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A REVIEW OF THE HUMAN-WILDLIFE CONFLICTS AROUND THE NAIROBI NATIONAL PARK, KENYA

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Abstract: Human-wildlife conflicts are one of the most important challenges facing wildlife conservation. In Kenya, the Nairobi National Park (NNP) experiences various pressures due to its small size and close proximity to an expanding city. The unfenced southern part of the park is the main hotspot for conflicts. For the review a content analysis of 21 publications related to NNP published between 2011 and 2022 was conducted to identify the causes, types and the mitigation measures of conflicts around the park. Documents for the analysis were collected through Google Scholar, Web of Science and Scopus. Our results indicate that livestock predation linked to lions is the major type of conflict superseded by retaliatory killings of the carnivores by the local communities. Other conflicts include crop raids by ungulates and the spread of diseases especially the East Coast fever that is transmitted from the wildebeest to livestock. Findings further reveal that one of the main causes of the conflicts is the expanding human population, which has encroached on wildlife dispersal corridors. It resulted in land subdivision and fencing of the farms as farmers try to protect their livestock from wildlife. This has greatly impeded wildlife migration. Mitigation methods in place include compensation schemes and landowners leasing their farms to the park management so that the corridors can be left open for free wildlife movement. These have however been inadequate therefore there is still a need to find sustainable mitigation measures that ensure coexistence between humans and wildlife in and around NNP.

Keywords: literature review, protected area, causes and types of conflicts, mitigation measures

1. Introduction

Human-wildlife conflict (HWC) refers to any negative interaction between humans and wildlife that results in harm to either party or damage to property (Mekonen, 2020; Wamuyu, 2012). HWC is a widespread and growing problem worldwide, as the human population continues to expand and encroach on wildlife habitats (Kutatoi et al., 2017).

Africa is one of the most affected continents when it comes to HWC (Ladan, 2014). There is documented evidence of conflicts in many countries of Africa including Zimbabwe, South Africa, Mozambique, Nigeria, Congo, Uganda, and Tanzania (Nicole, 2019). In Kenya the conflicts are widely spread across the country in areas such as Transmara, Amboseli, Taita and Kwale. Elephants are often blamed for destroying crops and injuring people, while lions and other predators kill livestock, leading to retaliatory killings by farmers (Ogutu, 2018).

The Nairobi National Park (NNP) is a hotspot for conflicts especially on its southern border that is unfenced and directly borders to human settlements. The main aim of the study is to identify the causes, types and mitigation measures of HWCs around the park by analyzing available literature.

2. Materials and methods

2.1. Area of study

Nairobi National Park which was formed in 1946 is one of the 24 national parks in Kenya (Mwangi et al., 2022). A unique feature of the park is that it is located within the capital city, specifically in the southern part of Nairobi, and it is only 7 kilometres from the city centre (Rudnai, 2012). The Park covers an area of approximately 117 km² (Simba et al., 2013) and it is partially fenced on its northern, eastern and western side. The Park is too small in size and inadequate for the wildlife populations that thrive in the area (Makini, 2018).

The Park is situated at an altitude of approximately 1,500-1,800 meters above sea level, which gives it a relatively mild climate compared to other parts of the country. Nairobi National Park experiences a sub-tropical climate characterized by warm temperatures and distinct wet and dry seasons. The dry season usually lasts from June to October, with July and August being the driest months (De Leeuw et al., 2014).

There is a variety of vegetation types, ranging from open grasslands to riverine forests (Maria, 2016). The diverse vegetation types provide critical habitats for a wide range of wildlife and contribute to the park's unique ecological diversity. The Park is home to a variety of wildlife, including large herbivores such as the African buffalo (*Syncerous caffer*), black rhinoceros (*Diceros bicornis*), common eland (*Taurotragus oryx*), Coke's hartebeest (*Alcelaphus buselaphus cokii*), and Maasai giraffes (*Giraffa tippelskirchi*) (Lesilau et al., 2021). The Park also hosts a number of predators such as cheetahs (*Acinonyx jubatus*), lions (*Panthera pardus*), spotted hyenas (*Crocuta crocuta*), and more than 400 bird species. Nairobi National Park is a popular tourist attraction which receives over 200,000 tourists annually. It offers visitors the opportunity to see wildlife and enjoy outdoor activities such as game drives, nature walks, and bird watching. The Park generates significant revenue for the local economy and supports several small businesses, such as tour operators, hotels, and souvenir shops (Ogutu, 2018).

As of 2023, the human population of the Nairobi area is estimated to be around 5.3 million people. Nairobi is the capital and largest city in Kenya, and it is a major economic hub for the East African region. The city's population has grown rapidly in recent decades, fueled by urbanization, immigration, and economic growth (Onkangi et al., 2018).

2.2. Method of the review

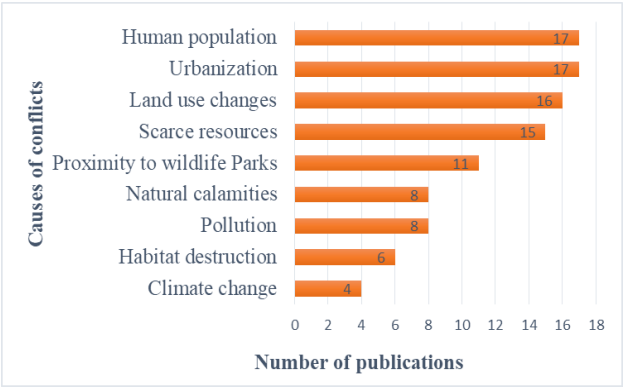
For the review, we conducted a content analysis (Stemler, 2001) of published MSc and PhD theses, the park's management plan and scientific peer reviewed journal articles published between 2011 and 2022. An extensive search was done using Google Scholar, Web of Science and Scopus. The search terms included "Nairobi National Park", "Human-wildlife conflict", "crop raids", "livestock predation", "land use changes", and "mitigation". 44 papers were collected of which 21 were chosen for review because they focused on the park exclusively and covered conflicting cases.

We used a priori codes including causes, types and mitigation measures for the conflicts related to wildlife experienced around the Nairobi National Park. We also used emergent codes to define subcategories within the three main codes. Based on the coding frequency of papers were calculated and a qualitative analysis was also conducted.

3. Results

3.1. Causes of conflicts

Figure 1: Frequency of publications including major causes of HWC around the Nairobi National Park.



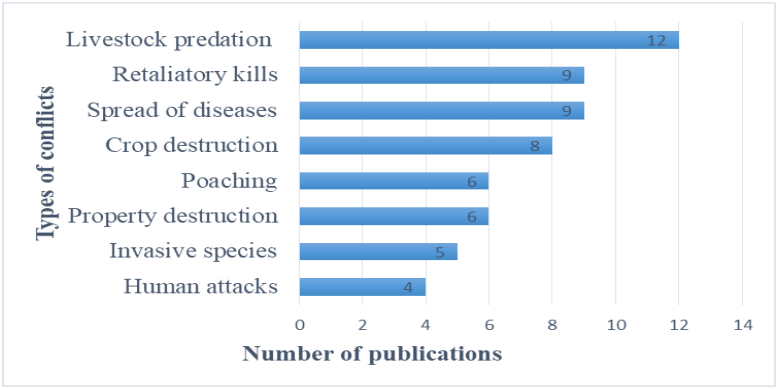
17 papers of the 21 that were reviewed stated that increased human population and urbanization were the major threats to Nairobi National Park. This is followed by the extreme land use changes that have occurred over the years (*Figure 1*). The Park has undergone immense changes as a result of Kenya's target to become a middle economy by 2030 (Mwangi et al., 2022). Lack of proper planning from the start implies that the current developments have to be constructed on the reduced natural spaces left thus making the NNP a commonly targeted area (Odwori et al., 2014; Ambani, 2017). Rael (2016) indicates that a total of 0.619 km² of land was cut off from the already small park space to cater for the construction of the Southern Bypass Road and the Standard Gauge Railway. Animal populations have been fragmented by this infrastructure. Some have been pushed outside the park and ended up in the human settlements which contribute to the Human-Wildlife Conflicts (Said et al., 2016).

Pollution is also a major concern for the park. The surrounding human settlements discard their effluents in the Mbagathi River and the various watering points that occur within the park (Mwangi et al., 2022; Kanani, 2019; Gitari, 2019).

3.2. Types of conflicts

Livestock predation by lions has been mentioned by 12 of the 21 publications as the main type of conflict around the park. It is superseded by retaliatory killings of the predators by the locals. The spread of diseases from wildebeest to livestock was equally a key concern (*Figure 2*). Lions leave the park to track prey in the plains during the rainy season which gets them closer to human settlements (Kanani, 2019; Lesilau et al., 2021). In the process of hunting for prey, the lions may attack livestock if they are unable to catch the prey (De Longh, 2016). In response to wildlife predation, the local communities end up trapping and killing the endangered carnivores since they greatly lead to losses of their sources of livelihood. Maasai, who previously peacefully coexisted with wild animals, have changed their land uses and now practice other economic activities such as farming that is not compatible with having the wildlife around them (Matiko, 2014).

Figure 2: Frequency of publications including major types of HWC around the Nairobi National Park.



3.3. Mitigation measures

Eleven of the twenty-one publications mentioned the need for proper policy formulation and implementation, especially in the area of land use changes. Fencing, community involvement and compensation schemes are among the reliable mitigation measures in place (*Figure 3*). Community participation is very key in ensuring transparency during policy formulation (Kenya Wildlife Service, 2020). This also ensures that the land use policies that are implemented are compatible with wildlife conservation. Without

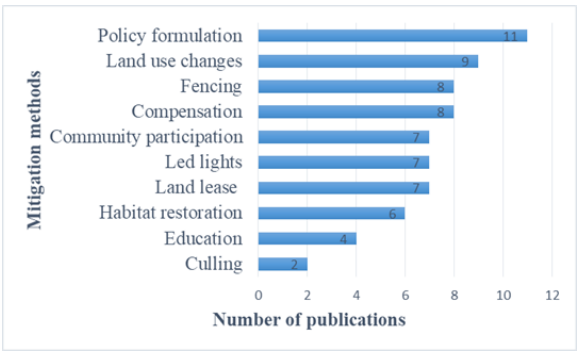
community involvement, most projects fail as they encounter resistance (McCloskey et al., 2011).

Fencing was cited as both a negative and positive method. De Leeuw et al. (2014) indicated that farmers use fences in the storage of fodder for use in drought, and it prevented their animals from contraction of zoonotic diseases and kept off carnivores from attacking their wildlife. On the other hand, fences around the farms have been said to cause blockage of wildlife corridors interfering with their migration patterns.

Compensation was noted as well to aid in the mitigation of conflicts (Koech, 2018). This method was often combined with the land lease at a fee that ensured the Maasais leave the lands open for wildlife migration (Maria, 2016). It worked only for some period and encountered challenges the main one being the increasing land prices in the area that motivated the original Maasai landowners (who are mostly poor) to sell off their land to other tribes who are not conversant nor tolerant to wildlife behaviors (De Leeuw et al., 2014).

Led lights which have been in use since 2012 have been supported as an effective method for preventing wildlife predation (Maria, 2016; Lesilau et al., 2021). However, the lions are very skilled and keep moving to newer farms that do not have the lights installed. It might be important that all farms get these lights installed (De Longh, 2016).

Figure 3: Frequency of publications including mitigation methods for the HWC around the Nairobi National Park.



4. Discussion

Most human-wildlife conflicts in NNP are associated with human population increase, intense urbanization and infrastructural development as shown in our results above. In the Nakuru National Park which is found in a similar urban setting, most conflicts were also linked to the park's proximity to towns, land use changes, and fencing, but poaching and fires were among the main causes as well (Ogutu et al., 2017).The findings of Mukeka et al. (2019) indicate that the conversion of land

for agricultural purposes and an increase in human population, as well as livestock numbers, were the major causes of HWC around the Masaai Mara National Reserve, which are quite similar to our results related to NNP. Usually, the communities that live in close proximity to the parks are the most affected by the conflicts, yet they receive minimal gains from wildlife conservation activities making them intolerant to wildlife (Manoa et al., 2020). The recurring type of conflict around the NNP is livestock predation which eventually results in retaliatory killings by the livestock rarers. In their findings, Broekhuis et al. (2020) mention that most community members living around the Maasai Mara National Reserve had positive attitudes towards wildlife, however, they would still kill the carnivores if they attacked their livestock. Unlike the NNP area, the main type of conflict experienced in the Greater Tsavo ecosystem is crop destruction that is caused by African Elephants (Mukeka et al., 2020).

Mitigation measures can only function if the local communities are directly involved in planning and decision-making processes (Abudulghafur, 2013). Makindi et al. (2014) recommend the incorporation of indigenous methods that are used by local people in the management of HWC with the conventional ones which are stipulated by wildlife management authorities. This has ensured harmonious coexistence in parts of the Tsavo Conservation Area.

In conclusion, the state of HWC around the NNP still calls for the need to find sustainable and lasting solutions that ensure peaceful co-existence between humans and the wildlife around the NNP.

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