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Introductory Chapter: Wildlife Management - Failures, Successes, and Prospects

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<http://dx.doi.org/10.5772/intechopen.79528>

1. Introduction

Wildlife is a resource of ecological, economic, and cultural importance. It forms a significant component of the natural ecosystem that maintains the ecological balance of nature through regulation of populations of different species; food chain or passage of food and energy through a series of functional groups comprising of producers, consumers, and decomposers; and natural cycles or circulation of inorganic nutrients between biotic and abiotic environment. Basically, each wildlife species functions with a specific role—predator, prey, decomposer, preserver, and in this way, ecological balance is maintained. For example, annual mass mortality of wildebeest drowning in the Mara River in the Greater Serengeti Ecosystem and of whales that sink on the ocean floor and salmon that die on river and streams when they come out to spawn have recently been identified as ecological input of high nutrients into these aquatic ecosystems from their carcasses and bones [1, 2]. This influences nutrient cycling in the aquatic ecosystem and maintains food webs.

By virtue of their critical ecological importance, some wildlife species are classified as keystone species and umbrella species. A keystone species is a species that has a disproportionately large effect on its environment relative to its abundance [3]. Such species play a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and influencing the types and abundance of a variety of other species in the community. Removal of such species has a huge downstream effect in the ecosystem and can lead to disappearance of the entire community. On the other hand, the umbrella species are species whose conservation is expected to confer protection to a large number of naturally co-occurring species. In conservation-related decisions, umbrella species are accorded priority since their protection implies protection of many other species making up the ecological community of their habitats [4].

The economic importance of wildlife is realized through its utilization to meet human needs and aspirations. The main forms of wildlife utilization are consumptive and nonconsumptive use. The former involves removal of a species from its natural habitat, while the latter involves the use of a resource which does not involve removal from its natural habitat. The main form of consumptive use of wildlife is hunting conducted to cater for subsistence or commercial needs. Photographic tourism is the main type of nonconsumptive use.

Wildlife resource contributes immensely to the economy of many countries and individuals through different avenues. In Tanzania, for example, the resource plays the biggest role in tourism sector, an industry contributing 17.2% of the GDP and 25% of foreign exchange. The revenues earned during the 2016/17 financial year through its wildlife management authorities was roughly US\$180 million [5]. Citing the 2011 Report by the United States Fish and Wildlife Service, the US-based Magazine—*Outside*—indicated that approximately 90 million U.S. citizens or 38% of the population aged 16 and above spent about US\$145 billion on wildlife-related activities. The hunters spent \$34 billion, anglers spent \$41.8 billion, and wildlife watchers spent \$55 billion [6].

Besides economic importance, wildlife species have spiritual, symbolic, and ceremonial importance to many global societies. Some ethnic groups have spiritual affiliation with totemic or sacred species which are worshipped as gods, revered as ancestors and classified as kins. These species are protected through taboos and traditional beliefs [7–9]. The totemic status ascribed to a particular species guarantees its protection since killing, injuring, or consuming it is prohibited.

The ecological, economic, and cultural importance of wildlife has prompted a need for conservation to ensure the long-term sustainability of this resource. In Africa, the precolonial, colonial, and postcolonial eras have observed some conservation regulations which sought to protect wildlife habitats and species. During the precolonial era, the beliefs and taboos were used to regulate, restrict, or prohibit killing or eating of a certain wildlife species. These controls were deliberately employed to avoid overexploitation and loss of such species [8]. The habitats for wildlife were also protected by taboos and beliefs [8, 9]. The colonial governments enacted laws and gazetted protected areas of different categories to safeguard the species and other natural resources. This system was inherited by postcolonial governments which gazetted more areas for wildlife conservation and maintained the centralized model of conservation—also known as fortress or fences-and-fines model. The model is based on the belief that biodiversity protection is best achieved by creating protected areas where ecosystems can function in isolation from human disturbance.

Despite the efforts to set aside large areas of land as protected areas, challenges are growing causing a dramatic decline of wildlife populations. With rapid human population growth and increased anthropogenic activities, loss of wildlife habitats and dispersal areas is increasing following their conversion to other uses such as agriculture, settlements, and infrastructures. Likewise, wildlife migratory corridors linking protected areas are being blocked and, thus limiting the gene flow between the populations and colonization of suitable sites. Other challenges include diseases, poaching, illegal logging, human-wildlife conflicts, climate change,

pollution, and introduction of exotic species [10]. Budget allocated to carry out effective management of wildlife is also limited.

The above challenges have far-reaching consequences on wildlife species. For example, research-based literature indicates that over 50% of wild mammals have declined across several African protected areas due to illegal activities conducted inside and around the protected area borders [11]. In Asia, deforestation poses significant risks to wildlife populations in protected areas than poaching. Such risks become more severe in the partially than strictly protected areas globally [12]. Furthermore, recent surge of illegal wildlife trade and their derivatives is perhaps the most challenging threats of our time that require concerted efforts from local and international institutions [12–14].

Many governments, globally, have responded to the growing conservation challenges by adopting new or alternative conservation policies and approaches. For instance, in the past three decades, community conservation approaches have been promoted to replace or complement the “fences and fines” (also known as centralized) approach. The later was considered to have failed in conserving wildlife. Under this approach, state-led enforcement of conservation laws became inefficient due to shrinkage of conservation budgets. This was manifested by heavy poaching which threatened survival of many key species such as buffalo, elephant, rhino, and lion [15–17]. For instance, poaching of African elephants for ivory reduced its population from 1.3 million in 1979 to 625,000 individuals in 1989 while black rhino plummeted from 65,000 in 1970 to 2400 in 1995 [18]. These declines of wildlife populations were partly caused by weak economies of the countries where protected areas are located and the need to increase incomes from illegal commercial sale of ivory and horns [12, 14].

The emerging of the community-based-wildlife management (CBWM) initiatives globally was important step in implementing more inclusive policies. The initiatives were construed as more plausible and promising in ensuring the survival of wildlife populations. However, implementation of this approach has had some unexpected outcomes with limited success stories [19, 20]. For instance, most of the community-based conservation projects were established to meet donor interests and their funding was fully dependent on donors. This has, consequently, led to failure of these projects instantaneously after pull out of the donors. Some community-based projects are also faced with challenges of inadequate capacity in terms of managerial and entrepreneurial skills.

Despite the challenges and failures, some successes have been recorded following wildlife conservation efforts globally. One of the successes is the growth of wildlife reserves worldwide from one (Yellowstone National Park) in 1872 to several thousand today [21]. There is increased commitment among the governments to set aside more wildlife reserves which is expected to cover about 17% of the total global land area by 2020 [22]. Similarly, about 10% coverage is expected for marine protected [12]. Essentially, this increase in protected area coverage is expected to guarantee the survival of the remaining populations of wildlife and other natural resources. Furthermore, the expansion of protected area coverage on a global scale has been reflected locally within individual countries notably from tropical countries. For example, the national coverage of the protected area network has increased notably in

Tanzania by 6.3%, the Republic of Korea (3.6%), and Mexico (2.0%). The 2017 World Database on Protected Areas (WDPA) Report indicates existence of over 230,000 protected areas in the world covering 245 countries and territories [23].

Another success recorded is increased public awareness on importance of wildlife conservation and, therefore, improved support to conservation efforts. This is a result of conservation education and realized direct benefits from conservation, especially to communities living around the protected areas. Research-based literature demonstrates that positive attitudes and support to conservation efforts are a function of direct benefits from wildlife and reduced costs related to conservation [24–29].

Along with increased public support, local and international community plays important role in ensuring the sustainability of wildlife resource. There is increased commitment locally and globally to adopt supportive policies and enforcing laws aiming at serving the species and their habitats. Many countries have formulated or reviewed their policies and amended or enacted laws to cope with increasing and emerging conservation challenges. Besides the national laws, these countries have signed/ratified various regional and international conventions and protocols for wildlife resource conservation and protection. This shows commitment of these countries to specific principles, objectives, and course of action. Some of the main conventions relevant to management of wildlife are: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) of 1989; Convention on Biological Diversity (CBD) of 1992; Kyoto Protocol on Climate Change (UNFCCC) of 1997; Lusaka Agreement on Co-operative Enforcement Operations directed at Illegal Trade in Wild Fauna and Flora; Convention on Migratory species and; SADC Protocol on Wildlife Conservation and Law Enforcement (1999).

This book is comprised of eight chapters presenting experiences drawn from different parts of the world on failures, successes, and prospects of wildlife conservation in the world. Chapter 1 titled “*Spatial and temporal vegetation dynamics: Opportunities and nutritional constraints behind wildlife mobility in savanna ecosystem*” by Drs Anthony Sangeda and Selemani Ismail reviews the opportunities and constraints of spatial and temporal variability of forage resources and wildlife mobility in Eastern Africa savanna ecosystem. Foraging animals normally respond to the decline in forage quality and availability by moving to other landscape with relatively higher quality and abundant forage resources. Although migration of wildlife outside protected areas is ecologically vital for breeding and survival, it foments human-wildlife conflicts. Limited ecological knowledge and nutritional requirements of wildlife coupled with rapid diminishing quality and availability of forage undermine biodiversity conservation efforts. The understanding of spatial-temporal variability of forage resources along with proper wildlife management practices as well as human-wildlife conflict management is highly required to realize high productivity in livestock industry and wildlife conservation.

Chapter 2 titled “*Emerging bacterial zoonoses in migratory birds*” by Dr. Parin Ugur presents a very critical challenge of zoonotic diseases— affecting wildlife, people, and domestic animals. The seasonal variance, global warming, and extraordinary climate conditions around the world are linked with change of the physiology and behaviors of different animal species. Free ranging birds and mammals harbor some species of potentially pathogenic bacteria.

The authors explain the mechanisms through which migratory birds contract diseases and transmit them to domestic animals and humans. The migratory birds confront numerous health risks brought on by bacterial species that affect other livestock populace and public health. The chapter provides brief reference on bird-to-bird transmission and general aspects of emerging bacterial zoonoses of migratory birds for wildlife professionals, veterinary practitioners, and students.

In Chapter 3 "*Application of attitude theory in wildlife management: A critical review of concepts and processes*", Dr. Brookes Jeffrey et al. highlight the factors influencing consistency between people's attitudes and their subsequent behaviors. The authors review a number of studies on attitudes and knowledge to understand these factors. Prior knowledge is one of such factors. Attitudes held by people with high levels of knowledge of an issue tend to be better predictors of subsequent behaviors than attitudes accompanied by low levels of knowledge. Essentially, prior knowledge moderates the relationship between attitudes and behaviors by two processes: (1) accessibility and (2) stability, or strength. Using information-processing model from social psychology, authors examine the implications of knowledge about a hypothetical predator restoration. Understanding the effects of knowledge for information processing is useful to wildlife managers and communication experts who attempt to influence, persuade, and educate public stakeholders.

Dr. Mureithi Stephen et al. in Chapter 4 titled "*Community-based conservation: An emerging land use at the livestock-wildlife interface in northern Kenya*" recognize the lands outside the protected areas as important dispersal areas for about 70% of wildlife populations. These lands are communal pastoral lands where pastoralists and wildlife have coexisted harmoniously for decades. The authors point out the land use changes taking place in the area and their impacts on pastoralism and wildlife populations. Establishment of community wildlife conservancies is construed as a strategy for decentralization of wildlife governance and halting biodiversity and habitat loss. Conservancies are promoted as an avenue for restoration of degraded grazing lands and improving pastoral livelihoods through better livestock grazing management, vegetation recovery program, and income generated from tourism-based enterprises. Authors recommend a clear land zoning, reliable market for livestock, and development of support infrastructures for success of conservancies. Climate variability and change, invasive species, unsustainable land use systems, cattle rustling, and human-wildlife conflicts are outlined as the perceived threats.

Chapter 5 by Dr. Sayuni Mariki—"*Community-based wildlife management areas in Tanzania: Benefits, constraints and future prospects*"—provides some insights on the performance of community-based wildlife management approach. The approach has been promoted as a promising and more plausible option to conservation, contrary to previous approach—"fence and fines." Using the Wami-Mbiki Wildlife Management Area as a case study, the author points out that the project excelled at the beginning but with time, it became unattractive to communities. The author attributes this change to "donor dependency syndrome," which is common to many conservation projects. Ending of the donor support cripples the projects due to lack of capacity in terms of managerial skills and financial resources. Consequently, illegal activities such as wildlife poaching, overgrazing, tree cutting, and charcoal burning

increase as the projects can barely conduct effective antipoaching patrols. Entrepreneur skills, transparency, and good relationships with stakeholders, among others, are recommended as important success factors for community-based wildlife management.

Chapter 6 titled “*Power struggles in the management of wildlife resources: A case of Burunge Wildlife Management Area (WMA), Tanzania*” by Dr. Rose Kicheleri et al. provides an analysis of powers held by different stakeholders namely—structural, institutional, and strategic power. While the central government, investors, and nongovernmental organizations have both institutional and strategic powers, the power for village councils is limited to structural. Village councils are, therefore, disadvantaged in making the strategic decisions about the management of the WMA. The chapter cites divergence of interests as a source of power struggles among the stakeholders. Power struggles are more notable on issues related to distribution of revenues, management, and access to natural resources.

Chapter 7 by Prof. Lee Sang-Go—*Marine Fish Stock Enhancement Programmes (FSEP), and Fish Stock Rebuilding Plan (FSRP) in Korea*—seeks to introduce the methods and insights of Korean ecofriendly FSEP-based FSRP and its 10 years’ fisheries management policy. It presents different strategies proposed to overcome any issues related to the implementation of the FSRP plan. Finally, Dr. Theresa Talley in Chapter 8 reviews the marine finfish enhancement program in California. The purpose of the review was to assess the program’s functionality and efficiency, environmental impacts, scientific accomplishments, economic costs and benefits, and contribution to the marine finfish stocks.

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