THE PROS AND CONS OF DEHORNING RHINOS

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INTRODUCTION

"If poachers kill rhinos for their horns, why not cut them off?" So runs a question that any lecturer knows will inevitably be asked by a member of the audience at the end of a talk on rhino conservation. It is a very sensible question given that, since 1977 conservationists' attempts to halt the decline of the black rhino using both a total trade ban on horn, enforced through the listing of all five species of rhinos on Appendix I of CITES and through underfunded field-based projects to protect large populations *in situ*, have failed miserably (Leader-Williams 1992; Leader-Williams & Albon 1988; Western 1989). It is also a sensible question because rhino horn does not contain any blood vessels or nerves and is composed of compressed hair that grows up continuously throughout life from a pair of horn bases situated on the nasal bones of African rhinos (Ryder 1962). Hence, dehorning will be painless and bloodless providing the horn base is left intact (Morkel & Geldenhuys 1991). However, any rhino that is going to be dehorned needs first to be caught by immobilisation, which has some possible attendant anaesthetic risks (see Milner-Gulland, Beddington & Leader-Williams 1992).

Although dehorning has been discussed as a measure to prevent poaching since the 1950's, it has until recently been discarded in most areas of Africa for several reasons (Leader-Williams 1989). First, the cost of dehorning several thousand rhinos, as there then were, over tens of thousands of square kilometers would have been extremely expensive. Second, the two African species, the black and the white rhino, use their horns in sparring (Owen-Smith 1971) and to defend calves against predators such as lions and spotted hyenas (see Figure 1). Hence, it was feared that hornless rhinos might be unable to maintain their social status and to rear their calves successfully. As important, most black rhinos live in thick bush, and a poacher sighting only a part silhouette could shoot before finding his quarry is hornless.

The dehorning of rhinos was finally attempted for the first time in 1989 in a brave experiment aimed at thwarting poachers in Damaraland, Namibia, where a small population of black rhinos uniquely adapted to desert life had once again become threatened when 16 of them were killed that year (Leader-Williams 1989; Lindeque 1990). Since then, Zimbabwe has conducted an experimental dehorning exercise on a number of white rhinos in Hwange National Park in 1991, and has now elevated the dehorning of rhinos to a national policy objective and embarked on the ambitious short-term task of dehorning all the country's rhinos, both black and white (Department of National Parks and Wildlife Management 1992).

The dehorning exercises undertaken in Namibia and Zimbabwe have been crisis responses to intense poaching pressure. While this in itself has been an extremely controversial measure among many conservationists, the dehorning scenario introduces a further even more controversial option into the rhino conservation arena. Rhino horns continues to grow throughout life to counteract wear on their tips, although growth rates are slower in older rhinos (Mentis 1972; Pienaar, Hall-Martin & Hitchins 1992). Furthermore, horns that have been lost in fights or removed in dehorning operations regrow, though possibly in a slightly deformed shape (Berger 1993; Bigalke 1946; Ritchie 1963). Therefore, rhinos do not have to be killed to produce a sustainable harvest of horn, even though poachers certainly kill rhinos. If there were to be a legalised trade in rhino horn, funds so derived could be used to further the cause of rhino conservation. The opening of a legalised trade has been adopted by Zimbabwe as a medium-term objective in its national policy (Department of National Parks and Wildlife Management 1992). This paper, therefore, aims to assess the advantages and disadvantages of dehorning, attempts to steer a way through the controversies outlined above, and to make recommendations for the way that Tanzania should proceed in its stance towards the option of dehorning.

DEHORNING AS A CRISIS ANTI-POACHING MEASURE

Several factors need to be considered for crisis dehorning to work and be adopted as policy, comprising the cost-effectiveness of this operation, and the consequences of the operation for the survival of rhinos, both through modification of the habits of the poachers and the dehorned rhino's own behaviour.

The first point to consider is whether or not dehorning meets certain criteria of cost-effectiveness. The particular question is whether or not the costs of dehorning produce the same benefits in terms of reduced rhino mortality as the equivalent amount of money spent on security and anti-poaching. Clearly, the costs of veterinairians, equipment such as helicopters and drugs do not come cheaply. Costs of dehorning of black rhinos in Namibia in 1989 was US$960 per animal, while recent costs in Zimbabwe are US$1000 per black rhino. The cost-effectiveness criteria depend to a large extent on the regularity with which dehorning must be done for it to be uneconomic for a poacher to kill a rhino. Using the available knowledge on horn growth rates and cost-price ratios, a modelling study showed that a rhino would need to be dehorned annually to ensure its safety from poachers and that it would be necessary for human induced mortality occurring during darting not to exceed 3.7% of the population to avoid a population decline (Figure 2). Using then available knowledge on rates of darting mortality, this study concluded that dehorning may well be unsustainable as an anti-poaching strategy (Milner-Gulland, Beddington & Leader-Williams 1992). However, the recent dehorning and other operations in Zimbabwe have become increasingly successful at avoiding rhino mortalities during darting due

to improvements in drug combinations, and overall mortality rates have dropped to less than 2% of rhinos immobilised (Milliken, in litt). While Zimbabwe's dehorning operation is still only at the stage of dehorning animals for the first time around, under the scenario of very low darting mortalities, dehorning in Zimbabwe would appear a sustainable strategy, providing it is done with sufficient regularity to deter poachers.

The second point to consider is whether or not poachers will continue to shoot dehorned rhinos anyway, perhaps out of spite or because they identify a shape in thick bush and only find once dead that the rhino is dehorned. In Namibia, no black rhinos have been poached since the dehorning in 1989, while horned white rhino have been killed (Milliken, in litt). In Zimbabwe, a total of 4 out of 112 dehorned white rhinos and 5 out of 129 dehorned black rhinos have been killed by poachers, but all these deaths occurred soon after the dehorning operations, before it can be assumed that poachers had knowledge of that dehorning had taken place. Clearly dehorning operations need to be conducted alongside vigorous and wide-ranging publicity campaigns, and the Zimbabwean authorities are now noticing cessation of poaching activity in areas where dehorning has taken place (Milliken, in litt).

The final point to consider is whether or not dehorning will affect the behaviour in some way, for example either the social behaviour during fights or a mother's ability to defend her calf against predators. To stand the maximum chance of success, therefore, dehorning should be carried out in a small and discrete population of rhinos living in an open area where there are no natural predators. These conditions were met by the habitat and rhino population of Damaraland, where the major factors to be considered were the effect of dehorning on social status and the risks of injury in fights with horned rivals (Leader-Williams 1989; Lindeque 1990). Thus far, there are few adverse effects on the behaviour of Namibian rhinos (Berger 1993). It will be much harder to study the possible behavioural effects of dehorning on rhinos in woodland in Zimbabwe, where predators may also be important, but again, thus far, no adverse effects have been noticed (Milliken, in litt).

A less stated advantage of the nation-wide dehorning operation in Zimbabwe is that it will provide some of the first accurate estimates of the country-wide numbers of rhinos. Dehorning acts as an adaptation of the techniques of individual recognition and of mark-recapture for counting animals. Previous estimates of rhino numbers in Zimbabwe have been based on aerial surveys, which are known to be highly inaccurate in woodland, with inbuilt corrections for an assumed rate of recruitment and the assumption that skulls found approximates to actual levels of mortality. As a result of the alteration in counting methods, the population estimates for Zimbabwe's black rhinos have changed from a suggested 2100 rhinos in 1989-91 to an estimated 430 in 1992. While uncritical commentators ascribe this change purely to the loss of

rhinos, which there have undoubtedly been, much of the change is also due to improved censusing methods directly attributable to the dehorning operation.

Dehorning has not yet been adopted as a crisis measure in South Africa, and the need for dehorning has regularly been considered and rejected as an option in Kenya. In South Africa, the poaching threat is not intense, but the need for constant vigilance is recognised, given that ta wave of intense and organised commercial poaching of rhinos has been moving steadily southwards (Brooks 1989). Kenya, which experienced its main bout of poaching in the 1970s and early 1980s, is now in the process of rehabiliating its rhino populations. Kenya has established sanctuaries and moved scattered rhinos to them, and has coupled this with an aggressive anti-poaching campaign. To date sanctuaries have been successful in stabilising and now increasing numbers of rhinos (Brett 1991). At present, therefore, both South Africa's and Kenya's stance on crisis dehorning is pragmatic in that they are not facing a crisis. The main question here in future will be whether this is a sustainable strategy in the long-term given that large scale poaching could begin in South Africa or return in future to Kenya.

DEHORNING AS PART OF A STRATEGY OF LEGALISED TRADE IN HORN

If dehorning of rhinos continues on a large and sustainable scale as an anti-poaching measure, it will continue to produce a harvest of horn that will be added to government stockpiles which at present have no commercial value. Furthermore, a large number of rhinos live on private land in South Africa and in Zimbabwe and could be dehorned on an optimal rotation time to produce a crop of horn. Selling such a valuable product legally could, it has been argued, produce a much greater income per unit area of wildlife land for re-investment in rhino conservation than many other alternatives available to state and private land-owners ('t sas Rolfe 1990a; 't sas Rolfe 1990b; Anderson 1983), and a recent modelling study confirms that this is the case (Milner-Gulland, Beddington & Leader-Williams 1992). Both South Africa and Zimbabwe have given notice that they intend to pursue this option, Zimbabwe, as already noted through its policy, and both countries through having made proposals to have their populations of rhinos transferred to Appendix II at the Eighth Copnference to the Parties of CITES at Kyoto in 1992. These proposals get into a very tangled web of arguments over whether any legalised trade could be carried out without encouraging illegal trade, over future likely demand and so on. These arguments have been reviewed elsewhere (Leader-Williams 1992) and this paper will not explore such issues any further, given that they may not be very relevant to Tanzania.

RELEVANCE OF DEHORNING TO TANZANIA

Tanzania's rhino population is now very reduced in size and most certainly not now subject to the intense poaching pressure being faced by rhinos in Zimbabwe over the last few years. Instead, Tanzania is in the position of Kenya in the early 1980s with a depleted population of

rhinos that is in need of urgent and rapid rehabiliation. The costs of finding and immobilising Tanzania's scattered rhinos just to dehorn them would be much more expensive than present costs in Zimbabwe, and this would most probably seriously affect the cost-effectiveness equation shown in Figure 2. The only concentrated population living in open habitats is that of Ngorogoro Crater, but there are already concerns that this population has a low recruitment rate, which could possibly be due to predation of young calves (see Figure 1), so dehorning here appears unwise at present. However, it could be argued that any translocated rhinos could be dehorned as part of the routine of moving them to future sanctuaries. On balance, at this stage, I would recommend that there is no need to dehorn rhinos if adequately protected sanctuaries are established. However, the situation should be kept under constant review, both as other countries gain experience of the technique, as the situation in Kenyan sanctuaries develops and as the success or otherwise of Tanzania's efforts to rehabilitate its rhinos is monitored.

On the legalised trade issue, Tanzania has a very small stockpile of rhino horn, officially around 31 kg (Leader-Williams 1992), and a very depleted population of rhinos that could play no realistic part in supplying horn to any market. Therefore, Tanzania's should retain its present position towards an Appendix I listing for its rhinos. However, Tanzania's policy towards its wildlife is that its should be sustainably utilised, and Tanzania is also a member of SADCC. Therefore, I would recommend that Tanzania respects and provides every encouragement to its southern neighbours' efforts in seeking constructive solutions to the dilemma of providing an economic value to their rhinos, providing this is achieved in a way that does not impact upon other range states' efforts to conserve their rhinos, through the further encouragement of illegal trade.

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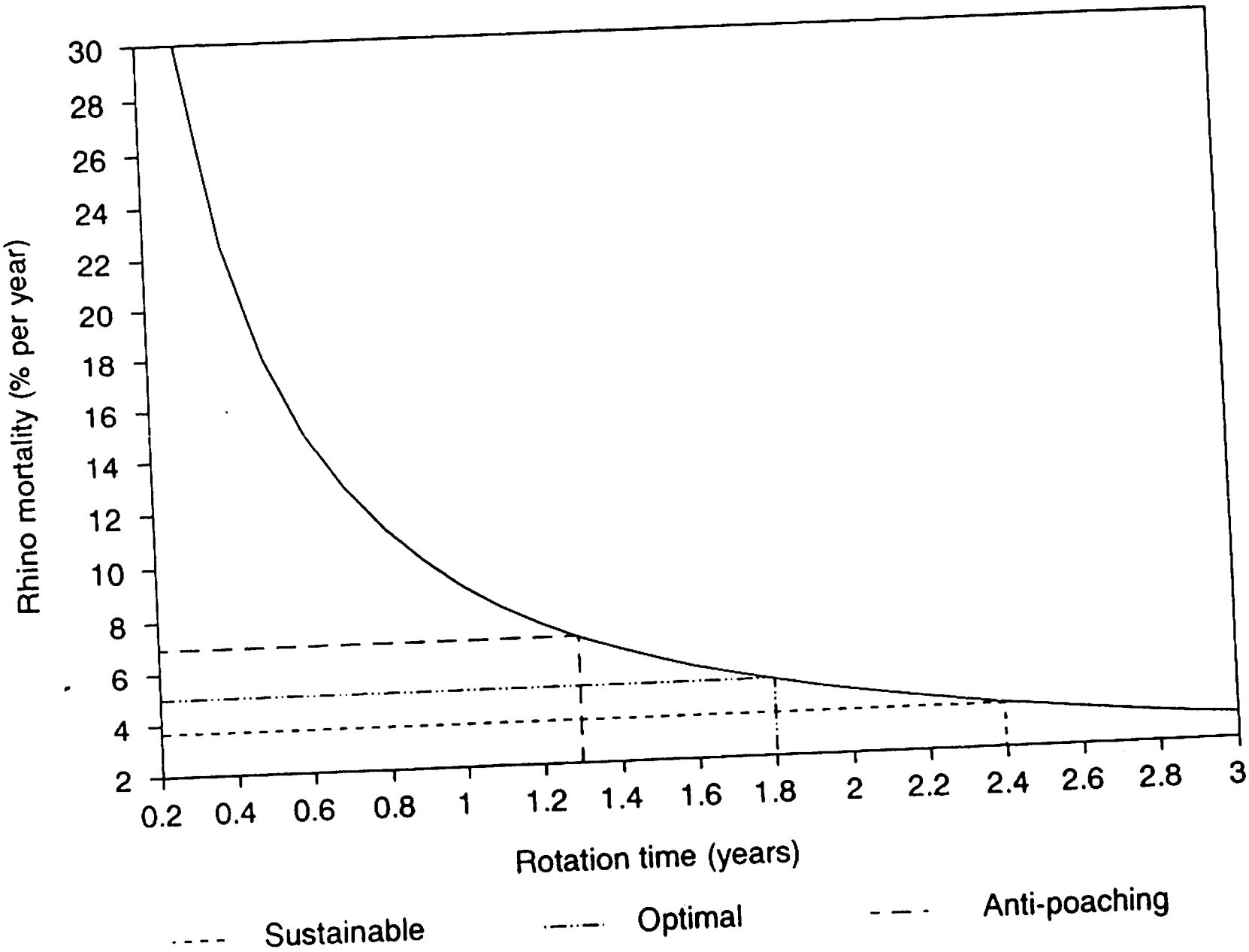
FIGURE LEGENDS

Figure 1. A rhino mother having to defend her calf from a spotted hyaena in Ngorongoro Crater, Tanzania in the 1960s (Photograph by Hans Kruuk).

Figure 2. The relation between dehorning rotation time and dehorning-induced mortality rate. A rhino population can sustain a human-induced mortality rate of 3.7% per annum without declining (from Milner-Gulland, Beddington and Leader-Williams 1992).


Rhino mortality (% per year)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
Rotation time (years)
Sustainable
Optimal
Anti-poaching