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Wildlife Watching and Tourism: Effect of Two-Way Radio Communication on Wildlife in Kenya

Francis Kabii Dr. John K.M. Wandaka
Lecturer, Kenya Utalii College
P.O.BOX 31052-00600 NAIROBI, Country: Kenya

Abstract
The two- way a radio has been used by safari guides as a communication tool between themselves and the office incase of emergencies while in the wilderness. Initially only a few large tour wholesalers were licensed to own some frequencies. This has now changed and most of the tour operators use the radio to differentiate their transport product. The use of these radios is no longer limited to emergencies but used as a tool to communicate with drivers on the location wildlife in the park, bringing about overcrowding and noise pollution among others. The study sought to evaluate the drivers' awareness and perception on how the use of the two-way radio affects wildlife and the customers. The study adopted an exploratory design with a combination of both qualitative and quantitative methods. The findings indicated that the driver guides are not aware of the effects of the two-way radio on the wildlife and customer experience. The study recommends that driver guides should be trained on the impacts of the two-way radio on wildlife and the environment and the policy on the two-way radio acquisition and usage should be put in place to guide the driver guides.
Keywords: Two-way radio, safari guide, perception, awareness, game drives

1.0 Introduction to Wildlife viewing in Kenya

Relatively little research attention has been dedicated to the understanding of the effect of noise during wildlife viewing in protected areas in Africa. This paper examines safari guides perception on the effect of wildlife viewing during the game drives. Although there may be many impacts, this paper concentrates on noise produced during the game drives and when viewing the focal animal.

Safari guides will go to great lengths to make sure their customers achieve the highest level of satisfaction that comes with watching wildlife. Experienced safari guides with skills and knowledge on wildlife spotting and interpretation are valuable assets to tour firms. Pressure from the customers is said to be the main reason why safari guides will tune to any available radio channel that might guide him to the areas where some specific wildlife have been sighted. This brings about overcrowding around the sighted animals due to driver guides communication using two-way radios which in turn creates a secondary problem of noise pollution around the wildlife. Walpole *et al,* (2003) observed that once safari guides communicated to other guides on the presence of any sought wildlife, only 6.8% of drivers observed all park rules in Kenya's Masai Mara National Reserve. The remaining 90% broke most of these regulations. The behaviour of visitors, as well as that of the guides during the game drive, remains an important factor in both wildlife impact and visitors experience.

Wildlife viewing present management challenges to law enforcers in the Kenya Wildlife Service managed protected areas. One significant challenge relates to duration and frequency of contact between visitors and focal animals. Other challenges include intrusion into critical habitats, irresponsible manoeuvring and relentless pursuit of the focal animal (Higham *et al,* 2008).Too many vehicles around the animals and stopping too close to the animal were the most frequent broken regulation. The other most broken regulation was visitors remaining too long viewing the animal and driving off the established roads. Different animals respond differently to noise depending on the noise level, type of noise and age or sex (Voipoi *et al*, 1998). Human-generated noise has been shown to affect taxonomically diverse organisms in marine (Slabbekoorn *et al*. 2010; Ellison *et al*. 2012) and terrestrial animals and environments (Patricelli and Blickley 2006; Barber *et al*. 2010; Kight and Swaddle 2011). The effects of noise on wildlife include wildlife behavioural changes, increase in physiological stress, energy expenditure, physical injuries, interference of normal activities and impaired animal-to-animal communication (Pater, 2001; Brown, 2001 and; Kight and Swaddle 2011).

It is not clear whether the safari guides in Kenya were aware of the effect of noise on the wildlife viewed and the customers. The purpose of this study was therefore to evaluate driver's awareness and perception on the effects of noise to the focal wildlife and, customers experience, in addition to evaluating the perception of driver guides on challenges associated with the two-way radio communication and recommend possible mitigation measures

1.2 Wildlife viewing and contribution of two-way radios to overcrowding and noise pollution

The two -way radio communication was initially used by safari guides to communicate with their offices in cases of emergency and breakdown while in the wilderness. Initially, only a few tour companies were given some frequencies to be used by their fleet of vehicles. Today this is not the case as many tour companies have installed

these radios in their safari vehicle where they often, without permission tune to other tour company frequencies and intercept the communication.

The two-way radios are currently used as a communication media where the tour drivers communicate with one other on the sighting of wildlife. By using a coded language that has been developed for certain preferred wildlife, within a short duration of spotting the preferred animal, it is sandwiched between fleets of vehicles and overcrowding and encircling the wildlife is the end result. This encourages the breaking of the park rules and regulations such as off-road driving, the maximum number of the vehicle that should view a given animal at any time, and distance from which animals may be watched so as to have the minimal negative impact to name a few.

To a visitor whose interest is watching wildlife in a natural setting, this overcrowding does not only reduce customer satisfaction but irritates them since it interferes with photography, video recording, animal's behaviour and serenity. Overcrowding paints Kenya as a mass tourism destination where sensitive eco-tourists who are keen on conservation would avoid. The two-radio communication has contributed to this overcrowding and the paper proposes what can be done to manage their use. During the planning of a tour, the planners normally give a visitor between two to five days in a destination visited so that they may have time to search for these animals depending on the animal of interest, size of the park and the vegetation cover of the park visited among others. The more the days a visitor stays at a destination, the more he enjoys the attractions and the more they are satisfied. With the two-way radios, this is no longer the case. Within one day, a safari guide only needs to tune to some frequency and eavesdrop to other frequencies and within 2 hours he will have known what animals have been seen and where.

To catch up with the other drivers, the safari driver speeds off without much consideration on the park rules in order to have a glimpse of the wildlife. This reduces the visitors stay after having seen within two hours what he could have taken five days. This behaviour not only affects the wildlife and the environment, but also the customers' satisfaction. The specific objective of the study was therefore, to examine the driver guides' awareness on the effect of noise emanating for the two-way radio communication on the wildlife during game drives, examine driver guides perception on effects of VHF radios on wildlife viewing, and the contribution of wildlife viewing to customer satisfaction.

2.0 The effect of noise on wildlife

This study observed that overcrowding the viewed animal was a common occurrence in most of the national parks where wildlife viewing took place in Kenya. The noise was therefore produced by the excited visitors, vehicles and the guides themselves. Several studies on effect of noise on wildlife reveals that noise can affect animal's physiological behavior; causes stress on animals, thereby affecting their metabolism and reproduction (Bayne *et al*. 2008; Dooling and Popper 2007; Goodwin and Shriver 2011; Krause, 1993; Busnel, 1978; Kavaler, 1975; Krausman *et al,* 1986).

Some wildlife species have declined due to increasing user level while other species have benefited (Walpole *et al.,* 2003; Grubb and King, 1991; Henson and Grant, 1991). Activities taken by visitors in national parks and reserves create more damages than others. The mode of transportation used, the number of visitors, and the species of animal being viewed determine the magnitude of the effect on animals being viewed. There is some evidence that young animals are more susceptible than adults to hearing loss from exposure to loud sounds (Abrams 1980), while some animals' change their home ranges as a result of disturbance (Geist, 1971).

The major challenges facing researchers today in their studies on the effect of noise on wildlife ranges from the definition of the term noise to the species of the animals studied. This challenge is faced more in African protected areas, where resources and expertise to investigate the impact is limited. . Scientists have suggested that disturbance may be an important reason why some species of animals continue to decline (Fleming *et al.,* 1988). The short and long-term effects of two-way radio communication on wildlife in Kenya and other African countries is not well documented, and hence this is the subject of this paper.

Geist, (1971) argues that there is need to study estimation of the energetic cost of animals being disturbed. Animals are denied access to essential areas for their breeding, grazing and hunting; hence the population is likely to decline (Van der Zande, 1984). Most antelopes, elephants and others herbivores feeding in a group respond to approaching threats at a greater distance and are less vulnerable to attack by predators than solitary individuals (Matandiko, 2016; Plotz, 2014; Reuben, 1978; Morse 1980; Caraco, 1984). In general, time devoted to vigilance by feeding individual animals decrease as the flock and herd increase, where research finding have shown a positive correlation between distance and human intruders at which they take flight and group size (Owen, 1977; Grig-smith 1981; Madsen, 1985). Research shows that continuous or repetitive loud noise appears to cause metabolic stress (Brouček, 2014; Gilloyzaga, *et al*. 1993) and vascular alteration (Axelsson and Dengerink, 1987) to the inner ear.

In a study conducted in Kenya's Masai Mara National Reserve on the effect of Animal Habitat Protection (AHP), the patrol unit set aside to protect animals indicated that their presence influenced the behaviour of guides and fewer park rules were broken as compared to when they were not present (Walpole *et al.,* 2003). The

safari guides used their radio communication to inform one another the presence of the AHP and where not available break the park rules. Geist (1978) has suggested that if people want to mix with wildlife, then wildlife need to habituate to humans and ignore humans. The wildlife views humans as potential predators and often responds to noise at levels that would arouse stress to wildlife. The human-made noise made through radio communication change animals into behaving in a maladaptive way (Brattsfrom and Bondello, 1983)... This may result in alteration of wildlife behavior, thereby affecting feeding strategies, intra-specific and inter-specific interactions, as well as their respective flight distances. There is limited literature on the effect of noise on wildlife in Kenyan national parks, and hence this was the subject of this paper

3.0 Research Methodology and Design

The study adopted an exploratory design with a combination of both qualitative and quantitative methods.The study areas were Lake Nakuru National Park, Amboseli National Park and Masai Mara National Reserve that was found suitable because protected areas are among the seven parks that account for over 80% of international visitors whose main interest is wildlife. The target populations were guides who use the two-way radio communication.. Judgmental sampling was used in the selection of the study area and guides to be interviewed. Intercept method was used in the selection of the guides who were willing to complete the questionnaire. Primary data was collected using self-administered questionnaire, focused group discussions, observation and interview. Secondary data was sourced from existing literature, journals and magazines and the internet. Test-retest method, pilot test and content analysis were used to test the reliability and validity of the data collection tools. Reliability statistics gave Cronbach's Alpha of 0.898 which was considered suitable.

4.0 Finding and discussion of results

A total of 300 questionnaires were administered from which 194 were usable. Four focus group discussions were held which comprised of 37 respondents which gave a total of 231 respondents. This gave a response rate of 77% which was considered representative.

4.1 Factor analysis on Perception of two-way radio on guiding (Cronbach's Alpha 0.602)

The principle component method of data extraction was run using varimax rotation with a maximum iteration of 0.25 in order to reduce data into a small number that would explain most of the variance. Three factors were generated and labelled according to the perceptions they represented. *Factor 1* was labelled ***'Perception of two-way radio on guiding'*** and comprised of attitudinal statement, which were extracted from a list of 13 items:

i. Driver guide can efficiently guide without a using two-way radio**.**
ii. Pressure from customers force driver guides to use radios to locate wildlife
iii. Mobile phones can be used instead of two-way radio for communication

The three had a factor loading above 0.6 and Eigen value above 1 and accounted for 53% of the variance as depictd in Table 1. The items with the factor loading of less than 0.5 were eliminated. The Cronbach's Alpha for the three factors ranged from 0.653 which was the highest to the lowest (0.587). Results indicated that a majority of respondents 72% can effectively guide without the use of the two-way radio.

Table 1: Factor analysis on perception of guides, wildlife and customers

Item on respondents attitudes and perceptions			
Perception of two-way radio on guiding(Cronbach's Alpha 0.602)	Factor loading	Eigenvalue	% of variance
Driver guide can efficiently guide without a using two-way radio	0.791	3.543	29.528
Pressure from customers force driver guides to use radios to locate wildlife	0.777	1.545	12.873
Mobile phones can be used instead of two-way radio for communication	0.754	1.316	10.968
Perception of two-way radio on wildlife(Cronbach's Alpha 0.587)			
Two-way radios affect the feeding habits of wildlife	*0.835*	5.483	49.841
Use of two-way radio reduces time taken to trace for wildlife	*0.814*	1.000	9.095
Perception of two-way radio on customer(Cronbach's Alpha 0.653)			
Two-way radios affect visitor's photography during game drives	*0.791*	3.040	30.402
The use of two-way radios has reduced the time taken during game drives.	*0.819*	1.916	19.164
Customers understand the coded language used by driver guides	*0.826*	1.113	11.131

The findings from the focus group discussion and interviews indicate that experienced drivers who have been guiding for more than 20 years guided without using the two way radio and could effectively locate animals.

They were quick to say that the populations of wildlife has declined in the recent past.. As indicated earlier, only a few companies had their own frequencies which were used to coordinate drivers when in a convoy. Opinion on replacing the two-way radio with mobile phones received mixed reactions with about 52% disagreeing and only 36% of respondents agreeing. The main reason for disagreeing was that the two large telecommunication companies Safaricom and Airtel are not connected to most national parks. Their network coverage is limited to some destinations. Communication through mobile phones must be paid for, unlike the two-way radio where the drivers do not pay. Majority of the respondents maintained that pressure from the customer is their main reason for using the radio to search for the preferred wildlife distribution.

Factor 2 was labelled '***Perception of two-way radio on wildlife'*** **and** was extracted from 11 items. Factor two had two attitudinal statements:

i. Two-way radios affect the feeding habits of wildlife.
ii. Use of two ways radio reduces time taken to trace for wildlife

The two parameters had a factor loading of 0.835 and 0.814 respectively. Together they had an eigenvalue of 5.483 and 1.000 and accounted for 59% of the variance of the 11 items. The Cronbach's Alpha for this factor was 0.587.

The findings indicated that most safari guides are not aware that the radio affects the feeding habits of wildlife. Similarly, the findings from the focus group discussions indicated that most of the driver guides do not know how the radio affects wildlife. It was difficult to define term *noise* from the perspective of the wildlife and how to measure noise. It was evident that drivers need regular capacity building on wildlife behavior, sustainable tourism management and interrelation within tourism systems.

Likewise, more than 76% of respondents agreed to the statements that two-way radio encourages over speeding in the protected areas and affects the monitoring and enforcement of park rules and regulations. Most drivers' guides break park rules as long as law enforcers are out of sight. The presence of patrol unit is communicated by the guides thus making it less effective. Most respondents were aware that the radio increases stress on animals, where more than 60% agreed with the statement that two-way radio increase stress while a minority disagreed. 70% of the respondents agreed that the radio encourages over speeding while 5% were aware that the two way radio communication disturbs and scares away wildlife though they have continued using it.

Factor 3 was labelled *'**Perception of two-way radio on the customer**,* and comprised of 'two-way radios affect visitor's photography during game drives, the use of two-way radios has reduced the time taken during game drives and 'customers understand the coded language used by driver guides'. Their factor loading was 0.791, 0.819, and 0.826 respectively and accounted for 60% of the variance. The Cronbach's Alpha for these factors was 0.653.

The results from the focus group discussions indicated that over 67 % of respondents were aware that their customers do not understand coded language used by guides to communicate with others on the availability and location of preferred wildlife. About 61% said that the use of the radio increase customers satisfaction and might be the reason why they normally use it during game drives to locate wildlife. Discussions revealed that customers often pressurize guides to see certain wildlife and are willing to give huge tips upon successive sighting of the animals. The anxiety is normally by those visiting national parks on their first trip and during the first days, but it reduces as day goes by. More than half of those interviewed indicated that some customers prefer the two way radio to be switched off during game drives and are aware that the radio affects photography and video recording during the game drives.

4.3 Discussion and implication of the results

The data was analyzed using Statistical Package for Social Scientists (SPSS) version 16. More than 88% of respondents agreed to the statement 'driver guides should be trained on use and impact of two way radios on wildlife and environment' only 4% disagreed with the statement. Likewise 81% agreed with the statement 'drivers sometimes use radio for socialization with others drivers' while 80% agreed with the statement 'government should introduce codes of ethics for use two way radios'.

On the issue of perception, on the effect of two-way radio on wildlife, 89% agreed that two-way radio contributes to overcrowding, reduces the time taken to track wildlife (88%), and encourages over speeding after the driver has been informed that wildlife has been sighted (70%). The majority (70%) agreed that poorly planned itineraries also encourage the use of two-way radios. The findings also indicate that the drivers are aware that the radio makes noise to customers and affect video recording and photography during the game drives.

The results suggest that there is a need for the safari guides to be trained in the use of the two-way radios and how it affects the guiding profession, the wildlife and the customers. Safari guides are aware that some use the radio for socialization in their vernacular. These points come out clearly in the focus group discussions. Since Kenya has more than 40 diverse ethnic tribes, it can be challenging if different guides communicated in their vernacular through the same frequencies. Some respondents were of the opinion that the government should

introduce regulation and code of ethics to govern the use of the two-way radio communication.

As aforementioned, the majority of the drivers use the radio, not for an emergencies but to locate the wildlife in the national parks and reserves in Kenya, despite the fact that they are aware that these radios contribute to overcrowding. The findings from the focus group discussions showed that the safari guides face a major challenge in balancing the customer satisfaction and the observance of the national park rules and regulations. The respective marketing officers guarantee the visitors that they will see the preferred wildlife within the specified days of the itinerary. The perception is therefore that it's the responsibility of the safari guide to make sure that the customers' desires are met at the same time protect the environment. The desire to satisfy the customers forces them to break parks rules and regulations such as over speeding, overcrowding and noise pollution through the two-way radios communication.

The study also revealed that tour officers sometimes limit the amount of fuel allowances the safari guides gets in every safari. To manage the fuel effectively, and at the same time meet the clients' expectations, the safari guides use the radios to trace for the animals within the shortest distance so as not to run short of fuel. The two-way radio is there for a tool to manage communication costs between the driver and the office, management of fuel cost and shortens the time taken to look for animals. The findings of the study further revealed that some customers were uncomfortable with the use of the two-way radio communication. Those whose main interest is photography and bird watching would request that the radio be switched off since the noise affects their recording.

4.4 Conclusions and recommendations

Kenya can no longer assume the effect two-way radios have on the wildlife.More attention is needed in order to mitigate any negative effect the radio might have. The finding supports that most of the driver guides in Kenya are aware of some effect of two-way radios on the guiding profession, the wildlife and the customers. Most driver guides can effectively guide without the use of the radio but many tour firms prefer using tour van with the radio so that they can always keep in touch with the driver and monitor their progress. Experienced guides can effectively locate wildlife without the assistance of the radio. Driver guides need to be trained on the effect radio has to the wildlife and there should be regular training on use of radio. Some drivers misuse the radio by using it as a socialization tool in their mother tongue. Most drivers were the opinion that mobile phone cannot replace the two way radio due to a limitation in coverage. They also agreed that there is no privacy when using the radio. There is a need for the government to set guideline on sharing, usage and coverage of the radio.

Driver guides are aware that the radio contributes to overcrowding but most are not certain on the long-term effect of radio to the wildlife, customers and the tourism product. Research finding on impact of wildlife viewing should be shared with the stakeholder so that all players are actively involved in sustainable tourism development. The radio reduces the time taken to search for wildlife and play some role in customer satisfaction.Driver guides have a duty to satisfy the customer and obey the park rules and regulation but sometimes pressure from the office and the customers force them to use the radio in search of wildlife thus interfering with the natural behaviour of wildlife and affecting the environment.

The study recommends training for the driver guides on use and effect of two-way radio and regulatory mechanism to be put in place. There is a need for further research on the effect of the radio to the endangered animals in Kenya such as rhinos and cheetah. For Kenya to achieve Millennium Development Goals and vision 2030, management of overcrowding round wildlife will be needed.

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