

Integrating Nguni cattle into black rhino reserves: Could this be a novel rural community-based conservation model?

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Abstract

Biodiversity conservation of species requires a shift in our conservation approach. This perspective evokes a critical debate of enabling black African communities to become directly involved in species conservation. The proposed community-based conservation model presents an opportunity to pilot a culturally familiar, ecologically significant, and economically sustainable mixed land-use system that will complement efforts to manage the critically endangered black rhino in Africa. This might not be the only or even viable solution, but nevertheless, such community inclusive bottom-up driven discussions and debates are necessary for conservation.

Introduction

Species conservation is an integral component of biodiversity management. For a long time, conservation efforts have taken a top-down management strategy, which excludes community needs and participation (Emerton, 2001; Wells & McShane, 2004). However, a paradigm shift in conservation has led to the realization that unless efforts address the human socio-ecological needs it will be difficult to rally the masses behind species recovery efforts (Berkes & Folke, 1998; Wells & McShane, 2004). It is evident that separating social and human development

from conservation is detrimental to the success of both the ecological and social systems (Meffe, 1997). This perspective evokes a critical debate and proposes a radical change where local previously disadvantaged communities become an integral player in the conservation of some of the world's critically endangered species such as the black rhinoceros (*Diceros bicornis*).

Rhino conservation, in general, requires resources to fund the operations to run the reserve and monitor both the habitat and the animals. With the increasing threat of poaching, security and antipoaching activities require a lot of resources (Humpreys & Smith, 2014). Furthermore, there is the ever-growing concern that conservation is utilizing fertile land that can be used by local impoverished communities for subsistence farming (Emerton, 2001). Some black rhino reserves, especially those that are owned and solely run by rural African communities, struggle to generate enough funds to meet the demands of conservation (Musavengane & Kloppers, 2020). Several non-governmental organisations (NGOs) and government efforts have contributed to the running of these reserves, but such a system is not sustainable in the long term. Other sources of income must be explored to make this a viable option.

The proposed community-based conservation idea presents an interesting opportunity to pilot a culturally familiar, ecologically significant, and economically sustainable mixed land-use system that will complement efforts to manage the critically endangered black rhino. I, therefore, propose a well-managed scenario where Nguni pure breed cattle (a hybrid of *Bos indicus* and *Bos taurus*), are introduced into a community-owned black rhino game reserve with an intention to improve habitat management, provide sustainable income and initiate a learning process that will be of value in influencing future black rhino conservation efforts, especially in community-owned lands. A controlled mixed land-use system has the potential to strengthen the ecological, cultural, and economic benefits of a rhino/livestock alliance in a reserve by putting in place culturally valued, community-based management and ecologically relevant regimes using sound, but simple, management plans for land and resource use.

Proposed design

A small number of black rhinos will be translocated from a source population and introduced into a habitat suitable community-owned nature reserve. The initial population must not exceed the new reserve's carrying capacity. Translocation (and fencing upgrades if needed) can be provided by the state and or NGOs. Depending on the origin of the translocated rhinos, the animals may remain the property of the donor source i.e., the state unless if outright donated. However, future offspring can be shared equally between the donor source and the new reserve owner(s), in this case, the community. Since most black rhinos in sub-Saharan

Africa are mostly state-owned, the state will provide the initial security and skills training to the community i.e., local herders will be trained in ranger skills, monitoring methods, firearm use, etc. The next step is to remove all other domestic livestock inside the reserve and then introduce disease screened Nguni cattle. The herd size must be within the reserves carrying capacity, notwithstanding the grazing pressure of other wild ungulates in the reserve.

Generally, Nguni breeds are adapted to the southern African conditions and are highly resilient to local diseases. Nevertheless, cattle will routinely be “dipped” to rid them of ectoparasites. Cattle will be rotationally grazed in the reserve and panned at night. Their numbers will also be kept in check and excess animals will be harvested for the beef industry and other valuable by-products like hides, horns, and hoofs.

Consequences of the mixed land-use model

The communal land will remain under conservation since it will continue to serve as a biodiversity conservation area. Similarly, the range for the critically endangered black rhino will expand, and this will contribute towards their population recovery. The model is cross-cutting in the sense that it will preserve a local practice of pastoralism, create alternative livelihoods (ranger and cattle herding jobs, tourism, and sales income) while enhancing the efforts of conserving a critically endangered species. Local previously impoverished communities will get to “own” rhinos and derive direct benefits from animal sales, tourism, and possible sustainable use practices (Child, 2012). This will enhance the rural community’s sense of ownership in conservation and encourage practical engagement of most rural black communities, instead of the prevailing mere “lip service” about imaginary benefits (Emerton, 2001).

Grazing activities of cattle will improve the habitat for black rhinos, and at the same time the browsing black rhinos will open up the grazing habitat for both cattle and other species inside the reserve. The constant dipping of cattle will assist in reducing the ectoparasite load in the system (Allan *et al.*, 2017). Finally, there is also the added benefit of increased biodiversity security (anti-poaching), since more people will be on the ground and the community will be directly invested in rhino conservation through; (1) ownership of the rhino progeny, and (2) tourism benefits.

Provision of a bulk grazer in the form of Nguni cattle to the reserve would thus make the habitat better for black rhino and other shorter grass grazers. It must be emphasized that the current proposal is primarily for biodiversity conservation and the income generated an added incentive. Nguni cattle are a favourite cattle breed amongst most southern African rural communities since they are said to be highly productive (Spickett, *et al.*, 1989). There are temperature tolerant, semi-arid adaptable, and possess good resistance to most endo- and

ectoparasites with natural immunity to tick-borne diseases (Spickett, *et al.*, 1989). Integration of Nguni cattle into black rhino reserves would provide some income from the sale of cattle progeny. The idea is not to stock at ecological or economic levels stocking rates (not initially at least). The establishment of a cattle scheme on a species conservation area would permit community members to see something tangible happening on their reserve; something that they understand, as cattle are a long-standing and profound part of the culture and economy of the Nguni society. Beef from this scheme will later be sold as prime organic and rightfully marketed as originating from cattle that improve habitat for the critically endangered black rhino. A brief survey about this marketing strategy suggests that, provided the meat grade is good, then this beef will most likely fetch a significantly higher price. This proposal may also alleviate overgrazing in community areas surrounding most conservation reserves.

Integration of cattle into the reserve will require monitoring systems that are designed to track conservation, production, economic and social indicators. Collaboration between different entities especially between scientists and game reserve practitioners will be needed to develop appropriate indicators and test applications.

Diseases

An increasingly important aspect of cattle and wildlife interactions is that of disease. The resurgence of rinderpest in East Africa, and its control, highlight problematic issues of wildlife-cattle interaction. Further investigations into diseases like Anthrax (*Bacillus anthracis*), Foot and mouth disease will require screening on soil samples in the reserve. It is also unlikely that cattle will carry any diseases that will affect rhinos since the two species are from different classification orders (rhino; Perissodactyla and cattle; Artiodactyla).

As the risk of disease transmission can be from domestic livestock to wildlife as much as the other way around, the chosen cattle should be disease-free, particularly for tuberculosis, Toxoplasmosis, Q fever, leptospirosis, and brucellosis, and should be tested and passed prior to entry into the game reserve. A regular disease-monitoring regime would be instituted once the cattle have gained entry into the conservation area. Once cattle have entered the reserve, they will not be allowed out and back in so that stock does not become infected by other cattle outside, nor bring diseases into the reserve. Ideally, the reserve must be free of blue wildebeest (*Connochaetes taurinus*), as cattle are susceptible to malignant catarrhal fever which is prevalent in wildebeest during calving.

Implementation

As much as Maasai pastoralists are low-cost guardians of the wildlife in Northern Tanzania (Aveling, et al. 1998), local herders are needed for this mixed land-use system as they will also assist in monitoring (1) habitat quality; (2) state of the infrastructure i.e., fences and watering points; (3) black rhino numbers; and (3) this will improve movement within the reserve that hopefully acts as a deterrent to poaching. Better off, herders can be skill trained to act as rangers while they go about their daily cattle herding duties. Herder-rangers must be sought from the community so as to create jobs for the locals. A herder-ranger would be multi-skilled: either a ranger with cattle handling skills or a herder who could be trained to be a ranger.

A corral should be built to accommodate cattle at night. This should ideally be built in a location that is easy to access by road for managers and monitors and should have a facility to handle the cattle. It should also be close to the selected grazing area. A mobile corral system would be ideal as the cattle can be grazed at different locations in the reserve. An electrified enclosure could be contemplated which could easily be moved.

Cattle would be driven out every morning to graze in a selected location. The location will depend on a number of factors (a) the availability of grazing; (b) the presence or absences of calving wildebeest, as cattle are susceptible to malignant catarrhal fever; and (c) the cattle will graze an area intensively before being moved to the next grazing area. The idea is to have a great impact on the grass for a relatively short period of time so that the habitat becomes more suitable to other species sharing the environment. Any calves will be managed according to the dictates of any commercial ranching operation.

Discussion

If it is plausible that cattle can be used as a tool towards rhino conservation at the same time upraising people's cultural values, then we have to look for practical tried, and tested ways to implement this balance of land use. Ideally in community-owned lands that are dedicated to rhino conservation areas in Africa. Sound scientific research and habitat monitoring will be closely linked into practice and implementation of the mixed land-use system so as to advise management decisions. The following suggestions combine research, practice and therefore require monitoring and improvements.

It is important for conservationists to be aware of the need not just to maximize an exclusion type of conservation, but rather to balance the productivity and risk in a system (Ingold 1992; Ghimire & Pimbert, 1997). Introducing a small herd of prime pure breed Nguni cattle into a reserve is not just an economic and ecological management tool for rhino conservation,

but also a social mechanism to uphold cultural values, where people will no longer view game reserves as exclusive land for rhino and other wildlife but also as their land where they rear their prime cattle.

Research is also required to help determine some of the thresholds of economic and ecological productivity under different conditions. This research needs to combine modern knowledge about animal nutrition and markets, as well as indigenous knowledge about risk management, resilience, and long-term changes in the conditions of the reserve ecosystems.

My proposal to include cattle in wildlife areas spans from lessons learned from other parts of Africa. In areas where wildlife management has been integrated with pastoralism, pastoral communities have been heard to refer to wildlife by such euphemisms as “our other cattle” and “cattle that give milk when it is very dry” (Aveling *et al.*, 1998).

Integration of cattle into wildlife conservation in Africa

There are several east African examples where cattle have successfully been integrated into conservation (e.g., Homewood & Rodgers, 1991; Adams & McShane, 1996; Homewood *et al.*, 2009). Yet this practice is generally not widely practiced in the continent. There are a number of challenges that come with this innovative compromise between conservation and pastoralist but in most cases, the benefits to both conservation and communities appear to be worthwhile (Homewood *et al.*, 2009). The idea of integrating livestock into a national park can spark heated debate (Adams & McShane, 1996). It seems clear that integrating a broadened set of values into land uses that includes both wildlife and cattle can be beneficial for conservation, production, and diversity (Anderson 1991; Ingold 1992). To guide the debate, further experimentation (with rigorous analysis and monitoring) is required to tease out the dynamics. Hence an experimental mixed land-use system of introducing a small herd of cattle into a small-sized game reserve will be vital for our understanding of the consequences.

In Conclusion, biodiversity conservation of critically endangered species requires a shift in our conservation actions. Several competing interests such as livelihoods and culture must be incorporated into our collective conservation efforts. The idea of an exclusive “wild areas conservation” is no longer viable (Adams & McShane, 1996) and there is a need for a paradigm shift that incorporates biodiversity conservation with human livelihoods into a compatible practice (Meffe, 1997). Indeed, not all mixed land-use models are applicable to all systems (Phalan *et al.*, 2011), however, that should not limit our efforts to constantly look for new possible ways to conserve biodiversity in a way that is culturally sensitive.

Declaration: The author declares that they have no conflict of interest.

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