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COMMENTARY

Conserving the African rhinoceros

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Abstract The Southern African rhinoceros population has been dwindling through the years. A lot of effort has been put toward coming up with the most effective way of protecting the black and white rhinoceros population in the world yet still the animals remain endangered despite the enormous global efforts to protect the species. Such conservation efforts include; establishment of sanctuaries, wildlife farming, dehorning, trade and market controls, listing of species as endangered, use of biotechnology and biotelemetry. However useful, each of these methods has its own strengths and weaknesses relative to the success of rhinoceros conservation. It however has been noted in this review that dehorning is the most effective method as it involves removal of the horn hence extinguishing the need for poaching. Despite the high success rate it has also been noted that this requires a great deal of skill and finance hence limiting the application of this technique in developing nations. Sanctuaries provide an ideal breeding environment that is better than the wild and enhanced breeding accounted for a significant increase in rhinoceros population where it has been applied. It was however been conclude that a holistic conservation approach is required to conserve the African rhinoceros.

Keywords Dehorning · Extinction · Farming · Poaching · Sanctuary · Trade

Introduction

The demand for rhinoceros horn has pushed rhinoceros populations in Africa into precipitous declines (Cumming 1990; Milner-Gulland et al. 1992; Western and Vigne 1985). Rhinoceros horns are sold illegally to well-established illegitimate markets. During the 1980s, the global population of black rhinoceros stood at 4,240, thus classifying the black

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rhinoceros, as a critically endangered species. In 1993, 80 rhinoceros were reported to have been killed by poachers. As of 2007 the rhinoceros population was estimated to be 780 individuals. However these figures do not seem to be reliable as there are many conflicting reports regarding their populations in the wild. In 2007 a journalised article in Planet Watch reported an increase in populations of black rhinoceroses, from 370 in June 2007 to a population of 388. The population of the white rhinoceros then stood at about 135. This was in contrast to an article that was published in Bush drums in the same period that 40 rhinoceroses had been poached after indicating their population to be 780. This kind of inconsistency in African rhinoceros population data publications presents a challenge to current scientist, conservationists and decision makers in finding solutions to rhinoceros loses due to poaching. Despite the confounding data, several methods have been employed in an effort to protect the Zimbabwean rhinoceros. Such methods include translocations to intensive protection regions, dehorning, intensive law enforcement among other methods.

The challenge that conservationists are facing today is that a lot of effort has been put toward conservation of the black and white rhinoceros population but there still is no clear information the most effective measures. The available data are so much fragmented such that the experiences and outcomes of different rhinoceros protection efforts are not easily accessible and understood by conservationists, academics, and policy makers. This is evidenced by a clear lack of standard practices and strategies to protect the rhinoceros yet there have been many efforts to find out the best methods. The present paper seeks to explore on-going and historic conservation efforts in order to put together vital bits of currently fragmented information on rhinoceros conservation strategies

Sanctuaries

Recent conservation methods for the African rhinoceros have been focused on the establishment of rhinoceros sanctuaries or intensive protection zones (IPZ) (Brett 1990; Nduku and Martin 1993; Martin and Vigne 1997). Sanctuaries are areas in which the rhinoceroses are kept, and bred under supervision. In sanctuaries, the rhinoceroses are preserved and breeding is carefully monitored in close proximity. This may be another alternative to conservation of rhinoceros species in Zimbabwe. The use of animal sanctuaries became increasingly important as during the last half of the decade as increasing poverty levels increased poaching activity.

Sanctuaries have been found useful in Kenya, as a mode of protection against poaching activities (Rice and Jones 2006). Rhinoceros significantly use their habitat for the creation of bedding sites, according to Rice and Jones (2006). It is not fully understood to what these bedding sites are used for, but their presence and quality is strongly correlated to fecundity (Rice and Jones 2006).

This strategy has been successful in conserving the rhinoceroses and resulted in rhinoceros population growth. However the rising population densities within reserves may require changes in management practices. Rhinoceroses fall into the category of 'K-selected' species, their demographic patterns are influenced by changes in their population density (Fowler 1987). An increase in population density may lead into lower levels of fecundity, a delay in the attainment of puberty, and an increase mortality (Albon et al. 1983; Clutton-Brock et al. 1992; Jorgenson et al. 1993; Saether and Heim 1993). This means that if the commercialisation of dehorning was to bear fruit, it would be resource intensive and would require a huge operational cost budget regularly.

Wildlife farming

There have been proposals to begin farming rhinoceros farming so that their horns may be harvested and sold as an enterprise (Damania and Bulte 2006). Rhinoceros farming is presently being done in China. South African wildlife authorities have been supporting the farming of rhinoceroses in China by approving the export of over 100 live rhinoceroses to China since 2007 (Pot Shot 2012). The aim of these efforts was to curtail poaching by satisfying market demands for ivory in China. In April of 2012 Zimbabwe, Botswana, Zambia, Angola and Namibia agreed to the sale of Rhinoceros horn powder and to legalise the sale of rhinoceros horn powder in pharmacies and clinics in the region to curtail the levels of poaching (Pot Shot 2012). Recent conservation methods for the African rhinoceros have been focused on the establishment of rhinoceros sanctuaries or IPZ yet the possibility of integrating these with a farming approach has been overlooked (Martin and Vigne 1997). The viability and functionality of these wildlife farms is heavily dependent on the trade rhinoceros products, especially the rhinoceros horn. The rhinoceros is an endangered species that is classified under Appendix I. This appendix bars the trade in all rhinoceros products and ivory of the affected countries.

Dehorning

The removal of the horn from the rhinoceros by far remains one of the best solutions to the poaching crisis. Experimental dehorning in Zimbabwe began in the early 1970s and was implemented in the mid-1980s. By the year 1993 all of Zimbabwe's rhinoceroses were set for dehorning (Milliken et al. 1993). But the challenge was that once dehorned, the horn would re-grow due to the living tissue at the horn base. Kock and Atckinson of the South African Veterinary Association (SAVA) reported on the dehorning of the rhinoceros population in Zimbabwe and stated it must be repeated every 13–18 months in order to be an effective poaching deterrent (SAVA Wildlife Group 1994).

A rhinoceros population census was conducted by the IUCN in December 2010. The effects of dehorning showed an increase in the population trends of animal populations in the region. The dehorning of Rhinoceros in Zimbabwe offers many advantages for the local and internationals economies in general. This is due to its flexibility in allowing the horn to be harvested separately from the animal, without loss of life. This allows the survival of the rhinoceros that is being affected by poaching. The horn that is harvested can be auctioned off at a price lower than or equal to the prices available in the illegal markets. This does not only reduce poaching, but it benefits the economy that is affected as well.

The main concept of dehorning is to increase the cost of illegally hunting the rhinoceros. One of the methods that may curb this activity is the release of the commodity legally onto the market. This should comprise of animal ranges that are specifically structured for the purpose of rhinoceros breeding. These rhinoceros will then be dehorned safely and their horns are harvested and released onto the market. This trade will then depress market prices for the commodity, hence reduce the incomes realised from poaching. The illegal hunters will then be forced to look for employment elsewhere.

International trade

The listing on Appendix I of CITES has done little to help the rhinoceros. It has simply driven a thriving illegal trade in rhinoceros horn. This has seen a decline in the African

rhinoceros from 65,000 in the late 1960s to <3,500 by the year 2010. Between 1970 and 1987, 85 % of the world's rhinoceros population was killed by poachers despite having a ban in international trade of rhinoceros since 1976, the trade continues illegally such that the United States has recently imposed sanctions on Taiwan and China for their continued trade in rhinoceros horn products, (Rhinoceros Case 2012).

However, the prospect of selling rhinoceros ivory stocks in Zimbabwe is totally dependent on the C.I.T.E.S status of the country's rhinoceros population. The white rhinoceros population in Zimbabwe is classified as a near threatened species and the black rhinoceros is classified as a critically endangered species. These appendices prohibit the trade or sale of any ivory stocks that are legitimately present in the country.

However, allowing the trade in rhinoceros horn stocks, from an economic perspective, may cause a fall in the global price of rhinoceros horn. This will cause the poaching reward for the horn to diminish in both African and Asian species. If dehorning is done regularly this would result in fewer large specimens of the horn being available as well. If regular dehorning is combined with increased resources for anti-poaching mechanisms such as horn tagging can dramatically reduce the profit form poaching. Increased incentives from poaching are the main cause of poaching.

Implementation of the shoot to kill policy

Rhinoceros are given top priority protection, as they are on the verge of extinction. In Zimbabwe, a shoot to kill anti-poaching policy has long been implemented by the National Parks and Wildlife Authority of Zimbabwe (NPWAZ) in order to discourage poaching. This has been effective in deterring local poacher who is more aware of the consequences of the activity. This method of conservation has been in practice since its inception in 1984. This method has been useful in deterring the general public from poaching the rhinoceros as a species. However it remains as an inadequate source of protection against the rhinoceroses. This is because the poachers themselves are equally armed and capable of defending themselves. This usually results in the exchange of gunfire with game wardens in the National Parks.

Radio collar tagging

Rhinoceros home ranges tend to be vast. This meant that monitoring the movement of the endangered animals would be extremely difficult. Rhinoceroses are radio collar tagged in order to enable the tracking of their free movement. Radio collaring involves fitting a signal transmitting collar on the neck of the animal. The collar then transmits signals to a receiver that shows the location of the animal within its home range. The tagging of Rhinoceros has been crucial in tracing the movement of the animal in its home range. This only becomes important if the animal is in known danger. However, it is much more efficient to tag the horn, since it is the target organ on the animal. This can enable the tracing of the horn even if it is poached to allow criminal movements. Radio tag use is crucial but, their use is now regarded as an old approach to conservation. The poachers are now adapted to the technology and are well trained to identify and disarm radio tags.

Enhanced growth rates and early breeding

The selection of enhanced growth rates in rhinoceros is a potentially powerful mechanism of saving the rhinoceros population from extinction. This is a long term solution to the problems affecting the decline of the population. A female rhinoceros has a calving rate of a single calf between 4 and 5 years. If this can be halved it would lead to the proliferation of the species. However it will take a long line of generation intervals in order to complete this, combined with the low calving intervals that are present, it may take decades to complete. Females that mature and reproduce early should gain a genetic advantage over those that delay reproduction, as they extend their genetic material earlier. However, early growth and maturation may affect future reproduction or survivorship of the progeny (Gadgil and Bossert 1970; Reiter and Le Boeuf 1991). The age at which female mammals reach puberty and begin reproducing can differ widely with the population density (Laws et al. 1975; Albon et al. 1983; Fowler 1987). The age at the female African rhinoceroses attains its first calve also appears to be sensitive to population density in the African rhinoceros population.

Another effort that was found as a potentially useful solution in reducing the illegal demand for the rhinoceros was wildlife farming. This would be practiced whereby the horn is harvested from dehorning the animals. This would also help in increasing the population numbers as populations would be allowed to proliferate as well. Farming would only be viable if the affected countries are allowed to trade freely under the CITES agreement.

Conclusions

An integrated and holistic approach is required to effectively protect the rhinoceros. Countries must forge policies that include dehorning, rhinoceros sanctuaries, rhinoceros farming and enhanced growth and early breeding are effective in protecting and ensuring the survival of rhinoceros populations in the world. However each of these methods has their own weaknesses relative to the success of rhinoceros conservation. Dehorning has been noted to be the most effective since it involves the complete removal of the horn thereby totally removing the need for poaching. Development of animal sanctuaries is not a permanently viable option in the protection of rhinoceroses from poaching activity.

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