Toward sustainable conservation and management of human–wildlife interactions in the Mmadinare Region of Botswana: villagers' perceptions on challenges and prospects

Oitshepile MmaB Modise, Department of Adult Education, University of Botswana, 4775 Notwane Rd., Gaborone, Botswana *modiseom@mopipi.ub.bw*

Rebecca Nthogo Lekoko, Department of Adult Education, University of Botswana, 4775 Notwane Rd., Gaborone, Botswana

Olekae Tsompi Thakadu, Okavango Research Institute, University of Botswana, 8173 Shorobe Rd., Sexaxa, Maun, Botswana

Masego Ayo Mpotokwane, Department of Environmental Sciences, University of Botswana, 4775 Notwane Rd., Gaborone, Botswana

Abstract: Human–wildlife conflicts are increasing globally. The increase in conflicts has been attributed to growing human and wildlife populations and a per capita increase in the consumption of natural resources. In Botswana, conflicts between humans and elephants (*Loxodonta africana*) are increasing. The growing human population (2.2 million) is encroaching on the animals' already restricted range. Concomitantly, more elephants are adversely affecting arable agriculture production. To better understand the magnitude and intensity of human–wildlife interactions with elephants and other native wildlife species in Botswana, we collected data through community forum conducted July 17–18, 2017 at a "*Kgotla*" meeting in Mmadinare, a village in the Central District of Botswana. Mmadinare has experienced increased human–wildlife conflicts, mainly related to elephants. The *Kgotla* is the traditional community meeting place in Botswana villages. The *Kgotla* provides for freedom of expression, transparent debate, officialdom, and is the official seat for the village leaders. Issues discussed at the *Kgotla* are highly regarded, and individuals who have discussions do so seriously. Although the forum was our main data collection method, we also used personal anecdotes that communicated participants' emotional encounters with elephants, their helplessness to deal with elephants, failure of traditional management approaches, and their concerns regarding the lack of government support. The research team members and forum participants who had been impacted most by the wildlife also visited the affected areas. Despite the increasing damage, the community emphasized that harmonious coexistence is desirable and sustainable. One strategy highlighted to lead to harmonious living with elephants was the establishment of a wildlife educational park. The option was attractive because the community expressed strong ownership of the concept. Their perspectives reinforced the gravity and urgency of the situation and the importance of working out intentional strategies to positively direct and manage human–wildlife interactions.

Key words: Botswana, conservation strategies, human–wildlife coexistence, human–wildlife interaction, *Kgotla* meeting, *Loxodonta africana*, partnerships, storytelling

Humans and wildlife have interacted for as long as humans have been in existence; they have shared the same landscapes and resources (Sitati et al. 2005). However, in some instances and especially where the interactions are not well managed, such interactions have led to conflict. The causes of human–wildlife conflicts are documented in literature, including expansion of human development (e.g., settlements) into wildlife habitats and the intrusion of wildlife species in human settlements (Messmer 2000, Conover 2001). The former is caused by constricting wildlife habitats due to the effects of the latter, consequently resulting in competition of resources.

Studies have also extensively documented the impacts of human–wildlife conflicts on socio-economic livelihoods of people (Conover et al. 1995, Dickman 2010, Barua et al. 2013, Khumalo and Yung 2015). The conflict includes property losses, attacks on humans, crops and livestock losses, and disease transmission to livestock or

humans (Conover et al. 1995, Treves et al. 2006, Dickman 2010).

Many complementary definitions of human–wildlife conflicts have been given in the literature. Messmer (2000) applied the term to any situation that involved negative interactions between humans and wildlife. These conflicts can either be real or perceived, economic or aesthetic, social or political. As such, human–wildlife conflicts may also encompass damages to the individual that result from federal, state, or local wildlife legislation, regulations, or policies that are designed to protect or conserve wildlife, public benefits, and individual property rights (Messmer 2000). Nyhus (2016) summarized these definitions by stating that "human–wildlife conflict is commonly described as conflict that occurs between people and wildlife; as actions by humans or wildlife that have an adverse effect on the other; as threats posed by wildlife to human life, economic security, or recreation; or perceptions that wildlife threatens human safety, health, food, and property." Others indicated a blending of concepts such as human–wildlife coexistence, human-human conflicts, conservation conflicts, and human–wildlife interaction proposed in the literature, though regarded as passing blame, mostly on wildlife (Hill 2015).

The use of the term human–wildlife conflicts to define the nature of human–wildlife interactions can be problematic, as it exacerbates rather than solves the problem (Redpath et al. 2014). Dickman (2010) and Madden and McQuinn (2014) argue that framing human–wildlife interactions from the conflict perspective limits the array of solutions that can be used to address it. It can, for example, constrain the achievement of conservation-related goals as attention would be centered on reducing negative interactions rather than on increasing positive behaviors toward wildlife (Dickman 2010). The literature then suggests softening of terms that communicate negativity and moving toward those that emphasize coexistence. In support, Madden (2004) noted that the idea of exploring coexistence and tolerance, as opposed to conflict, is progressive. Coexistence takes place when the interests of humans and wildlife are both satisfied or when a compromise is negotiated to allow the existence of both humans and wildlife (Frank 2016).

Background and study context

The discussion of human–wildlife conflict continues to receive attention especially as human and animal populations increase (Makindi et al. 2014). Globally, Sripal (2015) cites the U.S. Census Bureau (2002) to indicate that human population of the earth exceeds 6 billion and is growing at an estimated rate of 1.2% per year. This growth is said to be the root of increased human–wildlife encounters, but the problem is localized rather than general. Africa in general houses the world's largest concentrations of wild animals, both in density and diversity (Seoraj-Pillai and Pillay 2017). This concentration directs more research studies toward the area of human–wildlife interaction. It has also given Africa the important global role of several wildlife species protection.

While some studies focused on the attitudes held by local people toward wildlife (Treves and Naughton-Treves 2005), others explored means or strategies of dealing with this type of interaction. Still others have documented the impacts of human–wildlife conflicts on the socioeconomic livelihoods of people (Barua et al. 2013, Khumalo and Yung 2015). A recent study has shown that there are other hidden costs of human–wildlife conflict such as the psycho-social effects (Bond and Mkutu 2018), and these are often not factored into compensation initiatives. Mitigation measures indicated in literature include technical approaches, biophysical measures (e.g., killing problem animals, fencing), policy and legislative frameworks (e.g., monetary compensation, law enforcement), and participatory approaches (Treves et al. 2006, Dickman 2010, Redpath et al. 2014, Hill 2015, Hoare 2015, Yurco et al. 2017). Though notable advances have been achieved in this area of research, additional detailed studies are necessary.

As significant local communities in Africa still rely on subsistence agriculture, studies that explore how arable and pastoral farming are affected by wildlife like elephants (*Loxodonta africana*; Figure 1) and predators such as hyenas (*Crocuta crocuta*), leopards (*Panthera pardus*), and lions (*Panthera leo*) are important. In the northern part of Botswana, for example, and especially the Ngamiland District, the elephant and buffalo (*Syncerus caffer*) are subjects of concern (Sello 2012, Vanderpost 2007, Gumbo

Figure 1. Increasing human and elephant (*Loxodonta africana*) populations are on a collision course in Botswana, Africa as humans continue to encroach on a restricting elephant range. University faculty and villagers in the Mmadinare Region of Botswana are working to mitigate human–elephant conflicts (*photo of bull elephant courtesy of O. Messmer*).

2017). Hotspots (i.e., areas that are frequently and severely affected by wildlife destruction) in this region include the Nata area, Ngamiland, and Chobe District. Boteti subdistrict, in the Central District, is highly affected, and some research studies have also concentrated in this area (DeMotts and Hoon 2012, Frank 2016, Yurco et al. 2017). Areas in northeastern Botswana, where this study was done, have received less attention, though the elephant problem is also common.

In Botswana, human–wildlife interaction gets its impetus from the fact that Botswana's development is premised on a sustainable environment that emphasizes wildlife as a source of income in the country (Ministry of Finance and Development Planning 2016).

The country is endowed with wilderness and wildlife, which includes an increasing elephant population estimated at 130,000–200,000 (Chase 2011, Government of Botswana 2012). The elephant range, which has been restricted to northern Botswana, is getting smaller and smaller with the ever-increasing human population, though there have been reports and sightings of elephants in areas far beyond their common habitat. The recent media reports show elephants sighted in south, central, and southwestern Botswana (Mmegi News 2017).

DeMotts and Hoon (2012) noted that while

conservationists and politicians commend the growing figures of elephant population in Botswana, agrarians and inhabitants of northern Botswana battle with coexisting with elephants that destroy crops and impede livelihoods. Evidence suggests that >70% of the elephant population is found outside of protected conservation areas (Blanc 2007). This population poses a threat to human property (boreholes, fences, and crops), and could cause human death and injuries (Lamarque et al. 2009).

Carnivore species such as lions are also a threat to pastoral farmers, as they tend to kill domestic livestock (Gupta 2013). Wildlife in general can be a challenge. Buffalo, for example, transmit foot-and-mouth disease to cattle (Mogotsi et al. 2016). In the northern part of Botswana, especially the Ngamiland District, the elephant and buffalo are a threat to the main subsistence livelihood of arable and pastoral agriculture.

This study was conducted to explore human–wildlife interaction focused on elephants in the local community around Mmadinare. The community is prone to crop-raiding elephants and other wild animals. The purpose of our research was to describe the nature and magnitude of community interaction with wildlife, including why and how the interaction should be managed.

Study area

Mmadinare area and its associated localities in the northeastern part of the Central District of Botswana are prone to crop-raiding elephants and other wild animal interactions. The village is situated south of the ephemeral Motloutse River (Figure 2), a tributary of the Limpopo River (Mmadinare Development Trust 2014). Despite these raids, studies on human–wildlife interactions in this area had not been done prior to this paper. As stated, studies have concentrated on the northern part of Botswana, such as the Ngamiland District, Chobe District, and the Boteti subdistrict in the Central District (Gupta 2013, Mayberry 2015, Noga et al. 2015). Initiatives to mitigate effects of human–wildlife interaction are also biased toward areas where
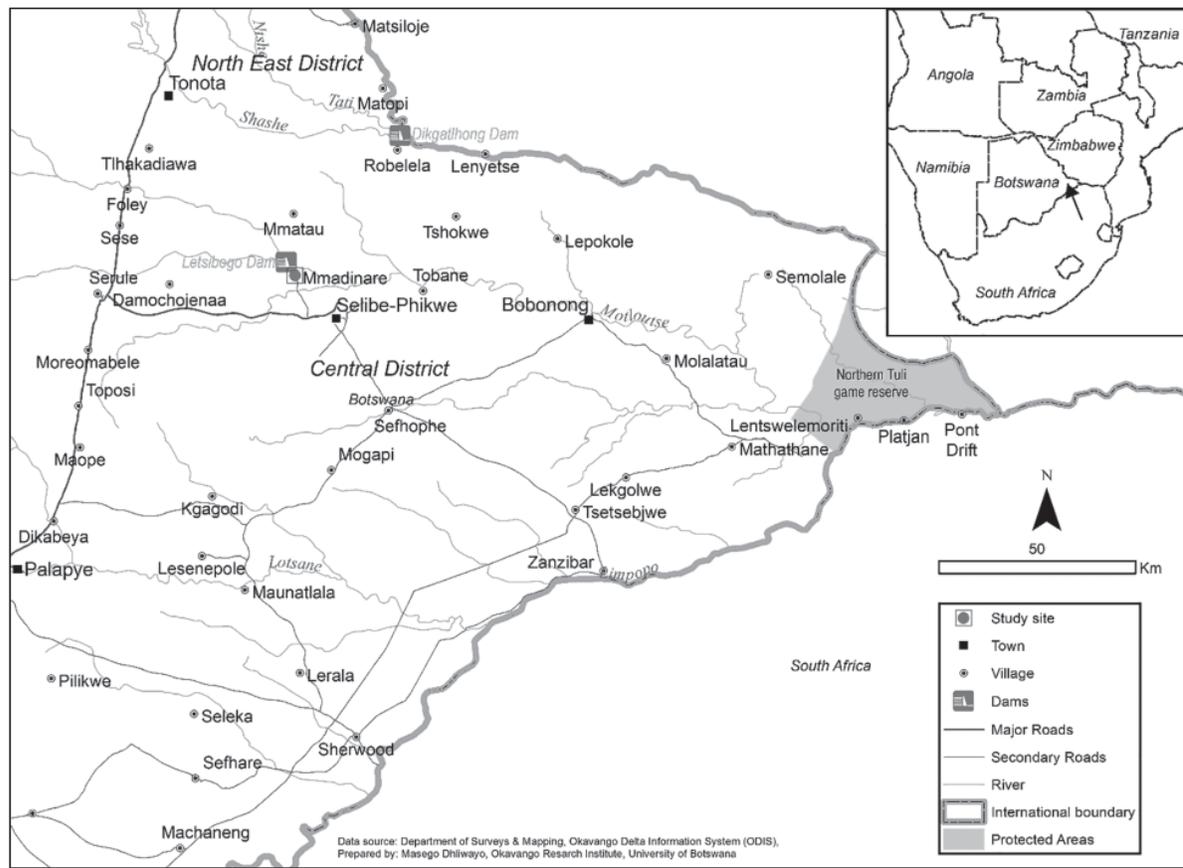
Figure 2. Location of the Mmadinare village in the Central District Council, mideastern Botswana, situated 15 km from the Selibe Phikwe River.

more studies on human–wildlife conflicts have been conducted (e.g., Jackson et al. 2008, Noga et al. 2015, Songhurst et al. 2015). This study therefore directed attention to northeastern Botswana, a place that has received very little research attention. The purpose was to learn from the experiences of local communities. As Tessema et al. (2010) indicate, understanding the experiences of the local communities is a key to improved human–wildlife interactions. Experiential understanding has the potential to inform strategies meant to facilitate positive or beneficial interactions, which in turn can create sustainable futures of human–wildlife interactions in Africa.

Our study was conducted at the Mmadinare village in the Central District Council, mideastern Botswana. The village is located 15 km from Selibe Phikwe. The Mmadinare Development Trust is a community-based natural resources management initiative.

The annual average rainfall in the study area is 400–460 mm (Ministry of Finance and Development Planning [MFDP] 2016). Climatically, the area is next to the dry Motloutse valley. This area is dry because it experiences the end effects of the Indian Ocean maritime air mass from the east. From the north, it experiences the end effects of the moist Inter Tropical Convergence Zone (ITCZ). The ITCZ consists of moist convectional air currents from the equatorial belt. Being at the attenuated effects of moist air, the study area has a high risk of drought. The vegetation structure in the study area is open tree savanna. Open tree savanna vegetation form supports varied grass species based on the local soil and moisture conditions and history of previous use. Examples of grasses found in the area include Tassel three-awn *(Aristida congesta)*, Lehmann lovegrass *(Eragrostis lehmanniana)*, and crabgrass *(Digitiria milanjiana*; Kabelo and Mafokate 2004). The common tree species are *mophane (Colosphospermum mopane)*, different acacia species and other hardy species, such as wild syringe *(Burkea Africana*; Bekker and De Wit 1991).

Methods

This study set out to focus on locally and culturally appropriate research approaches that do not rely on the sheltered culture of classical qualitative and quantitative research inquiries. It thus used a novel approach that involved local villagers through community meetings (*Kgotla*; Figure 3), storytelling, and visits to the affected fields. The guiding question was "How do Mmadinare community members describe their interaction with wildlife?"

Because the purpose of the study was to explore experiences of interacting with wildlife, purposive sampling was used to select Mmadinare villagers who participated in this study. This strategy helped to avoid the overwhelming majority of people who are free to attend *Kgotla* meetings. The research team worked with the village leaders to identify key informants. Key informants were those who had been directly affected. In addition, there were key stakeholders like police officers, wildlife officers, freelance tour operators, and local leadership who are usually called upon to help during the time of interactions.

The study was conducted in July 2017. On July 17–18, 2017, 65 villagers were engaged in a community forum as key informants. Key informants in this study were people who have had direct interaction with elephants. Others were people with knowledge about the subject of human–wildlife interactions, including community members who had witnessed the destruction by elephants, government officials who are normally called upon to intervene at the time of destruction (police officers, wildlife officers, district officers), local governance representatives such as senior chief representative, deputy senior chief representative, subchiefs, and village community development committee members. In addition, the sample included private entities such as private tour operators and self-organizing groups such as Mmadinare Development Trust. The characteristics of participants are representative of the diversity of experiences required to meet the objectives of the study. Because we exceeded the expected number of participants (50; informed by consultations with the main stakeholders listed above), we considered the input to be reflective of the survey population.

Figure 3. A community member speaking at the *Kgotla*. The *Kgotla* is the most important traditional place where members of the community gather to discuss issues of mutual concern (*photo courtesy of the researchers*).

Community/Kgotla research forum

Data collection consisted of recording inter-actions and communications between researchers and local communities at the *Kgotla*. This forum was strategically chosen as a meeting place for a number of benefits. For example, it gives an aura of an informal gathering. According to Lekoko and Nthomang (2017), the *Kgotla* is the most important traditional place where members of the community gather to discuss issues of mutual concern or any other issue raised by the chief, village development committees, or other local and government officials as well as visitors such as national political leaders and university researchers. The authors see *Kgotla* as an ideal place to solicit public acceptance and consensus on a variety of local and national issues. Modise (2016) also explains that the *Kgotla* is a symbol of the democratic processes embedded in the Botswana culture. As in many villages of Botswana, Mmadinare *Kgotla* is strategically located at the center of the village for easy access by all. This forum afforded the researchers the opportunity to engage the community over their experiences of human–wildlife interactions.

As Hills and Mullett (2000) observed, using community meeting places (*Kgotla*) is a way that ensures community members would not be excluded in a research purported to make a difference in their lives. Community members are capable of making meaningful contributions to their needs as long as they are allowed to participate genuinely (Chambers 1988). Heron (1996) also supported active participation of the community, stating that "to generate knowledge about persons without their full participation in deciding how to generate it,

is to misrepresent their personhood and to abuse by neglect their capacity for autonomy intentionally. It is fundamentally unethical." Of particular importance in this study was to engage Mmadinare community members to explore and interpret their encounters with wildlife and jointly work out strategies to mitigate the negative impacts.

Typical of all research methods, the community forum has its own challenges. Some participants might not openly participate in the presence of their leaders, such as chiefs, subchiefs, and everyone else they deem authorities. One other main challenge is that a substantial amount of time can be spent on participants who overemphasize a point. These occurrences are purely part of human nature; they need to be monitored and redirected when necessary. In this study, researchers used a variety of data collection tools, storytelling, visits, and observation of fields that have been destroyed by the elephants. Individual storytelling, on one hand, gave those who could not share their stories in a large group the chance to do so individually. Field observation, on the other hand, helped to ignite a sense of activeness in the project. Unshared stories were eventually able to be discussed. Puebla et al. (2004) explain that by coming up with an interview guide and guiding questions, researchers never intended to treat them as rules to be followed; rather, they helped with a clear outline of issues to be discussed.

Individual storytelling

Storytelling was another method of data collection used. Researchers listened to and participated in the sharing of experiences. Unlike some research approaches in "which the interviewer is essentially an "invisible," passive listener, researchers were fully engaged in the exchange of ideas" (Puebla et al. 2004). In narrating the stories, participants were encouraged to reflect on themes such as the location, time of destruction, impact of destruction, individual and collective efforts toward addressing the challenges, and support structures available to them during these challenging times.

Data analysis

By the nature of the research instruments used, data collected were qualitative; hence, qualitative analytic approaches were employed. This involved organizing data thematically to interpret experiences of participants. The analysis was guided by research objectives that helped to organize and synthesize information to derive patterns, ideas, and explanations to achieve the central purpose of the study.

Results and discussion

Our results emerged from the reflective conversations in the form of the community forum and stories told by selected Mmadinare villagers. It became clear from participants that not only the farms in Mmadinare were affected, but there were other hotspot areas such as Robelela, Chokwe, Lepokole, Maphaneng, Mahatane, and Span Plek (Figure 2). Some visits and observations were done at the scenes of destruction. The following main findings emerged.

Understanding human–wildlife interactions from voices of the affected

Participants described the interaction as a long-term relational experience of fear and destruction that elephants caused in their promising fields (Figure 4). Elephants often cause anguish because of the destruction to properties such as farm fences, boreholes, engines, and pipes. Such a sense of destruction was succinctly captured by a farmer, who said, "elephants stayed in my field so much that if they were pregnant they could have given birth in my field." The phrase, "they could have given birth in my field" is rich, precisely because it expresses farmers' helplessness in driving away elephants from their fields. Furthermore, it illustrates the length of time that elephants can stay undisturbed in a field; they stay as long as they want. This phrase is indeed another way of illustrating how long it can take for farmers to get help from those who help chase the elephants. Villagers described their interaction with elephants as inevitable, yet unpredictable and uncontrollable.

A seasonal encounter

As should be expected, elephants' destruction of farms is seasonal rather than regular, driven by their search for food and water. Forced to survive, elephants have no options but to use their natural instincts such as smell to locate

Figure 4. Researchers and participants toured complete crop damage caused by elephants (*Loxodonta africana*) as part of the *Kgotla* cummunity forum, Mmadinare villiage, Central District of Botswana, July 2017 (*photo courtesy of the researchers*).

fresh crops, identify the location of water such as dams, rivers, wells, and boreholes, and pursue them. Their route has also been tied to their historic migratory patterns (i.e., places where they used to graze), which are now inhabited by humans.

Participants related how human beings too have contributed to the kind of human–wildlife interaction experienced in the Mmadinare area. They have encroached into wildlife ranges. In the past, there were separate land use zones for humans and wildlife habitation. This arrangement has since been disturbed by the increasing populations of both humans and wildlife. Participants explained that when humans spread to occupy land initially inhabited by wildlife, the wildlife was either forced to move away or coexist with humans. Another challenge that led to increased numbers of elephants may be the instability or conflict that used to exist in the neighbouring country, Zimbabwe. As a result, elephants fled to Botswana and found a peaceful abode that increased their population and distribution, thereby leading to heightened incidents of human–wildlife conflict in the affected villages.

Participants gave a picture of uncontrollable encounters with elephants. Most incidents of destruction happen at night because elephants avoid human disturbance during the day. However, elephant visits are unpredictable. One farmer, for example, explained that elephants are so tricky because "one never knows when they will strike again." This farmer reported that in 2013, elephants destroyed all his crops.

The destruction also occurred in 2015 and not 2014; thus, the time of destruction is difficult to predict. The word unpredictable is thus used to place more emphasis on the difficulty to prepare for and protect their farms from being destroyed by elephants. The unpredictability is also tied to humans' fear of losing their lives. However, despite this emotional experience and fear toward elephants, participants believe that harmonious coexistence is possible. Coexistence comes through directed strategies, some of which are discussed below.

Self-organizing and practical accountability of others

Mmadinare villagers emphasised that those who have been directly and indirectly affected should cooperate in addressing the challenges of human–wildlife interaction. It was revealed that even those who are not farmers are affected because once the perimeter fences are destroyed by elephants, thieves easily move into the fields and harvest. Every community member has been called upon to participate in formulating strategies for positive interaction with elephants. Self-mobilization has come up as an apt strategy for coexistence. The community also saw cooperation and collaboration with groups such as government departments, The Botswana Police Service, Department of Wildlife and National Parks (officers, Department of Crop Production officials, and the District Council as necessary. An axiom "no man is an island" is true in the sense that when farmers are affected, the rest of the community members are too.

One farmer explained that without teamwork, living harmoniously with wildlife is impossible. The police, for example, cannot address the problem effectively without the cooperation of other departments. Interestingly, community members first acknowledged the existence of the problem but accepted that the problem can only be solved with several stakeholders.

A benefit-oriented interaction framework

A benefit-oriented interaction framework was suggested by the participants. The distinctive feature of this framework is fruitful interaction. The community would set clear goals of how they can benefit from elephants rather than letting elephants destroy their livelihood. The characteristics of the type of coexistence envisioned by the participants include the following 3 facets.

Harmonious coexistence. This aligns well with the conservation of elephants. Conservation, for participants, should come with socio-economic benefits. They see elephants as a potential source of improved livelihoods. The suggestion of a community-managed nature reserve is congruent with current strategies for Community-Based Natural Resource Management (CBNRM). Having a nature reserve managed by communities will boost the local economy, and most importantly, employees would be from the community itself. Thus, the community's suggestion that elephants within their area should not be destroyed but rather utilized for community benefit is also vital to offset costs of coexistence.

Community cohesion. Strategies for coexistence should be guided by villagers' experience of interactions with wildlife. The inability to group themselves was considered a weakness, hence the need for collective efforts to deal with elephants. However, they explained that inability to team up in this respect is not due to lack of interest but rather the complexity or challenges of dealing with wildlife. They believe that teamwork can be achieved in an organized environment like an educational park. Participants imagined the educational park as a strategy to bring them together on a single goal of empowerment of community members.

Economic viability. Participants had very good reason to believe that coming up with an educational park can grow their economy based on their knowledge of government strategies. Botswana, for example, has a system of CBNRM that has been used to help communities optimize their benefits from wildlife and natural resources. Communities with solid plans to manage their interactions with wildlife can mobilize resources to overcome challenges that arise from negative impacts.

Participants explained that they have been allocated land that they can use for the educational park. However, while the land is a symbol of hope for sustainable livelihoods, it needs to be developed. Furthermore, participants were aware that without proper planning, their dream of a wildlife educational park may not come to fruition. To this effect, participants explained that they have already put together a strategic document to guide them in their plans. Included in this strategy is a desire to engage in tourism for employment creation. Communities alone would not have all the resources needed to put up a functioning and effective nature reserve.

The Government of Botswana, being the lead and facilitator of community development, was not absolved from its responsibility of helping the Mmadinare community realize their dream of coexisting harmoniously with wildlife. The community further suggested that all other stakeholders that can provide other needed resources such as expertise, finance, and materials should be brought on board early at the conceptualization of the idea of a nature reserve. They also called for volunteerism where people in their community can volunteer resources of any kind to facilitate coexistence with wildlife in a fruitful manner.

Facilitating harmonious coexistence

Participants have suggested some strategies that can be used while still exploring the idea of a wildlife educational park.

The use of electric fence. Since it was made clear that the current farm boundaries (fence and wood) are easily destroyed by elephants, electric fencing was considered to be the best choice. It can deter destruction from elephants. In the Mmadinare area, for example, solar-powered electric fences are seen as an alternative that can be placed around a cluster of ploughing fields

as a drift fence, which is a boundary to separate ploughing fields from livestock grazing areas or veterinary fences. The electric fence can deter elephants and reduce crop-raiding and fence damage as well as other opportunistic challenges such as livestock crop-raiding. The community indicated that since arable and pastoral lands are in 1 place, the fence could be used as a barrier between them. Cluster fencing using solar power was recommended by the community since Botswana is endowed with a lot of sunshine.

Chili pepper. Introducing chili pepper, which has the potential to cause discomfort to elephants, may keep them away from entering the farms. Chili pepper ploughing is considered a possible solution because once ploughed, it is physically there to drive elephants away at any time. When comparing chili pepper with the burning of tires, which pollutes the environment, participants said tire burning is not sustainable because of scarcity of sourcing used tires. Tire burning is also a health hazard due to emission of pollutants such as carbon monoxide, oxides of nitrogen, and other chemicals into the atmosphere. Additionally, the timing for burning tires cannot be optimized, as no one can predict the time, location of the encroachment by elephants. However, participants indicated that they had never tried chili pepper but had heard about it. They were hoping to get more information about it from researchers and other stakeholders.

Relocating or culling of elephants. Participants expressed that elephant populations in the area of Mmadinare can be controlled through relocation, culling, or hunting to reduce their population. However, participants were aware of current wildlife conservation management in Botswana, which may make it difficult to pursue this suggestion. Some participants recalled that in the past, a proposal to translocate some elephants to Mozambique did not materialize. This therefore suggests that other means like culling by selling to countries which need elephants may not be entertained either. In respect to hunting as a specific means of reducing elephant population in the area of Mmadinare, the 2014 Botswana Government hunting ban makes the option impossible. However, community members want to open

all these suggestions for the future, including a possibility for relocating elephants.

Fire or light. Participants suggested lighting fires or using lights as a deterrent, though they were skeptical about its effectiveness. One participant observed that elephants are very intelligent and revealed that when they tried some elephant chasing strategies such as the use of solar-power lights, elephants would within a short time use a different entry point where there would be no lights to enter the crop fields. This therefore demands that the whole perimeter of the field be lit. Solar-powered lights present a viable opportunity that needs to be investigated further.

Lessons learned

Lessons that stand out from participants' voices can be summarized using 3 main points: 1) the need for self-organization and mobilization of community members to positively address human–wildlife interaction, 2) the importance of using experiences as guideposts or guidelines of what to do to mitigate the negative interaction of villagers with wildlife, and 3) the inevitability of collective partnering of communities with stakeholders to mobilize appropriate resources and formulate effective strategies for coexistence of communities with wildlife. These points are briefly discussed below in relation to productive management of human–wildlife interactions in the Mmadinare village.

Self-empowerment. This idea, as explained by participants, embodies important principles of self-determination, self-organization, and active participation of community members in community projects. Genuine community empowerment usually comes with communities organizing themselves around common interests or concerns. For the Madinare community, human–wildlife interaction is seen as an opportunity that can benefit the community if well managed through an officially recognized structure like an educational park. Participants see the need for the community to come together as a team to develop strategies for their envisioned coexistence with wildlife. While the community can be given a mandate for planning, it is imperative to note that the process of planning for an educational park is complex. Alone, the community may not succeed; other stakeholders should be involved. While stakeholders are many, strategic ones include

government ministries, community-based organizations, nongovernment organizations, private organizations, and industries with interest in wildlife issues. Furthermore, community planning can benefit from direct government schemes tailored to address this issue of management of human–wildlife interactions like the CBNRM in Botswana. The CBNRM in Botswana is defined by the CBNRM Policy of 2007 as "a development approach that incorporates natural resources conservation" (Ministry of Environment, Wildlife and Tourism 2007).

Local community experiences. After disclosing interesting stories about their interactions with wildlife, there is evidence that coexistence or productive management of human–wildlife interactions can draw from experiences that the Mmadinare villagers have had with elephants raiding their ploughing fields or farms. Both the planning and development of the envisioned educational park can be effectively guided by experiences relating to how they have previously and currently dealt with elephant intrusion. These experiences, if treated as local community strengths, can positively raise awareness of what may or may not work in managing human–wildlife interactions. Experiences of community members who participated in this study can be socially legitimized through a number of means. It can, for example, demand more dialogue with the community. Additionally, active guidance and participation of authorities such as village leaders like chiefs, subchiefs, and community-based organizations can be fruitful. In a nutshell, the proposed educational park calls for an experienced-based management system.

Exploration and planning. Finally, the idea of an educational park suggested as a strategy for coexistence of the Mmadinare community with wildlife is complex and requires more detailed exploration. Among factors that can motivate communities and partners to advance this new idea are: 1) Framework for planning and implementation. The idea of an educational park for Mmadinare village still requires a lot of effort to refine it. For example, a feasibility study will have to be done to determine the practicability of the proposed park at this location. Furthermore, more consultations and direct dialogue with a wider community than only those who participated in this study may yield additional information that can help

inform strategies or frameworks for planning and running the park; 2) Demand and support for the new idea. This aspect of a strategy would require answering the question, "How is the idea of an educational park supported, especially by the Government of Botswana?" The existence of schemes such as Community-Based Natural Resource Management provides an impetus for the villagers to suggest this kind of management strategy. These opportunities, however, need to be explored further to confirm their availability for the proposed Mmadinare project; and 3) Strategic advantage and sustainability of the proposed idea. Regular consultation of strategic partners with the community is of paramount importance to clearly define how the educational park will benefit the local community.

These factors are not exhaustive of what could be done to facilitate positive coexistence of humans with wildlife, particularly in the area of Mmadinare.

Management implications

In this study, the positive attitudes and perceptions of community members toward researchers from the university raised awareness that local communities in Botswana are gradually realizing that institutions of higher learning are no longer closing community interest out of their mission in their pursuit of market knowledge. Historically speaking, university researchers were known for treating research as a temporary move away from the day-to-day institutional environment and doing something that may earn them money or promotion and not necessarily benefit a community. It was research without social benefit. These days, many universities see their engagement with local communities as a high priority to keep them relevant and sustainable. Establishing sustainable university–community partnerships, as suggested in this paper, should not at any time favor or disadvantage 1 partner over the other. University researchers, for example, should not impose new perceptions of coexistence of Mmadinare villagers with wildlife. Whatever ideas of coexistence are discussed must be complemented by experiences and suggestions from the local communities. Perhaps researchers' constant dialogue with community members on the issue

of an educational park can lead to a shift from their initial ideas and their mutual agreement will translate into respect for the voices of both researchers and local communities.

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Associate Editor: Erin E. Harper

OITSHEPILE MMAB MODISE is an associate professor in the Department of Adult Education at the University of Botswana. She is a trainer/educator at the university level and an on-the-job trainer, manager, and researcher with >3 decades of experience.

REBECCA NTHOGO LEKOKO is a professor of social change and community empowerment at the University of Botswana. Her professional practices weave together diverse and pertinent issues pertaining to community development, such as education for empowerment, social mobilization strategies, and participator approaches.

OLEKAE TSOMPIE THAKADU is an associate professor (environmental communication and education) at the University of Botswana, Okavango Research Institute. His work and outreach are focused on mobilization and civic engagement of local communities through Community-Based Natural Resource Management (CBNRM) programs.

MASEGO AYO MPOTOKWANE is a lecturer at the University of Botswana. Holds a Ph.D. degree in environmental science from the University of Stirling. He has extensive experience in environmental and conservation issues.