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CHALLENGES FOR THE SUSTAINABILITY OF COMMUNITY BASED NATURAL RESOURCES MANAGEMENT PROGRAMMES (CBRM) SUCH AS CAMPFIRE IN ZIMBABWE"

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Abstract

This discussion is a review paper which examined the challenges which have made CBNRM programmes to be unsustainable. The major challenge that CAMPFIRE areas have faced is the problem of human wildlife conflicts which has mainly manifested themselves in the form of crop raiding by large herbivores, predation of livestock by carnivores and human deaths and injuries. The major dilemma so far is to design strategies that ensure sustainable management of wildlife while fulfilling the social needs of the local communities. This discussion suggests that the sustainability of CAMPFIRE programmes has been compromised by lack of ecological data in many CAMPFIRE areas. This is because the ecological template remains largely unexplored in wildlife studies. Previous studies focused more on the social template meaning that most social problems associated with CAMPFIRE programmes are well known. Thus there is need to establish the ecological aspects such as wildlife numbers and their distribution across the rangeland. Wildlife management programmes such as cropping or hunting, culling or demarcation of parks requires reliable information about wildlife numbers, population structure, and wildlife movement corridors. Estimating wildlife numbers in a wildlife conservation area is crucial for establishing complex predator and prey relationships as well as habitat types for different species. Assessing the distribution and seasonal movements of wildlife is critical as it establishes grazing areas, water points, migratory routes, and areas of high species diversity. Information on the distribution and movements of wildlife can also be used for demarcating park boundaries. It is also critical to establish vegetation productive of rangelands as well as

determining the carrying capacity. Knowledge on the carrying capacity of rangelands is critical as this prevents unsustainable increases of wildlife populations, leading to degradation of the rangelands. This discussion also recommends that there is need to link the ecological data with human land use data such as agriculture and settlement. Such information is critical in designing wildlife management options that ensure continued existence of wildlife species in landscapes dominated by a mosaic of human land sues.

Key words: sustainability, Community Based Natural Resources Management Programmes (CBRM), Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), human wildlife conflicts

Introduction

The Community Based Natural Resource Management (CBNRM) theory prioritizes wildlife conservation needs in the protected areas as well as the socio- economic development needs of the people residing at the periphery of the protected areas. The rationale for choosing the CBNRM theory is that it is a critical approach in wildlife conservation as it ensures sustainable co existence of wildlife and humans in situations where a mosaic of human land uses are located closer to the parks (Brandon and Wells, 1992). Another importance of the CBNRM theoretical framework is that it views people residing closer to parks as the focal point for sustainable management of wildlife resources. Without the cooperation and participation of people residing in proximity to the protected areas, the chances of successful wildlife resources conservation diminish. Under the CBNRM theory, people residing close to the park must perceive management of wildlife resources as beneficial to them if they are to be motivated to manage wildlife resources sustainably. Thus, to ensure sustainable coexistence of humans and the endangered wildlife species, it is critical to establish how wildlife is responding to expanding human land uses in areas closer to conservation areas.

The (CBNRM) approach has been implemented to ensure sustainable biodiversity conservation in many African countries. The CBNRMs have been regarded as a fundamental tool to ensure sustainable conservation of wildlife in many areas adjacent to protected areas in Africa as it was implemented as an initiative to link rural development with species conservation (Barrette,

1995). In Zimbabwe, CBNRM such as Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was launched in the communal areas adjacent to national parks to ease human wildlife conflicts and to change the local people`s attitude towards wild animals. CAMPFIRE was regarded as one of the ways to ensure that there was no conflict between the economic survival of agricultural communities and foraging needs of wildlife (Gandiwa et al, 2013). The increase in conflicts between wildlife and humans in many conservation areas in Zimbabwe has however, undermined the sustainability of CAMPFIRE programmes. Crop raiding by large herbivores and predation of livestock by carnivores has reduced tolerance towards some wild animals like elephants which are regarded as threatened species (Gandiwa, 2013).

Currently, the greatest dilemma in communal areas closer to parks is developing management strategies that limit the interactions between human land uses and elephants to prevent conflicts. The greatest challenge in many conservation closer to national parks so far is to develop wildlife management options in a context of increasing humans and wildlife densities (Guerbois et al 2012). The major dilemma is to design strategies that ensure sustainable management of wildlife while fulfilling the social needs of the local communities (Newmark and Hough, 2000). This can only be achieved by integrating the conservation of wildlife inside the park to the social and economic development outside the park. Such knowledge is critical in developing management strategies which ensure continued presence of wildlife populations alongside expanding human land uses. The major challenge is that the ecological template in wildlife ecology remains largely unexplored as previous studies focused more on the effects of elephants on humans due to the prevalence of human wildlife conflicts in many protected areas. Human deaths and injuries, crop destruction and crop raids are some of the most severe manifestations of human wildlife conflicts established so far (Leingruber 2003, Foley 2002, Hoare and Dutoit, 1999). In a bid to solve human wildlife conflicts, researchers have emphasized more on developing strategies to deter wildlife from raiding crops from grain stores and fields. Thus this discussion suggests that there is need for researchers to focus on the ecological template. The absence of ecological data in most of the areas where the CBRMN projects have been implemented is the key challenge to the sustainability of such projects. The practical aspects of quantifying the ecological attributes such as habitat modelling, wildlife counting and the use of GIS and Remote Sensing to estimate

carrying capacities are areas which have not been widely researched because of lack of technical expertise. People lack technical people who can practice rangeland management techniques which can provide accurate information on important ecological aspects of the areas. The major drawback to venture into researches which takes both the ecological and social template into cognicence in Africa has been attributed to technological limitations which made it impossible to collect elephant distribution data and human land use data. The recent advancement in wildlife technology has made it possible to collect elephant and human land use data, thereby refocusing elephant researches. The advent of the satellite linked GPS radio collar technology; aero plane surveys and dung count methods have made it possible to collect elephant distribution data (Forley, 2002). The introduction of the GIS software has allowed spatial data analysis through the integration of elephant distribution data and human land use data layers, making it possible for wildlife ecologists to establish the main factors affecting elephant distribution across land scapes (Ngene, 2009). This approach tends to be objective and unbiased as data on human land uses and elephant distribution is collected from the field without interacting with people. Integrating human land uses and elephant conservation is an objective way of providing solutions which will ensure sustainable presence of elephants in a land scape dominated by expanding human land uses. This study insists that the social template should be measured objectively by mapping human land uses through digitizing rather than soliciting people`s views on elephants as in previous researches.

In Zimbabwe, one of the few studies assessing the effects of human land uses on elephants was conducted by Sibanda (2012). Sibanda (2012) tested whether cotton fields contribute more than cereal fields to African habitat loss through its effects on woodland fragmentation. Cotton fields were found to be the major driver of elephant habitat fragmentation and elephant distribution in the mid Zambezi (Sibanda, 2012).

Murwira and Skidmore (2005) also tested whether the probability of elephant presence was related to spatial heterogeneity of vegetation cover resulting from agriculture in the Sebungwe Region. Results indicated that elephant presence could be predicted reliably using spatial heterogeneity of vegetation cover resulting from agriculture (Murwira and Skidmore, 2005).

Sustainability in this context means that wildlife products are harvested in a manner that benefits the local communities presently without comprising the long term survival of the wildlife. This can be achieved through carrying out researches on the following critical ecological parameters:

Counting wildlife populations in rangelands

Wildlife management programmes such as cropping or hunting, culling or demarcation of parks requires reliable information about wildlife numbers, population structure, and wildlife movement corridors. Estimating wildlife numbers in a wildlife conservation area is crucial for establishing complex predator and prey relationships as well as habitat types for different species. Determining the size and structure of wildlife population which involves estimating the wildlife numbers, age and sex structure is critical in designing wildlife management policies and conservation strategies (Norton-Griffiths, 1978. Assessing the distribution and seasonal movements of wildlife is critical as it establishes grazing areas, water points, migratory routes, and areas of high species diversity. Information on the distribution and movements of wildlife can also be used for demarcating park boundaries. Wildlife distribution data is important in establishing the spatial overlaps of human land uses and wildlife ranges (Norton-Griffiths, 1978. Such information can be useful in designing wildlife management strategies that takes into cognicence both needs of wildlife as well as the socio economic activities in the park. Without ecological data on the type and amount of the individual population of various species, achieving the concept of sustainability becomes a nightmare.

Knowledge of the number and distribution of wildlife populations is critical in quota setting process. Setting hunting quotas without information on estimates of wildlife numbers can lead to overhunting and declining in numbers (WWF, 1986). The increase of wildlife populations within the park is also a major cause for concern as it increases competition in the park, resulting in animals moving outside the park to extent their ranges. As the spatial overlaps between human land uses and wildlife increases, serious conflicts has manifested in the form of human injuries or deaths, crop raids and poaching of wildlife.

Wildlife distribution information can be integrated with human land uses to establish how human land uses can coexist sustainably with wildlife. This is because human land uses such as

agriculture significantly affect wildlife distribution. Murwira and Skidmore (2005) observed that the persistence of wildlife in many areas in Zimbabwe is increasingly being threatened by the expansion of agricultural fields into wildlife habitats. As Murwira and Skidmore (2005) suggests, the greatest challenge so far is establishing the kind of agricultural land scape in which wildlife species survive sustainably.

The techniques of counting animals are not carried out in areas where the CBNRM projects exist. Such techniques give the information on the types of species present, number of species. Complex interactions among species can also be estimated by analysing the results from animal counts. In most situations the sustainable existence of CBNRM projects is compromised since people find themselves continuously harvesting wildlife products resulting in the local extinction of some animals.

Determining the relationship between wildlife distribution and rangeland condition (Habitat modelling)

Information on the distribution of wildlife can be combined with NDVI so as to determine how wildlife distribution is influenced by the amount of vegetation across the rangeland. NDVI is used since it has been observed to be good estimate of vegetation productivity of an area. Figure 1 shows an example where elephant distribution was combined with NDVI using logistic regression to establish how the probability of elephant presence is influenced by the amount vegetation across the study area. As illustrated in figure 1, a significant ($p<0.05$) positive relationship between probability of elephant presence and NDVI. At low NDVI (-1 to -0.2), probability of elephant presence is low (0.2). As NDVI values increases (0.6), the probability of elephant presence also increases (0.8) (Nyakupanda, 2014).

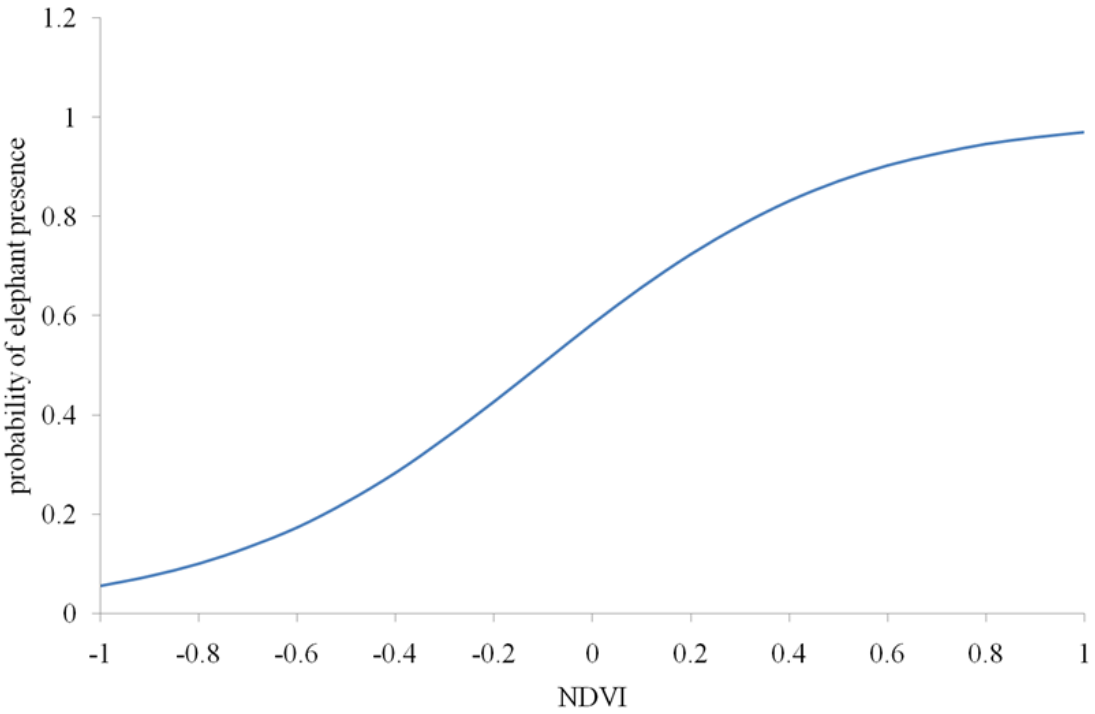

Figure 1: Probability of elephant presence ($y=e^{(0.338+ (3.152*x))}/ (1+e^{(0.338+ (3.152*x))}$ as a function of NDVI.

Source: Nyakupanda, 2014

Techniques like habitat modelling are not commonly practiced in most CBNRM project areas. Failure to model the habitat for different animals is one of the key factors that may threaten the sustainability of the CBNRM projects.

The concept of carrying capacity

Carrying capacity refers to the number of wild animals that can be sustained by the rangeland. Beyond carrying capacity, the balance between the grazing pressure and the regenerative power of the rangeland is destroyed and the condition of the rangeland progressively deteriorates. In many CAMPFIRE areas the carrying capacity of rangelands is not known. This has led to the increase in human wildlife conflict as animals extent their ranges outside the park. For instance, the increase in the number of elephants can be a major cause for concern as elephants require large habitats. Failure to establish the carrying capacity in many conservation areas has resulted in serious human wildlife conflicts as the increasing animal species extent their ranges into the human settlement.

Conclusions

This discussion concludes that the major reason behind the unsustainability of CAMPFIRE programmes is lack of ecological data on the numbers and distribution of wildlife. Studies linking wildlife distribution and human land uses on the park periphery also remain limited making human wildlife a serious problem in many conservation areas.

Recommendations

The sustainability of the CBNRM projects requires researchers to find out more about the ecological variables in communities where the projects. Incorporating the ecological and social ideas into the management of the CBNRM projects will result in better decisions pertaining to the resources that are available. Researchers need to refocus their attention from considering the social template only (effects of wildlife on humans) and adopt an integrated conservation and development approach which takes both the ecological template (wildlife conservation) and the social template into cognicence. This is achieved through linking wildlife conservation needs within the protected area to the social and economic development outside the park. Researches on wildlife ecology should focus on establishing wildlife populations and their distribution across the rangeland. There is also need to link wildlife data with human land uses on the periphery of the park. Such information is critical in developing wildlife conservation strategies that ensure sustainable coexistence of humans and wildlife.

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