



Communicating for conservation: circumventing conflict with communities over domestic dog ownership in north Morocco

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Abstract

Conservationists consider open and direct communication as best practice even when their data conflict with local beliefs. However, ensuring the effective delivery of a controversial message without overtly challenging community identity is difficult. Such a scenario needs high levels of meaningful contact and trust-building dialogue between conservationists and communities as well as innovative means of communicating controversial information. Indirect communication is one such strategy, allowing people to draw their own conclusions about controversial information. We present an example of successful indirect communication of such information in the context of a long-term Barbary macaque community conservation project in Morocco. Dogs in the area kill macaques and domestic livestock in the forest, and local shepherds believed these dogs to be feral. However, our observations identified these dogs as being owned, free-roaming village dogs rather than feral dogs. To impart this controversial information, we developed a dog health programme to communicate our findings and improve the health of domestic dogs to safeguard human and animal health. We administered rabies vaccinations to dogs in three villages and provided their owners with brightly coloured dog collars. After observing collared dogs hunting in the forest, the shepherds realised the dogs had owners. Community participation was high and we vaccinated 242 dogs achieving 60–81% vaccination coverage. An additional benefit of the activity was to successfully convey the message that the conservation team is committed to local people's welfare as well as to Barbary macaque conservation.

Keywords Barbary macaques · Communication · Community conservation · Conflict avoidance · Domestic dogs · Rabies

Introduction

Including local people in conservation initiatives in a meaningful manner is a complex undertaking. Poor-quality relationships between the various actors involved, along with imbalances in power relationships which are often unacknowledged, cause many failures (Russell and Harshbarger 2003; Geoghegan 2009; Madden and McQuinn 2014). Trust and meaningful engagement between local people and conservationists and local communities are fundamental to successful conservation outcomes (Bell et al. 2008; Sprague and

Draheim 2015; Madden and McQuinn 2017; Setchell et al. 2017).

The way in which conservationists present quantitative data that oppose local beliefs can be a major cause of alienation and conflict between and among stakeholders (Peterson et al. 2013; Redpath et al. 2013). Communities may feel that the conflicting information challenges their identity causing resentment and reinforcing their incorrect beliefs (Peterson et al. 2013; Redpath et al. 2013; Sprague and Draheim 2015). For instance, cattle ranchers in Florida believe the population of the Endangered Florida panther (*Puma concolor coryi*) is much higher than state officials claim. The ranchers' refusal to accept scientific information may be based on their community identity as land owners who resent the state's protection of a recognised cattle predator (Kreye et al. 2017). Such clashes between the differing realities of conservationists and local people are common and may be related to the different relationships the two parties have with wildlife (Milton 2000; Theodossopoulos 2003; Bell et al. 2008). Badly managed or culturally inappropriate communication has led to

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costly, acrimonious and long-term disputes often characterised by important stakeholders feeling excluded from participatory processes if their views are left unheard or belittled by conservationists or bureaucrats (Saunders 2011; Sprague and Draheim 2015). Such disputes, in which stakeholders' positions become polarised and entrenched, often leave members of local communities sceptical about the need for wildlife conservation measures (Krange and Skogen 2011; Redpath et al. 2015; Sprague and Draheim 2015) and feeling excluded from conservation activities (Peterson et al. 2002; Skogen et al. 2008).

Where a controversial message conflicts with the long-held beliefs of some members or groups of stakeholders, oblique or circumspect communication may be more effective than direct presentation of the information. Tacit communication can help avoid loss of credibility by conservationists, local people, or both. Moreover, tacit communication may also be effective as a form of expression in societies where direct communication and contradiction are culturally inappropriate (Cohen 1987). Ideally, the method of message delivery will effectively communicate information and provide a benefit to the target communities. One way to provide a benefit to communities is to work with them to combat zoonoses transmitted between people, wildlife and livestock—often referred to as a One Health approach (Cleaveland et al. 2014). Here, we describe how a carefully considered intervention can facilitate communication of empirical data that do not accord with local beliefs. We developed a communication delivery programme in the context of a Barbary macaque (*Macaca sylvanus*) conservation programme in Bouhachem, Morocco, the cornerstone of which was to vaccinate village dogs against rabies.

Domestic dogs harass and kill Barbary macaques and kill villagers' cows in the forest of Bouhachem (Waters et al. 2017; Waters et al. 2018). Shepherds blamed this loss of livestock on a pack of feral, forest dwelling dogs which, they believed, originated from the closest town, Mulay Abdesalam, where they were abandoned by visiting pilgrims. However, we found that the free-ranging dogs in the forest were owned by villagers (see Waters et al. 2018). Our observations conflicted with the shepherds' belief that the dogs they observed hunting in the forest were feral. The shepherds did not recognise village dogs because they did not view dogs as individuals (Waters et al. 2018).

When we tentatively conveyed these findings that the feral dogs were village dogs to four shepherds sympathetic to the work of our Barbary macaque conservation project, the information was met with general amusement or disagreement. This alerted us to a possible future conflict situation if we continued to impart our findings directly. We were aware of the history of local people's exclusion from and resistance to top-down development initiatives and thus mindful of

potentially alienating them if we persisted with a direct communication strategy.

As in other developing countries (Knobel 2005), rabies affects the health of people, domestic animals and wildlife in Morocco. Between 1978 and 2008, it claimed the lives of ~22 people per year, with a ~406 reported cases annually in animals in the same period. A national campaign to eradicate rabies began in 1986, with free vaccinations offered to dog owners at the veterinary service offices in large provincial cities and towns (Fassi-Fihri 2008). There are no data on vaccination coverage in each town, as officials do not census dog populations. The programme effectively excludes the rural village dog population because people must take their dogs to veterinary service offices in towns and cities for vaccination (Fassi-Fihri 2008).

Around Bouhachem, shepherds reported livestock deaths from rabies and we knew that human deaths, though rare, also occur. Shepherds told us that their dogs had never been vaccinated against rabies and there were no recent records of veterinary visits to Bouhachem to vaccinate dogs. We have observed potentially rabid domestic dogs attacking macaques, with the risk of an injured macaque contracting rabies (Waters et al. 2017). A rabid macaque attacking people could have disastrous consequences for both people and macaques. Based on this, we developed a dog vaccination programme, with the following aims:

- i. To communicate our findings about dog ownership to shepherds and other local people without threatening community identity.
- ii. To collaborate with villagers to improve the health of their domestic dogs and reduce the risk of rabies transmission to people and livestock.

After presenting our methods, we describe how we conducted a programme that we hoped addressed local people's beliefs and concerns. We explain how the programme was successful in its aims but had unforeseen consequences.

Study site

Bouhachem Nature Reserve (Fig. 1), which we refer to as Bouhachem hereafter, is an area of mixed oak forest situated west of the Rifian mountain chain in the north of Morocco. It is a mountainous area of approximately 142 km² and home to the endangered Barbary macaque, now only present in fragmented populations in Morocco and Algeria. In October, 2009, we initiated an ongoing research and conservation project focusing on the Barbary macaque in Bouhachem with the aim of including communities in conservation activities. We

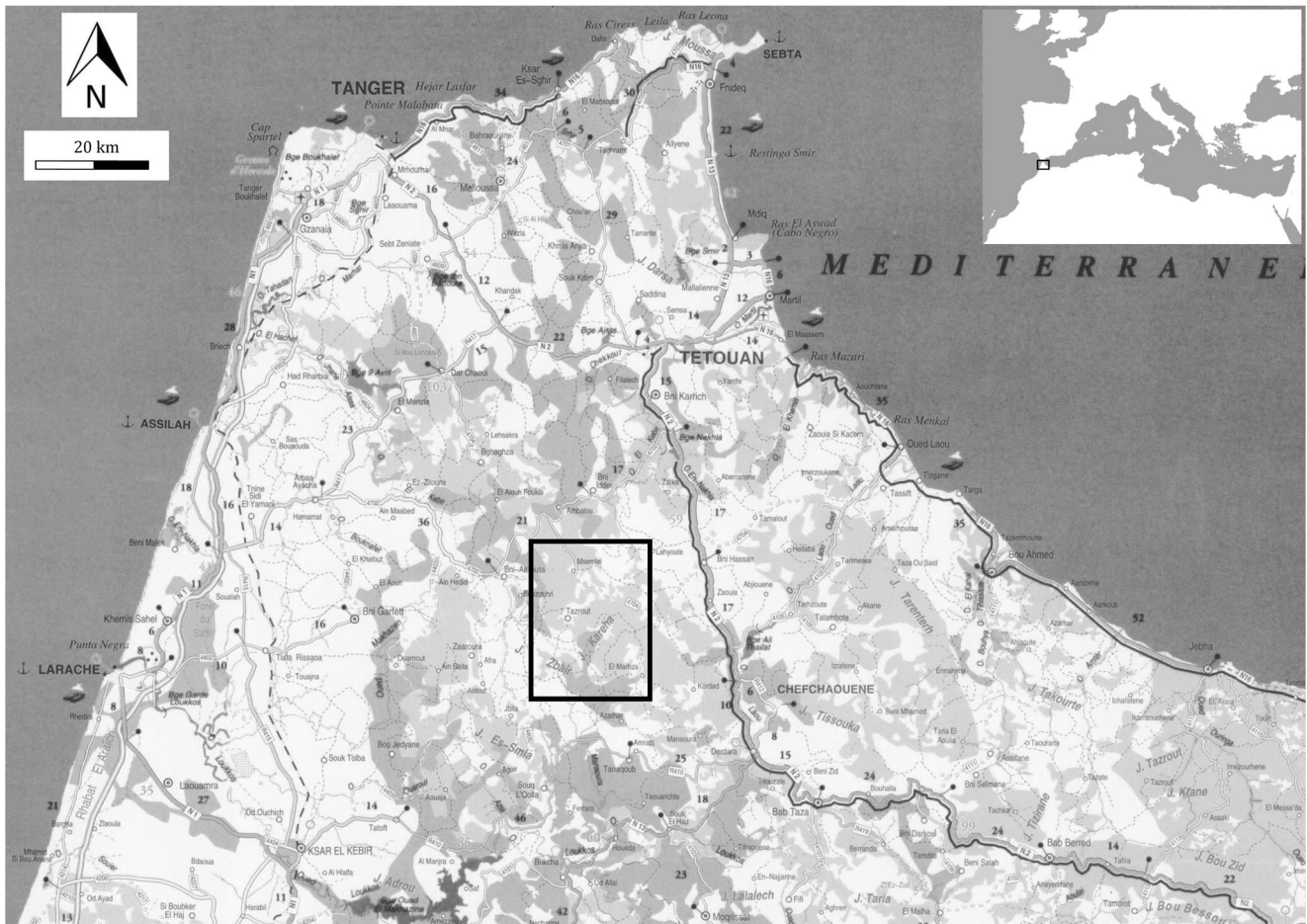


Fig. 1 The location of Jebel Bouhachem Nature Reserve in northern Morocco and the Mediterranean

applied a biosocial approach integrating quantitative and qualitative methods to develop conservation strategies which addressed the local situation for people, their livestock and the Barbary macaque.

Ten villages are adjacent to or directly on the periphery of the forest. There has been no recent census at a household level so no population data are available. The villagers are agropastoralists. Domestic livestock include goats (*Capra hircus*) and cows (*Bos taurus*). Cows graze in the forest unattended, but shepherds herd goats into and out of the forest and use livestock guarding dogs to protect goats from the African wolf (*Lupus lupus lupaster*) and feral dogs. The remote location of the villages means that their inhabitants have been historically marginalised and excluded from decisions concerning the forest they use to sustain their livelihoods as well as being discriminated against by city dwellers. To avoid their further exclusion, we engaged local shepherds in project research activities by integrating our different knowledge systems to co-produce information about Barbary macaque population status in Bouhachem. In the context of conservation, this approach

provided an entry point into engagement with local people by including them in the conservation research effort and had enormous benefits in terms of establishing a dialogue and close relationship with a group of people who regularly used Barbary macaque habitat. Our regular engagement, allowed us to identify and, if possible address, issues that were important to shepherds and their communities.

Methods

We collected data between January 2009 and April 2011. Study participants were men aged 14–84 years working as shepherds regularly or occasionally at the time of the study. We interviewed five shepherds from each of the ten villages on the periphery of Bouhachem forest. We encountered many of these individuals regularly while conducting Barbary macaque surveys in the forest. We collected interview data from March to November 2010 using semi-structured interviews to enable interviewees to communicate their depth of knowledge

and their thoughts about the subject matter in their own words (Huntington 1998; Drury et al. 2011). Our interview focused on the shepherds' knowledge of the macaques' locations. However, many shepherds spontaneously expressed their beliefs and views about Barbary macaques, domestic dogs and other species as well as livestock depredation. During 2010, we also visited all study villages at least once every 8 weeks (weather permitting) to familiarise people with our presence. We collected data on accompanied and unaccompanied dogs in the forest during spring 2010 (see Waters et al. 2018). We conducted the vaccination programme over 2 weeks in late September 2010 and at the end of November we distributed dog owners' vaccination certificates. In the spring of 2011, we briefly interviewed 30 shepherds from participating and non-participating villages asking them about any feral dog activity.

We chose three villages, Lahcene, Talyamin and Mtahen, for the first phase of the vaccination programme because their inhabitants asked us lots of questions about our activities. We conducted house to house visits in these villages in September 2010, wearing t-shirts with the conservation project logo on the front. On the first visit, we introduced ourselves and explained the dog health programme even if the householder did not own a dog. We enquired whether householders with dogs wished to participate in the vaccination programme and ascertained approximately how many dogs we would be vaccinating. We informed each dog owner of our return date so they could try to keep their dogs close to their home. We recorded the number, sex and age of each dog reported to us by villagers so the veterinary authorities could provide us with the necessary number of rabies vaccines and vaccination certificates.

On our second visit, 2 d after the first, we vaccinated as many dogs from participating households against rabies as possible. We provided the owners of vaccinated dogs with brightly coloured collars to prevent duplicate vaccinations. We completed the certificates and retained them for validation by the provincial veterinary authorities. We distributed the certificates to participating households 6 weeks later in November 2010.

In spring 2011, we asked 15 shepherds from the three participating villages about the feral dog pack, to understand whether our method of communicating dog ownership using coloured collars had been successful. We also interviewed 15 shepherds from three villages 25–30 km away for information about their recent observations of feral dogs. We had previously interviewed all these shepherds in 2010. The first author kept field notes to identify the themes emerging from all our engagements with local men. Our analysis followed an iterative grounded approach where we used open coding to further analyse and identify emerging themes based on the qualitative data as opposed to identifying them beforehand (Tadie and Fischer 2013) and we continued the analysis until these themes became stable (Cassidy 2017).

Results

Eighty percent (116/145) of households owned 1–7 dogs used to guard property and livestock. Almost all dog owners wanted their dogs vaccinated. However, some dogs were pregnant, infirm or of the wrong age to be vaccinated. Others were used to accompanying the goats into the forest and their owners could not stop them from doing so on the vaccination day. We vaccinated some of these dogs in the forest a few days later when the village shepherds presented them to us. Four Mtahen shepherds declined to participate in the programme. However, when we returned to the village for the second day of vaccinations, all four men approached the team asking us to vaccinate their dogs, which we duly did. We vaccinated a total of 242 dogs and achieved 60–81% vaccination coverage for the three villages (Table 1).

When we asked 15 shepherds from the three participating villages if they would take their dogs to the closest town if the regional veterinary authorities set up rabies vaccination services there, they all said they would find it impossible as their dogs could get lost, be attacked by other dogs, or attack people on the way. This confirms that despite the free provision of rabies vaccines for dogs, the strategy of administering them in a nearby town discourages rural dog owners from participating due to the logistical difficulties of travelling any distance with untrained dogs.

When we asked 15 shepherds from the three participating villages about the feral dog pack after the vaccination programme, in spring 2011, four shepherds said that there were no feral dogs, and 11 others informed us that the feral dogs had moved from the area. In contrast, the 15 shepherds from three villages 25–30 km away from those that had been offered the programme reported that the feral dog pack had increased and killed many cows in the forest over the winter. These results suggest that the shepherds from the three participating villages understood that the dogs were from those villages, through their observations of collared dogs, and so no longer mentioned the pack of feral dogs.

There was, however, some confusion about our project among younger boys from Mtahen who had only ever seen us in the village when vaccinating dogs. When we encountered these young boys in the forest following the vaccination programme, they shouted excitedly that we were injecting the macaques. The experienced shepherds quickly corrected them and told the boys that we were protecting the macaques. One older shepherd explained further:

The Monkey People do not vaccinate the macaques. The macaques don't need to be vaccinated as they live in the forest. Village dogs must be vaccinated to keep our livestock and us well.

Table 1 Numbers and percentage of domestic dogs vaccinated in three villages in Bouhachem in October 2010

Village	No. of households	Collar colour	Total no. of dogs	No. of females	No. of males	No. of dogs vaccinated	% vaccinated
Lahcene	39	Yellow	84	17	67	63	75
Mtahn	78	Green	183	28	155	148	81
Talyamin	18	Pink	52	9	43	31	60
Total	125		319	54	265	242	

This shepherd's explanation indicated that he had adequately understood the rationale behind the programme.

Discussion

Our conversations with shepherds suggest that they understood that the “feral” dogs had owners when they observed unaccompanied collared dogs in the forest, 6 mo after the programme had taken place. We succeeded in communicating our information to shepherds without prioritising our knowledge over theirs and without threatening anyone's identity, maintaining and increasing our good community relations which continue to this day.

Our initiative avoided the risk of information being misunderstood or distorted by adult villagers, although, some children who were unfamiliar with our work misinterpreted our activity. Conservationists often erroneously assume that everyone shares the same interpretations of a community conservation initiative but this incident highlights the risks of conducting community actions without adequate awareness-raising appropriate to social and cultural norms. We responded to the boys' misinterpretation of our work by conducting annual visits to village schools around Bouhachem to inform children about our activities.

This study highlights the importance of consistent contact with and commitment to local people by conservationists. Our inclusive strategy of visiting every household in a village to ascertain whether they were dog owners ensured that all households had some social interaction with the team and the programme in the first instance, acknowledging their status as stakeholders in our work. Our study also illustrates the importance of social factors in recruiting shepherds and others to activities initiated by the conservation team. The four shepherds who initially refused the vaccinations found they had excluded themselves from a social activity and changed their minds. The majority of villagers welcomed the initiative, viewing it as directly benefitting themselves and their livestock. Our subsequent engagement with many villagers established our reputation as “good people”, and part of the social landscape.

Participation in the vaccination programme had no financial benefit for the villagers, but subsequent requests from four other villages to participate in the programme show the value

people place on it. This supports the suggestion that financial incentives are not the only incentive to which local people respond in conservation initiatives, although they are important (Kuriyan 2002; Madden and McQuinn 2014; Silva and Mosimane 2014).

The accepted vaccination coverage for the eventual eradication of rabies from an area is 60% (Hampson et al. 2009). Visiting individual households to vaccinate dogs appears to be an effective strategy to ensure vaccination coverage in rural areas of north Morocco. The high uptake of the vaccinations indicates that, if we continue them, along with a dog sterilisation programme, then human and livestock deaths from rabies should decrease in these three villages. The Dog Health Programme provided salient and meaningful benefits to local communities and has stimulated their interest in conservation activities. Some villagers believe that the vaccination initiative lessened the risk of rabies transmission from village dogs to other livestock. For example:

It [the programme] avoided problems for other animals like mules because dogs infect other animals with rabies too. (Anon, ~70 years, Talyamin).

There are no official data available to substantiate these beliefs as villagers do not report rabid dogs or other livestock to the authorities. The programme appeared to empower some villagers to control the dog population as, in a follow up study in 2014, we found that shepherds had begun to sterilise their male dogs to prevent them roaming in the forest. We suggest that this behaviour change means that shepherds have accepted some responsibility for their dogs' behaviour, instead of placing the blame on outsiders visiting Mulay Abdesalam.

The vaccination programme facilitated the development of management strategies which balanced Barbary macaque conservation needs with the important role dogs play in protecting villagers' livestock in the forest. An additional benefit of the activity was to successfully convey the message that the conservation team is committed to local people as well as to the conservation of the Barbary macaque. Local people may feel excluded from conservation because they feel that they are treated as less important than endangered wildlife (Tumusiime and Svarstad 2011). People's differing priorities often underlie human-wildlife conflicts, which are more suitably framed as human conflicts about wildlife based on the

diverging interests of conservationists and communities (Madden and McQuinn 2014; Redpath et al. 2015; Madden and McQuinn 2017).

Failure to develop inclusive and meaningful relationships with local communities can lead to ineffective dialogues, and hinder conservation work (Madden and McQuinn 2014). Conservation practitioners should be aware that directly communicating controversial findings may be culturally inappropriate and threaten local identities. In our case, building trustful relations included using indirect communication of controversial information (i.e. identifying village dogs using brightly coloured collars). This strategy allowed local people to assimilate this information for themselves on observing the collared dogs in the forest thus avoiding loss of credibility for all involved. By communicating indirectly in situations where direct communication may be unwelcome, it is possible to avoid a build-up of resentment, subversive behaviour and ultimately full-blown conflict with the very people who must co-exist with the species we are trying to conserve. Our method seems to have encouraged accountability for dog behaviour among some villagers. Our efforts to prevent conflict succeeded but the sustainability of our approach depends on our constant reflection on how local people view us, our activities and the macaques. Conflict prevention efforts need good community relations backed up by appropriate methods of communication and will only be effective if conservation practitioners have a profound understanding of the situational context of their study site.

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Compliance with ethical standards

Ethics statement At the start of interviews with each individual, we explained our aims and asked the shepherd if he would like to participate in the study. Nobody refused. All participants remain anonymous. This project gained approval from the Research Ethics and Data Protection Committee of the Department of Anthropology, Durham University, in spring 2009.

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