

**The Use of 'Push to Talk' Mobile Phone Technology
to Reduce Human Elephant Conflict,
Laikipia District, Kenya**

**Laikipia Elephant Project
Working Paper 2**



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The Use of 'Push to Talk' Mobile Phone Technology to Reduce Human Elephant Conflict,
Laikipia District, Kenya

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Executive Summary

Human-elephant conflict is a significant problem in Kenya, as in many other parts of Africa and Asia where wild elephant populations persist outside protected areas. Various methods have been tried to reduce human-elephant conflict, ranging from traditional farm-based deterrence to electrified fences. The success of all forms of deterrence depends on the effectiveness of collaboration among farmers and wildlife management authorities. In particular, early-warning of crop raiding is important in successful raid deterrence. The rapid spread of mobile phone technologies in rural Africa is changing patterns of communication among local actors. This paper reports a study of the effectiveness of mobile phone technology in tackling human-elephant conflict in Laikipia District, north-central Kenya.

The technology tested is 'Push to Talk over Cellular' Technology. This enables communication between two individuals, or among a group of people, combining the functionality of a two-way radio with a mobile phone. Push to Talk users can make standard phone calls and send SMS. Push to Talk technology requires less airtime, demands less energy, and is less costly than a conventional phone call.

Mobile phones are widely distributed in Laikipia, and network coverage is extensive. Push to Talk was trialed in three locations with a long-standing history of crop-raiding by elephants, and where local farmers were engaged in attempts to defend their field, Mwenje, Rumuruti and Ex-Erok.

In all three areas Push to Talk technology improved coordination of responses to human elephant conflict, bridging problematic relationships between the different stakeholders (the Kenya Wildlife Service, the smallholder farming community, private landowners and police). Push to Talk also helped address security incidents such as livestock theft.

This trial suggests that Push to Talk technology can make mobile phone use more affordable and accessible to poorer communities, and also make group communication possible. This has a number of potential applications. Push to Talk, and mobile phones technology more generally, is relevant to community-based human-elephant conflict mitigation where there is good mobile coverage and widespread adoption.

Introduction

The African elephant has undergone significant decline in range and numbers in the twentieth century (Douglas-Hamilton 1987). Nonetheless, as a result of the expansion of settled agriculture onto rangeland and the fragmentation of areas of open savanna, human-elephant conflict (HEC) remains a significant problem, especially where farmland lies adjacent to land managed for conservation (Thouless 1994; Kangwana 1995; Barnes 1996; Woodroffe et al. 2005). Human-elephant conflict includes damage to property and risk to human life. Economic losses include loss of cattle and standing crops, breaking of grain stores, water reservoirs and barriers (Hoare 1995). These sorts of losses are common in Kenya (Thouless 1994). In Kenya, people are killed every year by elephants in an attempt to defend their crops (Hoare 1999; Kangwana 1995; Kiiru 1995), and elephants in their turn are killed legally and illegally (Omondi et al. 2004).

Various methods have been tried to reduce HEC in Kenya (Sitati and Walpole 2006; Walpole and Linkie 2007; Graham and Ochieng 2008; Ochieng 2009). Traditional farm-based deterrents include the use of watchtowers, fires, ditches and loud noises. More novel farm-based techniques include the use of chilli grease fences around farms, fireworks and powerful electric lights and electrified fences (Hoare 1995; Jenkins & Hamilton 1982; Thouless and Sakwa 1995; Thouless et al. 2002). In Laikipia, a district-wide electric fence is being constructed to separate the majority of smallholder land from the ranches and conservancies, and experience with electric fences in the area is growing (Graham et al. 2009).

Human-Elephant Conflict, Communication and Mobile Phones

However, whether human-elephant conflict reduction depends on deterrence or barriers, a critical element in success is likely to be the nature and effectiveness of human organisation in the communities and areas affected. Collaborative action is the essential basis for success in elephant deterrence, as it is in so many other fields of conservation and development and to wider questions of the governance of the commons (Ostrom et al. 1990, 1999; Dietz et al. 2003). Yet, locally-evolved institutional arrangements for resource management often prove ineffective in the face of social, economic political or ecological change (Agrawal 2001). Communication is an essential element in the creation of 'social capital' (Bebbington 2008), and central to the classic 'design principles' for common pool resource management (e.g. Becker and Ostrom 1995). Pretty (2002) argues the need for relations of trust between conservationists and resource users, and the importance of common rules, norms and sanctions, and suggests that effective conservation must be based on 'collective cognitive action' and 'inclusive social learning' (Pretty 2002, p. 69).

In human-elephant conflict, early-warning of crop raiding has been identified as an important element in successful raid deterrence (Sitati et al 2005). The effectiveness and timeliness of communication among farmers and between farmers and wildlife management authorities could therefore help with successful HEC management. To date, there has been relatively little investigation of the possible contribution of novel communication technologies such as mobile phones to HEC management.

Mobile telephony has expanded rapidly in Africa (Mbarika and Mbarika 2006). James and Versteeg (2007) use data from Vodaphone suggesting that the penetration rate (number of phones per 100 people) for Africa as a whole was 6 per cent in 2005, with penetration as high as 36% in South Africa. International Telecommunications Union data suggest that in 2002, mobile phone penetration in Kenya was 1.9% (compared to 1% for land lines, Meso et al. 2005). However, the footprint of mobile phone coverage vary substantially across African countries, and actual mobile phone usage is likely to be far higher than these data suggest (James and Versteeg 2007). There is considerable speculation about the relevance of spread of mobile phones to development. The rapid spread of mobile phones into rural Africa is widely believed to be changing patterns of communication among local actors, and to be a technology that can transform the way rural as well as urban Africans live, learn and carry out business (Kyem and LeMaire 2006). A number of mobile-based commercial applications have potential in terms of development (Meso et al. 2005, Ananthaswamy 2009). The pace of mobile phone penetration in Africa (with

the number of subscribers rising by 35% per year, Scott et al. 2004) offers commercial opportunities for mobile phone operators who can address the 'bottom of the pyramid' market of poor rural Africans. Developments such as the Grameen phone (<http://www.grameenphone.com/>) represent novel and promising strategies for extending phone access to the poor. The mobile phone-based payment service M-PESA, launched by Safaricom and Vodafone in Kenya in 2005, is aimed at those without formal bank accounts (Vaughan 2006). Mobile phones have found a role in election monitoring (Mbarika, and Mbarika 2006), and providing market prices in areas where travel is difficult, as well as novel applications such as crowd-sourcing (Ananthaswamy 2009).

It is an obvious question to consider whether mobile phones might have a possible role in addressing human elephant conflict. This report discusses an investigation of the potential of mobile phone communication to reduce human-elephant conflict in Laikipia District, Kenya, by improving communication between smallholder farmers, large landowners and wildlife conservancies and their fence management teams, and the Kenya Wildlife Service. The project was a collaboration between the Laikipia Elephant Project, the GSMA Development Fund, Safaricom Ltd, Wireless ZT, Nokia, the Nokia Siemens Networks, and the Laikipia Wildlife Forum.

'Push to Talk over Cellular' Technology

This study has focused on one particular mobile phone technology, 'Push to Talk over Cellular' Technology (PoC). This 'Push to Talk' technology offers the functionality of a two-way radio in an otherwise conventional mobile phone. Push to Talk can be used alongside voice and data services on a single handset, so that users can make standard phone calls and send text messages, while also accessing two-way communication and group talk through the press of a button. Push to Talk allows communication among a group of people, and is particularly useful in connecting a user group intermittently over a period of time (e.g., through a working day). Because network resources are used only for the duration of each talk 'spurt,' Push to Talk technology requires less airtime, demands less energy, and is less costly than a conventional phone call (GSMA Development Fund 2008).

Study Area

Laikipia comprises a 10,000 km² plateau located on the equator between Mount Kenya, the Aberdare Mountains and the Rift Valley in north-central Kenya (Figure 1). Formerly a single administrative district, Laikipia was recently broken up into three districts administered through the towns of Rumuruti and Nanyuki. Rainfall on the plateau follows a steep gradient from around 800 mm per annum near the mountain watersheds in the south-west and south-east to just 300 mm in the lower northern parts. A single permanent river, the Ewaso Ngiro drains northwards, dropping down below Laikipia into the dry Samburu rangelands which are occupied by nomadic pastoralists.

In the colonial period, Maasai pastoralists were forcibly resettled from Laikipia, and large parts of the plateau was sub-divided into large farms or ranches for European settlement (Hughes 2005). After Kenyan independence in 1963, some properties were purchased and subdivided in government and non-governmental land buying schemes for smallholder agriculture (Kohler 1987, Graham 2007). Small plot size, poor soils and low rainfall meant that some of this land was left unoccupied or soon abandoned (Huber and Oponde 2005). Such land has been opportunistically settled by pastoralist groups such as Pokot, Samburu and Mukogodo Maasai.

Land use in Laikipia broadly follows the rainfall gradient, with smallholder cultivation in the south where rainfall is highest, privately owned large-scale ranches further north and drier acacia bushland in the north, owned collectively by pastoralists and under traditional livestock keeping. The remaining 8% of Laikipia consists of urban centres, swamps or government owned forest reserves under various stages of unregulated exploitation (Figure 1). Laikipia contains no formally protected wildlife areas, but contains an unusually large number and diversity of wild mammals including Kenya's second large population of elephants numbering over 7,000 animals (KWS 2008, unpublished data).

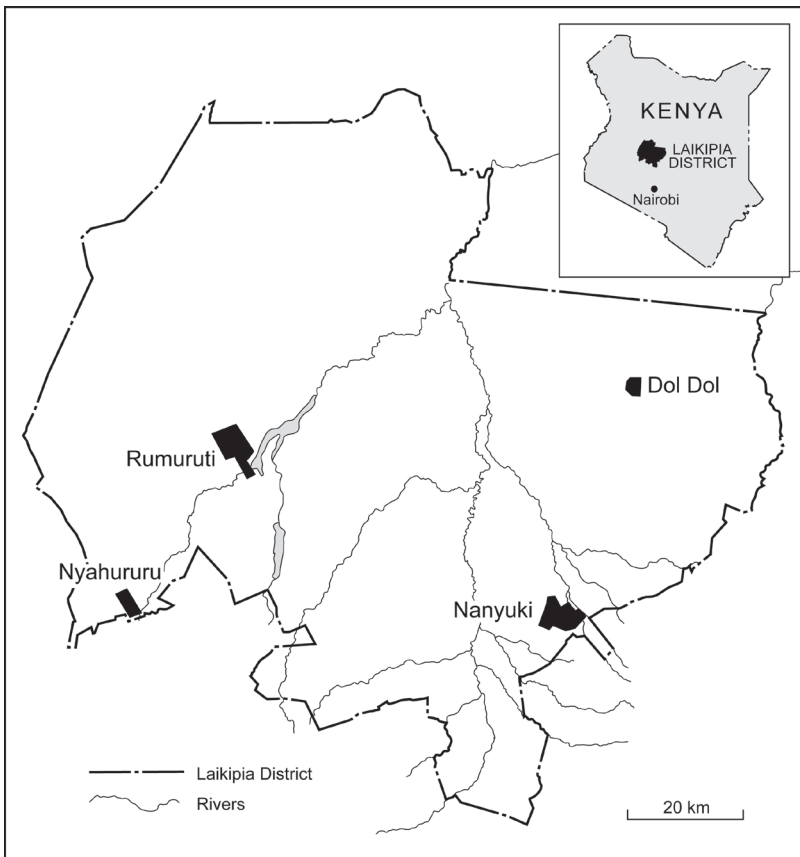


Figure 1: Location of Laikipia District

The remaining large-scale ranches (covering some 42% of the plateau) mostly tolerate elephants, and many engage in wildlife tourism enterprises. The district is a popular tourist destination because of its wildlife. However, Laikipia is not a wilderness, but a patchwork of small farms, large ranches, privately owned conservancies, and government land. The unplanned processes of land annexation, subdivision and settlement have left large areas of smallholder farms surrounded by private and group ranches, informal grazing areas and forests containing substantial elephant populations. When elephants leave land where they are tolerated and move into areas of smallholder cultivation or pastoralism, they come into conflict with people (Figure 2).

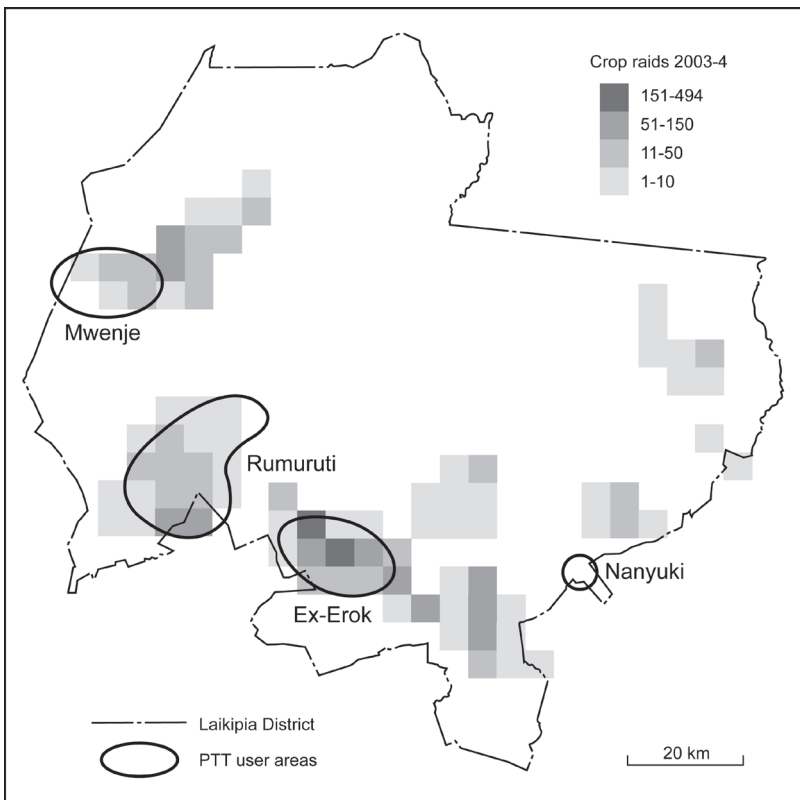


Figure 2: Location and intensity of crop-raiding and distribution of Push to Talk users during the trial

HEC is a particular problem on smallholder cultivated land in southern Laikipia where elephants raid growing crops, damage stores and occasionally injure and or kill people (Thouless and Sakwa 1995; Gadd 2005). In Laikipia, an average of five people and ten elephants are killed each year as a result of human-elephant conflict (Conservation Kenya 2007). There were 3668 HEC reports between November 2003 and October 2004. Of these, 2420 were crop-raids, in which an average of 15% of fields were damaged per raid (Graham 2007).

Study Sites

Mobile phones are widely distributed in Laikipia, and network coverage is extensive, particularly in the southern part of the area, where smallholder farming is concentrated. Three sites were selected for the Push to Talk trial in Laikipia (Mwenje, Rumuruti and Ex-Erok see Figure 2). All these places had a long-standing history of crop-raiding by elephants, and local farmers were already engaged in attempts to defend their fields, supported by the Laikipia Elephant Project.

Mwenje is a small-scale farming area located south of the 40,000 ha Laikipia Nature Conservancy (LNC). The land at Mwenje is highly productive, densely-settled and intensively farmed. Small-scale farmers plant crops right up against the boundary with LNC. Elephants are resident to LNC and a number of them break through the electrified perimeter fence to raid crops on the small-scale farms in Mwenje. LNC has employed security guards to patrol the conservancy fence and where possible prevent elephants from breaking through. An alarm fitted in each of the electrified fence energiser houses alerts LNC security when the fence is broken. The neighboring small-scale farmers recruit scouts to help scare fence breaking elephants back into the LNC. In addition there is a Kenya Wildlife Service post based at Mwenje and the rangers there also help the community to scare crop-raiding elephants back into LNC. We felt that the provision of PoC communication technology to these disparate groups would help to coordinate effective responses to observations of elephants trying to break out of LNC.

Rumuruti: The Rumuruti Forest covers approximately 3200 ha in south-west Laikipia and is surrounded by small-scale farms. Elephants move out from the forest at night and raid crops on these farms. A community association known as the Rumuruti Forest Association (RFA) employs scouts to patrol and protect the forest from illegal logging. These scouts also play a role in monitoring and reporting incidents of human-elephant conflict. The Kenya Wildlife Service has two nearby posts; one at Rumuruti Town and one at Nyaharuru Town. We felt that the provision of PoC communication technology to the Rumuruti Forest Association scouts, their supervisor (the Chairman of the RFA) and the wardens of the nearby KWS posts would help improve the coordination of responses to crop-raiding incidents here.

Ex-Erok is a small-scale farming area in southern Laikipia that shares a boundary with the Ol Pejeta Conservancy and ADC Mutara Ranch. The latter two large-scale properties both contain large numbers of elephants. There are scattered small-scale farms in Ex-Erok which elephants from Ol Pejeta and ADC Mutara raid to eat crops. In response to the insecurity presented by armed groups of transient pastoralists, the small-scale farmers of Ex-Erok have created an active community security group. We felt that the provision of Push to Talk communication technology to members of this group together with security personnel from Ol Pejeta, ADC Mutara, the KWS and local government police, would help to coordinate effective responses to the presence of crop-raiding elephants that move into Ex-Erok.

Methods

The Push to talk Mobile phone trial took place in November 2007. It was a collaboration between the Laikipia Elephant Project, the GSMA Development Fund, Safaricom Ltd, Wireless ZT, Nokia, the Nokia Siemens Networks, and the Laikipia Wildlife Forum (Table 1).

The aim of the trial was to assess the performance of cost-effective communication in improving reporting of and responses to HEC problems among local actors. These actors include communities of small-scale farmers, government wildlife service personnel and the staff working for large-scale ranches and conservancies. Without mobile phones, communication among these actors is limited. Observations of elephants approaching properties where they might cause damage go unreported, reducing the possibility of preventative action.

The Push to Talk trial was carried out between November and December in 2007 during which human-elephant conflict is high across the study sites. The trial involved three elements. The first of these was organising local actors into user groups for human-elephant conflict management within each of the three trial sites.

The second was providing individual users with Push to Talk enabled handsets and associated training. The third and final element of the Push to Talk trial was monitoring and evaluating the performance of the Push to Talk technology provided.

Table 1. Roles and Responsibilities in Push-to-Talk Trial

Organization	Contribution to the project
GSM Development Fund	Managed project and engaged stakeholders and partners (e.g., conservation organizations and software/hardware suppliers)
Safaricom Ltd	Provided GSM network coverage and local support, along with SIM cards for trial handsets
Nokia Nokia Siemens Networks	Donated 50 Nokia 3010 handsets
Wireless ZT	Provided free Push-to-Talk licenses for the month-long trial
University of Cambridge Laikipia Elephant Project	Assisted in the identification of trial sites, engaged users, ran trial fields, and assisted with the assessment phase
Laikipia Wildlife Forum	Identified conservation issue
Laikipia Nature Conservancy and Ol Pejeta Conservancy	Laikipia Nature Conservancy and Ol Pejeta Conservancy Provided community liaison officers to assist with user engagement and facilitation of training

At each of the trial sites a specific user group was created comprised of actors that could either report or respond to potential or actual incidents of human-elephant conflict or other security incidents. The idea here was to improve communication and management responses during human-elephant conflict incidents. So for example at Mwenje mobile phone handsets were distributed to rangers working for the Laikipia Nature Conservancy so that they could communicate to other members of the group when elephants broke out of the electrified perimeter fence surrounding the conservancy and onto small-scale farms. Mobile phone handsets were also given to strategically positioned community members at Mwenje so that they could receive warning messages from Laikipia Nature Conservancy rangers and prepare themselves and their neighbors to deter crop-raiding elephants using traditional methods (fire, noise makers, torches etc.). Lastly mobile phones were also provided to Kenya Wildlife Service rangers located in an outpost within Mwenje so that they could help to scare elephants away from small-scale farms and back into the Laikipia Nature Conservancy. Similar organisational frameworks were established at the Rumuruti and Ex-Erok trial sites.

Nokia provided fifty Nokia 3110c mobile phone handsets for the trial. Each handset was enabled with ‘Push to Talk over Cellular’ (Push to Talk) capability by Wireless ZT with network coverage and ‘talk time’ provided free of charge by Safaricom Ltd. The 50 mobile phone handsets were distributed to designated users across the three trial sites and among the project managers based in Nanyuki. Prior to the trial, individual users were given unique call signs and trained on how to use the handsets, how to make one-to-one and group Push to Talk calls and on a protocol for communication between users (e.g. “Scout 1, Scout 2” to indicate that scout 2 was calling scout 1, “over” to indicate the user had finished talking and “copied” to indicate the message had been received).

Table 2: Distribution of phones among actors across Push to Talk trial sites

Site	Actors	No. of phones	Role of Actors
Mwenje	LNC Rangers	10	Provide an early warning to communities and KWS when an elephant breaks through Laikipia Nature Conservancy (LNC) perimeter fence and help with scaring elephants back into LNC
	LNC Management	2	Supervise LNC fencers and coordinate management responses
	Community members	8	Receive early warning messages from LNC and alert neighboring small-scale farmers. Help scare elephants back into LNC with torches and noise makers
	Kenya Wildlife Service (local post)	2	Provide support to scare elephants away from farms and back into LNC using gun shots and thunderflashes
	Laikipia Elephant Project Scouts	2	Report human-elephant conflict incidents, monitor and supervise mobile phone use within trial site
	Rumuruti	Community Scouts	6
Foresters		2	Respond to reports of illegal forest extraction
Kenya Wildlife Service Warden		1	Respond to reports of elephant incidents and scare elephants away from farms
Rumuruti Forest Association Management		1	Coordinate and supervise community scouts and push management responses by Kenya Wildlife Service
Ex-Erok		Community Security Committee	5
	Ol Pejeta Conservancy Management	1	Provide support to scare elephants away from farms and back into the Ol Pejeta Conservancy
	ADC Mutara Management	1	Provide support to scare elephants away from farms and back into ADC Mutara
	Kenya Wildlife Service (local post)	1	Scare elephants away from farms and back into Ol Pejeta or ADC Mutara
	LEP Scout	1	Report human-elephant conflict incidents, monitor and supervise mobile phone use within trial site
	Laikipia Elephant Project HQ, Nanyuki	Project Management	4
Kenya Wildlife Service		2	Coordinate and monitor responses of KWS rangers at local posts

Monitoring and Evaluation

Over the trial period, all Push to Talk calls were monitored by trained members of the project team to establish the number of occasions that Push to Talk was used to report an incident, the type of incident reported and any response taken. These data were recorded and subsequently analysed to generate simple summary statistics for Push to Talk use within each trial site.

In the month after the trial was carried out, a short semi-structured questionnaire was used to assess the perspectives of individual Push to Talk users on the usefulness of the service in assisting with human-elephant conflict and other security incidents. Thirty-seven Push to Talk users were interviewed for this purpose. Responses were coded into several categories and survey data are presented as the percentage frequency of respondents giving each response.

In addition group interviews were held with PTT user groups, one from each of the three trial sites. For this purpose a simple check list of issues to discuss was created and open discussions among the group were encouraged.

Results

Use of Push to Talk across the trial sites

In Mwenje, Push to Talk was used within the user group to communicate about 51 security incidents on 28 days of the 31 day trial. There were 45 human-elephant conflict incidents, and six others: two of livestock theft, one where gun shots were heard, one report of a farmer killed by an elephant, one complaint by a community scout about the conduct of a wildlife authority ranger, and one report to group members about work carried out on the perimeter fence of the Laikipia Nature Conservancy. Preventative action was taken in response to 48 incidents. The wildlife authorities responded to incidents reported on two occasions, rangers from the Laikipia Nature Conservancy responded on 19 occasions and community members took action on 27 occasions.

In Rumuruti, Push to Talk was used by group members to communicate about human-elephant conflict or other relevant security incidents during 14 of the 30 trial days. Twenty human-elephant conflict incidents, three incidents of forest destruction and two incidents involving livestock theft were reported using Push to Talk. Preventative action was taken on seven occasions, five of which involved the Kenya Wildlife Service helping to scare elephants out of small-scale farms and two of which involved the government's administrative police in response to livestock theft.

In the Ex-Erok trial site, Push to Talk was used to report security incidents on 5 days of a 32 day trial period. Human-elephant conflict incidents were reported using Push to Talk on four occasions and theft of livestock on three occasions. Preventative action was taken in response to the Push to Talk reports on all seven occasions, four times by the Kenya Wildlife Service to scare away elephants from small-scale farms and three times when the administrative police managed to successfully retrieve livestock stolen from a smallholder.

Perceptions of Push to Talk performance

Group interviews with users reported that the Push to Talk service had prevented destruction of crops by elephants and improved security across each of the three trial site during the trial period.

All Push to Talk users interviewed reported that the service provided was useful (n=36). Reasons given were improved communication among all stakeholders (42%), improved response of the authorities to the incidents reported (33%) and improved communication with the authorities about incidents (25%).

All those interviewed used Push to Talk to report human-elephant conflict incidents. Seventy

three per cent found that Push to Talk provided an early warning for crop-raiding, allowing actors on the ground to take preventative action. This was verified through discussions during group interviews. For example in the Mwenje trial site community users described how Laikipia Nature Conservancy rangers patrolling the perimeter fence were able to report to the Push to Talk group if an elephant had broken out of the Conservancy, and thus provide an early warning so that the community users knew where to go to scare elephants out of farms and back through the fence.

Twenty-one percent of users felt that the use of Push to Talk had resulted in an improvement in the management response of actors, in particular the Kenya Wildlife Service, to reports of crop raiding. Improved management responses were reported in each of the three trial sites. For example the Kenya Wildlife Service sent patrols to the Rumuruti and Ex-Erok trial sites in response to reports communicated through the group using Push to Talk during the trial period. The Kenya Wildlife Service rangers reported that as Push to Talk users provided reliable information on the location of incidents they could work more efficiently across a larger area.

Sixty-five per cent of users also reported that Push to Talk had helped prevent theft of livestock or the recovery of livestock stolen. For example on the 30th of November 2007, livestock stolen at the Ex-Erok trial site were quickly recovered because community members were able to use Push to Talk to direct the administrative police and Ol Pejeta Conservancy security personnel to where the livestock theft took place. Within the Rumuruti Forest trial site, users reported that Push to Talk had helped with forest protection with community scouts reporting incidents of illegal timber extraction to the local Kenya Forest Service station. As the mobile phone handsets contain an in built camera, this was used by scouts to take photographs of illegal activities in the Rumuruti Forest to help verify incidents reported by scouts.

During group interviews users reported that Push to Talk improved the response of the authorities to reports of incidents for two reasons. Firstly multiple tiers of authority were able to listen in to Push to Talk group communication at the same time so that it became difficult for a ranger on the ground to make excuses for not responding if a more senior officer was listening. Furthermore users consistently reported that the Push to Talk service created collective pressure on the authorities to act to incidents as many people were simultaneously listening in on reports of incidents.

Users also reported that relationships between different actors improved as a result of Push to Talk. This was reported at each site but especially at the Mwenje trial site where the relationship between the Laikipia Nature Conservancy and the neighboring communities was very negative prior to the trial. Cooperation during the Push to Talk trial improved perceptions within both the community and conservancy. Users reported that the relationship between the Kenya Wildlife Service and communities in each of the trial sites also improved.

Discussion

The pilot was associated with reduced tension and improved trust among farmers and community members, the Kenyan Wildlife Service (KWS), private landowners, and local law enforcement officials. The Push to Talk trial enhanced communication among these stakeholders and, in particular, helped community members recognize that conservationists were there to help them.

In terms of communication, Push to Talk technology helped create early warning of crop raiding and fence breaking by elephants. It allowed the community to guide the KWS to specific sites of HEC, saving time and resources. It helped the community to coordinate policing of forest destruction with Kenya Forest Service. It enabled communities, ranches and the police to prevent stock theft and recover stolen stock

In terms of relationships, the Push to Talk groups placed collective community pressure on the authorities to respond to incidents. Push to Talk communication therefore began to build trust and respect between different stakeholders. The use of Push to Talk also enabled the different stakeholders to work more effectively together in incident prevention.

In terms of costs, users tended to use the Push to Talk phones more often than they had previously used traditional handsets, and they therefore needed to be charged more frequently (on average every 2.9 days). The handsets used a new small pin socket, so users had to visit charging stations several kilometers away, incurring additional costs (Ksh 20 per charge). The use of a solar or wind up chargers should be investigated in future applications of Push to Talk technology in conservation. Standardisation of mobile phone charging sockets will be particularly helpful in physically remote locations (<http://news.bbc.co.uk/1/hi/technology/7894763.stm>).

The trial revealed a number of issues with training and support for a successful Push to talk communication system. Time is needed to train people to use Push to Talk technology. Although most trial participants were accustomed to more rudimentary phones, each needed to learn to operate the more sophisticated handsets donated for the trial. Successful uptake of Push to Talk by community users also requires the presence of organizations that can identify and draw together user groups, establish protocols and rules for communication, and ultimately arrange payment of phone bills (e.g. in areas lacking banking facilities).

Conclusions

In all three areas of Laikipia where it was trialed, Push to Talk successfully alleviated human-elephant conflict (HEC). The technology improved coordination of responses to HEC, bridging problematic relationships between the different stakeholders (KWS, community, private land-owners and police).

Push to Talk was also used to address major security incidents, in particular livestock theft and the policing of illegal removal of forest materials. Push to Talk clearly has a role to play in community-based policing across Kenya. It can extend group communication capability to bottom of the pyramid users, empowering them to combat the security issues they meet on a daily basis.

Despite the technical and local success of this trial, it is not likely that Push to talk technology will be available commercially in Laikipia in the near future. After commercial assessment, Safaricom took the decision in 2008 not to roll out the technology in Kenya.

However, this trial suggests that mobile phones are highly relevant to community-based human-elephant conflict mitigation in Laikipia, and by extension in any country with good mobile coverage and penetration. Other technologies, such as group SMS (tXt) offer alternative ways to make group communication by mobile phone possible. Whatever the commercial future of Push to Talk in Kenya, mobile phone technology more generally is highly relevant to a range of socio-economic and conservation uses worldwide.

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Laikipia Elephant Project Working Papers

- 1. The Use of Electrified Fences to Reduce Human Elephant Conflict: A Case Study of the Ol Pejeta Conservancy, Laikipia District, Kenya (2009),**
Max Graham, Nathan Gichohi, Francis Kamau, George Aike, Batian Craig, Iain Douglas-Hamilton and William M. Adams
- 2. The Use of 'Push to Talk' Mobile Phone Technology to Reduce Human Elephant Conflict, Laikipia District, Kenya (2009)**
Max Graham, Christine Greenwood, Gabriel Kairo and William M. Adams
- 3. An Assessment of Elephant - Compatible Livelihoods: Trials of Beekeeping, Chilli Farming and the Production of Dung Paper, Laikipia District, Kenya (2009)**
Max Graham, Susie Wren and William M. Adams

Building Capacity to Alleviate Human-Elephant Conflict in North Kenya

DEFRA Darwin Initiative Grant 741

This project aims to enhance the conservation and management of Kenya's second largest elephant population (over 5,000 animals) and the ecosystem they inhabit through the implementation of an integrated and sustainable community based approach for alleviating human-elephant conflict (HEC).

The purpose of this project is to alleviate human-elephant conflict and promote tolerance of elephants in Laikipia District, Kenya.

The project works to support local partners in the following activities:

- Research on the development of systems to provide early warning of human-elephant conflict using local knowledge, Mobile phone ('push-to-talk') technologies and GPS/GSM collars;
- Dissemination of information on elephant conservation and human-elephant conflict management in vulnerable communities and local conservation organisations and land managers;
- Assess the feasibility of establishing economic activities that promote sustainable livelihoods and reduce negative human-elephant conflict;
- Promote the establishment of strategy and revenue streams to support for long term human-elephant conflict management in Laikipia;
- Support local organisations in the development of the institutional capacity to manage the West Laikipia Elephant Fence.

The project's partners are:

CETRAD

Elephant Pepper Development Trust

Kenya Wildlife Service

Mpala Research Centre

Ol Pejeta Conservancy

Rivercross Technologies

Save the Elephants

Symbiosis Trust

The Laikipia Wildlife Forum

www.laikipiaelephantproject.org

www.geog.cam.ac.uk/research/projects/heccapacity/



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People living with elephants