

Rhino Economics

Presentation to the African Rhino Specialist Group meeting, Mokala National Park, March 2011

By Michael 't Sas-Rolfes

1 Introduction

The discipline of economics has a number of beneficial lessons for rhino conservationists. Drawing from various sub-disciplines, we can identify ways to make live rhinos more valuable than dead rhinos to the people who control their destiny – this will help to conserve them.

People value rhinos for different reasons, and the way in which we allocate the rights to benefit from them will influence the way in which they are managed.

Existing conventional law enforcement measures may not be the best way to address the problem of rhino poaching, even if they are intensified. In fact, this approach may even be counterproductive, for reasons explained below.

2 Different economic approaches

We can usefully apply several different sub-disciplines of economics to the issue of rhino conservation.

Many conservationists will be familiar with ‘environmental resource economics’ (ERE). Conventional ERE is a relatively narrow sub-discipline of economics, concerned primarily with two issues. The first is the optimal use of natural resources, as determined by the application of bio-economic harvesting models. The second is the valuation of natural resources using methods outside the market pricing system (but still based on the concept of market value).

In the last two decades conventional ERE has been challenged by a more radical paradigm, ecological economics (EE). This approach argues for a completely different approach to valuation, one based on objective scientific measures (such as energy flows). EE is very technical and has yet to have a significant influence on policy decision-making.

The currently dominant economic paradigm views economic value as subjective, being determined by the expression of individual human preferences. Much of the thinking behind this approach has been influenced by the ‘Austrian school’, which emphasizes the role of human values and the ‘Chicago school’, which emphasizes the importance of incentives faced by individual decision-makers.

This approach has been applied to many specific areas, providing very useful insights, with Nobel prizes being awarded to a number of economists for these. Here are some examples:

The literature on 'law and economics' and industrial economics, influenced by the work of Ronald Coase, Harold Demsetz and others, teaches us much about the importance of property rights and market structures (as determined by legal regulation) in determining incentives and outcomes.

Gary Becker provides many useful insights through his approaches to 'behavioural economics' and the economics of crime and punishment. James Buchanan and others developed the literature on 'public choice' theory, which examines the economic incentives of politicians and public servants. Critically, the public choice literature demonstrates that government officials are self-interested individuals, and that political decision-making processes are also infused with economic considerations.

A more recent synthesis of much of the above work is provided by the literature on the 'new institutional economics' from the work of Douglass North, Elinor Ostrom and others. Recently, the Chicago school's approach to economics has also been popularized in books such as the 'Freakanomics' series.

The field of economics continues to develop and in future we can expect greater interest in understanding the interfaces between economic and biological / ecological processes, with advances in biology, psychology and evolutionary theory playing a central role in such analyses.

3 Rhinos and economics

In today's world, humans control the destiny of rhinos. Rhinos compete with humans and other species for scarce resources: territory, food and water.

Economics studies the allocation of scarce resources among competing human wants and needs.

Given the above, it follows that economics is a useful discipline for studying rhino conservation. It also follows that rhino conservation efforts will succeed in so far as rhinos are perceived to have positive value to humans, to enable them to compete successfully with other species for the scarce resources they need to survive.

4 The values of rhinos

Rhinos have values to humans both dead and alive. Rhino conservation will succeed as long as live rhinos have greater value than dead ones.

We can identify the following values for live rhinos:

Existence values

The concept of existence value (sometimes embodied as a concept of 'animal rights') asserts that rhinos have intrinsic value, independent of any direct value they may provide to humans.

Other non-use values

These include ecological values, for example rhinos may also play a role in maintaining the integrity of ecosystems on which humans ultimately depend.

Non-consumptive use values

Rhinos provide value to some humans via non-consumptive uses such as tourism viewing.

Non-fatal consumptive use values

Harvesting rhino horn from a live rhino by sedation and dehorning constitutes a use that is consumptive but not fatal for the animal.

Future fatal consumptive use values

The fact that rhino carcasses may eventually supply horns, trophies and meat endows live rhinos with value as an investment for breeding purposes.

Dead rhinos may provide the following values:

Non-use

This is trivial, but a rhino carcass has some ecological value as it returns organic matter to the ecosystem by providing food for predators / scavengers and recycled nutrients to the soil.

Fatal consumptive use

As discussed above, dead rhinos can provide trophies, horns, meat and other body parts that may be used by humans.

Who benefits from these values and are there any costs? Are the benefits and costs distributed in a fair and sensible way? These are really important questions, because these factors determine how rhinos are perceived and managed by those who control their destiny.

5 Rhinos and property rights

Property rights – the rights to benefit from resources such as rhinos and the obligations to pay the costs – play a critical role in determining how humans manage and use them. There is much empirical evidence that strong and clear property rights over valuable resources help to ensure that those resources are managed responsibly. Conversely, weak and undefined property rights do not create the right incentives, and typically lead to careless management and overexploitation.

The clearest (and typically strongest) form of property right is legal ownership. Ownership rights are rendered less effective when their net benefits are reduced by legislative intervention or the closure of markets. They are also weakened when poorly supported by underlying institutions (i.e. governments with ineffective law enforcement and judicial systems). In such cases *de facto* control over resources becomes more important than unenforceable legal rights.

Different interest groups value rhinos for different reasons. Sometimes these interests are incompatible (e.g. animal rights advocates versus hunters) and may lead to what are effectively property rights disputes: conflicts over control and use rights. A challenge for rhino conservationists is to manage these conflicting interests in such a way that would incentivize relevant humans to maximize their investment in rhino conservation.

6 Rhino conservation defined as an economic objective

We can define the main objective of rhino conservation as follows:

To increase the perceived value of live rhinos, relative to the value of dead rhinos, to the people that matter!

7 Economic incentives for poaching

Poaching takes place when the expected return from poaching is greater than the expected return from the best alternative activity.

The expected return equates to the expected income from poaching less the expected cost of poaching. The expected income is directly related to the price of rhino horn. The expected cost consists of direct costs plus the 'risk cost' of indulging in an illegal activity.

The risk cost is a function of four factors:

- 1) The probability of detection
- 2) The probability of capture
- 3) The probability of punishment
- 4) The severity of punishment

This analysis suggests that we can potentially reduce poaching in several different ways:

- Increase the expected return from alternative activities
- Reduce the expected income from poaching by causing a drop in the price of rhino horn
- Influence (to raise) the direct costs of poaching
- Increase the probability of detection
- Increase the probability of capture
- Increase the probability of punishment
- Increase the severity of punishment

These different ways should not be viewed in isolation. The first three are challenging, with perhaps the most tangible option being to reduce the price of horn by providing additional supply from competing legal sources. Given that rhino horn is a renewable resource, that some rhinos are already dehorned as a protective measure and that existing legal stockpiles are constantly replenished from natural mortality, there is good scope for the legal custodians of rhinos to displace a significant level of existing illegal off-take through direct competition.

An alternative approach to price reduction would be to encourage consumers to change their habits, but this is less tangible: we have no idea how much this approach would cost to be effective, nor whether the necessary funding could be found. It is far easier to assess the potential net economic benefits, incentives and likely results associated with a legal trade approach than with attempts at 'demand reduction'. The two approaches are also somewhat incompatible.

With some thoughtful consideration (backed up by empirical evidence) we can also reach some interesting and important conclusions about enforcement.

The first is that raising the probability of early detection is critical, for two reasons:

- 1) A low probability of detection effectively reduces the overall perceived risk cost significantly, even if all the other factors are high
- 2) It is the only enforcement measure that protects rhinos while they are still alive – the other measures are all 'after the fact' and therefore far weaker and less relevant for rhino conservation

A second important insight is that increasing the severity of punishment is not always a sensible policy, because it can backfire. As penalties increase, judges become more cautious about finding parties guilty so as to avoid unjustly passing harsh sentences. The probability of punishment is not independent of its severity – it may decline as severity increases.

A third insight is that criminals discount the future heavily, such that longer prison sentences are less of a deterrent (in other words there are rapidly diminishing returns to prolonging sentences).

Furthermore, middlemen often pay the fines imposed on poachers, suggesting that these fines are not as high a deterrent as assumed.

A final issue is the pervasive existence of bribery, intimidation and corruption, all of which undermine the legal enforcement system.

Many people wrongly assume that rhino poaching can be addressed simply by raising penalties for poaching / illegal trade and stepping up enforcement efforts. The literature on economics of crime and punishment shows that this approach has serious limitations. Evidence from other markets (e.g. illegal drugs) demonstrates that it can fail. Intensified enforcement can even be counterproductive, as it may simply drive up the black market price of rhino horn, thereby raising the incentives for poaching.

8 The economics of organized crime

Current information on the illegal rhino horn trade suggests that so-called 'organized crime' is playing an increasingly important role.

Recent studies on organized crime combine the insights of economists with those of sociologists, criminologists, legal experts and even journalists to reveal interesting conclusions. Noteworthy references include the work of Oxford University's Diego Gambetta and the book 'McMafia' by Misha Glenny.

In contrast with common perceptions of Mafia organizations being run like firms, recent studies show that 'organized' crime syndicates typically consist of loose affiliations of criminal specialists who transact with each other on an *ad hoc* basis. The upper echelons of these syndicates act as underworld coordinators and enforcement agents, seldom handle illegal goods themselves and typically co-opt corrupt government officials to assist them. Consequently, they are rarely arrested or convicted.

Experience shows that in all illegal activities where organized crime has become established (e.g. international drug and arms smuggling, counterfeiting, prostitution) enforcement efforts can never achieve anything better than temporary disruption, as each specialist cell is quite easily replaceable. Glenny also documents how organized crime has expanded substantially over the last two decades, often as the result of excessive regulation. Organized crime has, in effect, become an alternative governing institution to regulate activities that conventional governments refuse to acknowledge as acceptable practice (against the will of certain people in the marketplace).

9 Conclusion

Applying broad economic analysis to the issue of rhino conservation provides interesting and important insights. If we recognize that humans control the destiny of rhinos and that humans also respond to economic incentives, we can seek ways in which to influence those incentives to favour rhino conservation. Property rights play a vital role in affecting human incentives; poor property rights regimes are often the root cause of unsustainable practices.

Conservationists should distinguish between policies that encourage investment in live rhinos and those that encourage disinvestment, and should promote those that make live rhinos more valuable than dead rhinos.

The literature on the economics of crime and punishment and recent studies on organized crime also suggest that conservationists should be careful to rely on or advocate increased post-poaching law enforcement as a solution, as this may have limited effect.

By far the most effective deterrent to rhino poaching is a high probability of early detection and interception before rhinos are actually killed. This deterrent effect could potentially be increased under a carefully managed legal rhino horn trading regime that brings about a reduction in the price of horn and generates further financial resources to re-invest in field protection.