The questions, whether open or closed ended, during the interview should be strictly aligned with the study objectives. For example, if the research question pertains to large carnivore–human conflict only, collecting socioeconomic data may not be necessary. However, if the objective is to assess socioeconomic aspects, questions on conflict should also be addressed.
- If the survey is focused on only academic objectives, this should be conveyed to the interviewees to avoid expectations among the respondents of a monetary settlement against loss (Hazzah, 2006; Krithivasan, Athreya, & Odden, 2009; Mishra, 1997; Sekar, 1998).
- The interviewer should clarify his/her role (e.g., government or nongovernment representative), even if the study is concerned with academic objectives. Any compensation schemes available from the surveyor’s side for possible implementation should be discussed with respondents (Bhattarai, 2009; Scholte, Adam, Kari, & Mbouche, 1999).
- The area’s remoteness should be considered because people from highly accessible areas may respond differently than those from remote locations (Maheshwari, Takpa, Kujur, & Shawl, 2010). Attitude of the locals from areas previously surveyed may

also differ from those where a survey was conducted for the first time (Distefano, 2005).

- Key people (e.g., administrators, forest department officials, conservation non-governmental organization (NGO) representatives, local leaders) should be included in the sample, along with affected local communities, to learn their role in conflict mitigation (Bhattarai, 2009).
- Conversations on livestock loss should be restricted to the previous 2 years to avoid problems of inaccurate recall. Information on livestock holding, numbers lost to predation should be cross-checked with government records (Bhattarai, 2009; Mishra, 1997; Krithivasan et al., 2009; Wang, 2008).
- Identification of the predator can be difficult (Krithivasan et al., 2009; Wang, 2008), but showing photographs of the predators in the area facilitates the process (Bauer, 2003; Dickman, 2008). It is also important to ask how the predator was identified: direct sighting or indirect evidence; time of sighting of predator and depredation (Bhattarai, 2009).

Factors that increase chances of depredation should be considered (e.g., lax guarding, husbandry practices, poorly constructed livestock pens, grazing within high-risk areas, attentiveness of shepherds, and relying on children to guard livestock) (Dickman, 2008; Jackson & Wanchuk, 2004; Jackson, Hillard, & Wangchuk, 2001; Maheshwari et al., 2010; Mwebi, 2007).

- The categorization of the level of large carnivore–human conflict should be systematic and based on defined criteria (Maheshwari & Sharma, 2010; Nugraha & Sugardjito, 2009; Wang, 2008).
- Scat analysis is a robust technique that should be used to validate allegations of depredation and to verify the share of domestic livestock in the predator's diet (Bagchi, Goyal, & Sankar, 2003; Bagchi & Mishra, 2004, 2006; Biswas & Sankar, 2002; Krithivasan et al., 2009; Wang, 2008).

Remedial Measures Implemented Through Compensation Schemes

Conflict mitigation is a necessity for success in wildlife conservation. Mitigation generates support for conservation among local communities and lessens the hostility that locals can have toward predators (Karanth & Madhusudan, 2002; Nelson, 2009; Ogra & Badola, 2008; Wagner, Schmidt, & Conover, 1997; Zabel & Holm-Muller, 2008). Financial or material compensation losses from predators are common but do not always work (Bulte & Rondeau, 2005; Ferraro, 2001; Kaczensky, 1999; MacLennan, Groom, Macdonald, & Frank, 2009; Ogra & Badola, 2008; Treves, Wallace, Naughton-Treves, & Morales, 2006). This section reviews the benefits, common pitfalls, attitudes and perceptions of local people towards compensation programs.

Recommendations for Successful Implementation of Compensation Programs

Goal of Compensation. A successful compensation program requires well-defined goals. Beeland (2008) identified the following: address the economic loss; share the costs of conserving large carnivores equitably; reduce killings of carnivores by locals; increase tolerance toward carnivores; reduce attractants; and promote good husbandry. This helps managers and stakeholders to decide on the most effective strategy (Agarwala, Kumar, Treves, & Naughton-Treves, 2010).

Sustainable Funding. Compensation schemes worldwide tend to be too small and are not sustainable, irrespective of the funding source (Jackson et al., 2001; Lee, 2011; Maheshwari et al., 2010; Wagner et al., 1997). Long-term funding must be ensured for proper implementation. When compensation programs fail, confidence among the local communities is lowered, which may affect achievement of conservation goals.

Time Lag Between Observation and Verification. Many programs report large time lags between observation and verification, reducing the ability of wildlife managers to verify if the mortality was caused by a large carnivore (Schwerdtner & Gruber, 2007). For example, indirect evidences of large carnivores disappear quickly. Distinguishing the damage caused by other animals is difficult (Hötte & Bereznuik, 2001; Olsen, 1991; Van Eerden, 1990). Trained personnel should be used to identify the carnivore causing depredation, and quantify animal-inflicted damage (Thirgood, Redpath, Newton, & Hudson, 2000). DNA analyses (Ernest & Boyce, 2000) and camera trapping (Karanth & Nichols, 1998) may be necessary to identify the “problem” animal.

Burden of Proof. Livestock owners are often frustrated at the burden of proof during the verification process (Lee, 2011); probable kills are typically not fully compensated. Many compensation schemes require external verification because self-reporting of wildlife damage may over-estimate damages (Sekar, 1998) or involve fraudulent claims. To avoid abuse, compensation programs have adopted a community-based approach whereby locals are actively engaged in program design and delivery (Aust, Boyle, Fergusson, & Coulson, 2009; Jackson & Wangchuk, 2004; Treves, Jurewicz, Naughton-Treves, & Wilcove, 2009). Although overstating losses occurs, practitioners can design contracts that encourage people to tell the truth (Moxey, White, & Ozanne, 1999; Wu & Babcock, 1996).

Low Reporting Rate. Some studies have found a low rate of reporting depredation events (Madhusudan, 2003; Ogra & Badola, 2008). Reasons include confusion with regard to the process, logistical complication, time-consuming processes, and loss of confidence due to burden of proof or corruption (Ogra & Badola, 2008; Václavíková, Václavík, & Kostkan, 2011). Good communication strategies play an important role in such cases. Effective and fully staffed ranger guard posts close to the park in remote areas could reduce the unwillingness of communities to report large carnivore–human conflict events (Nugraha & Sugardjito, 2009). Other site-specific strategies can also be worked out such as in the province of Riau in eastern Sumatra, Indonesia, villagers voluntarily report tiger-human conflict through a “Conflict Hotline” phone number (Nugraha & Sugardjito, 2009).

Timely Payments. A transparent process is vital to avoid abuse of the payment system (Madhusudan, 2003; Ogra & Badola, 2008; Sillero-Zubiri & Laurenson, 2001). Insufficient information about a program can lead to frustration (Wagner et al., 1997). The verification process should be separate from the actual payment (Nyhus, Osofsky, Ferraro, Madden, & Fischer, 2005).

Determining Loss and Compensation Values. Calculating the compensation amount can be challenging because the value of livestock may vary with age, size, or reproductive status. Even when compensated monetarily, some livestock owners may perceive they are not receiving fair compensation for the time spent or hardships faced while protecting their assets, or for the emotional loss of losing livestock (Bhatarrai, 2009; Kruuk, 2002; Jackson & Wangchuk, 2004).

Large carnivore-human conflict can also involve loss of human life. Putting a value on a human life is both difficult and according to some, immoral (Nyhus et al., 2005). The program must ensure that local people participate in determining what constitutes appropriate compensation. (Bhattarai, 2009)

Measuring Success. Many programs cannot objectively quantify the impact they have on people's attitudes or on the wildlife populations of conservation interest (Nyhus et al., 2005). Even when compensated, livestock owners may continue to kill wildlife illegally (Kruuk, 2002; Naughton-Treves, Grossberg, & Treves, 2003). People are often more frustrated at the failure of an inadequate program or cessation of a successful one than if none were in place at all (Maheshwari et al., 2010; Wagner et al., 1997). More rigorous methods (e.g., comparative assessments of local attitudes), as well as of the health and size of the wildlife population(s), before and after implementation of a compensation program are required to evaluate the success.

Alternatives to Compensation

The effectiveness of ex-post compensation (payment made after the damage has occurred) has been widely criticized because compensation is not tied to incentives (Agarwala et al., 2010; Bulte & Rondeau, 2005; Lee, 2011; Madhusudan, 2003; Nyhus et al., 2005; Ogra & Badola, 2008; Treves et al., 2009; Václavíková et al., 2011). This criticism has led to the development of payment in advance and performance payment approaches (Lee, 2011). The key difference between these two approaches and ex-post compensation is that the livestock owner receives compensation in advance (prior to a depredation event) and the approach creates an incentive for locals to maintain carnivores in the landscape (Nelson, 2009; Zabel, Pittel, Bostedt, & Engel, 2010). It also reduces the burden of transaction costs associated with ex-post compensation, such as finding a carcass, verifying cause of death and applying for funds.

Payment in Advance. Assistance schemes are provided in advance to the affected livestock owners with a grant or subsidized loan for technical support and materials (e.g., electric fencing, grain bins, and livestock carcass bins) to improve husbandry practices and reduce losses to carnivores (Large Carnivore Initiative in Europe, 2007; Lee, 2011).

Performance Payment. This strategy provides incentives for conservation by issuing payments based on indicators of conservation outcomes such as recovery of the target species population or a surrogate such as good husbandry practices and presence of large carnivores in the landscape (Lee, 2011; Muhly & Musiani, 2009; Nyhus et al., 2005; Zabel et al., 2010). There are a number of technical challenges, however, with these approaches such as: determining the right variable to monitor (e.g., population of carnivore or prey); allocating appropriate payment; decisions on how to allocate payments (since large carnivores often have large home ranges that may include private land holdings, it is a challenge to agree on who is producing the outcome and how to define a community to make payments to); defining the boundaries for the conservation outcomes (e.g., communities, watersheds, ranches); and the ability of incentives to reach the entire affected community (Haaren & Bathke, 2008; Lee, 2011; Mishra et al., 2003).

Conclusion

Large carnivore–human conflict is a threat to the survival of many predators around the world and requires effective, carefully designed, empirical research and cost-effective solutions (Athreya et al., 2013; Crooms et al., 2013). This article focused on PRA as a tool for understanding carnivore–human conflict and economic compensation schemes for damages caused by carnivores. While there appear to be general guidelines that can aid wildlife managers and researchers in implementing effective PRAs and compensation schemes, it is important to be sensitive and incorporate site and species-specific issues and lessons learned from other similar studies.

The common lesson is that the future of known approaches and methods cannot be foreseen. However, if carried out with adequate attention to key factors, these approaches can act as powerful tools to resolve carnivore–human conflict and to achieve conservation goals. The prerequisite to success is the empowerment of local communities in the decision-making process (Chambers, 1994; Macdonald & Sillero-Zubiri, 2002). This article has provided protocols and recommendations for designing PRA and compensation programs. We hope that the article will stimulate meaningful dialogues between locals, managers, and researchers, and lead to successful conservation programs that mitigate carnivore–human conflicts.

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Supplemental Material

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