African wildlife conservation and the evolution of hunting institutions

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Abstract

Hunting regulation presents a significant challenge for contemporary global conservation governance. Motivated by various incentives, hunters may act legally or illegally, for or against the interests of conservation. Hunter incentives are shaped by the interactions between unevenly evolving formal and informal institutions, embedded in socio-ecological systems. To work effectively for conservation, regulatory interventions must take these evolving institutional interactions into account. Drawing on analytical tools from evolutionary institutional economics, this article examines the trajectory of African hunting regulation and its consequences. Concepts of institutional dynamics, fit, scale, and interplay are applied to case studies of rhinoceros and lion hunting to highlight issues of significance to conservation outcomes. These include important links between different forms of hunting and dynamic interplay with institutions of trade. The case studies reveal that inappropriate formal regulatory approaches may be undermined by adaptive informal market responses. Poorly regulated hunting may lead to calls for stricter regulations or bans, but such legal restrictions may in turn perversely lead to more intensified and organised illegal hunting activity, further undermining conservation objectives. I conclude by offering insights and recommendations to guide more effective future regulatory interventions and priorities for further research. Specifically, I advocate approaches that move beyond simplistic regulatory interventions toward more complex, but supportive, institutional arrangements that align formal and informal institutions through inclusive stakeholder engagement.

1. Introduction

The high-profile death of Cecil the lion has reinvigorated debates over the role of hunting and hunters in conservation. The combination of this event, a controversial auctioned black rhinoceros hunt in Namibia, and recent public and media outcry has generated renewed calls for increased regulation, supported and advocated by NGO campaigns (Di Minin et al 2016a). These calls have prompted policymakers from the USA and other Western countries to impose tighter restrictions or even complete bans on certain forms of recreational hunting (Goode 2015, Grijalva 2016), and have raised the profile of hunting in recent academic literature. Conservation scientists have expressed concerns that hunting constitutes a threat to African wildlife populations, notably megafauna, especially in tropical regions (Bennett et al 2002, Ripple et al 2016a, 2016b, Benítez-López et al 2017).

However, not all hunting is inimical to conservation. Appropriately managed at sustainable harvest levels, hunting may support efforts to conserve biodiversity, yielding potentially significant positive environmental and socio-economic benefits, both direct and indirect (Brown and Williams 2003, Leader-Williams 2009). Examples of such benefits include protein and revenues from animal products and hunting fees, which underpin the livelihoods of rural communities, provide essential income to landowners and conservation agencies, and support the maintenance of wildlife habitat in areas that would otherwise be converted to agricultural use. In extensive African
wildland regions that are ill-suited to alternative uses such as ecotourism, hunting can and does provide critical economic support to sustain conservation management (Lindsey et al 2006).

Nonetheless, the Cecil incident has highlighted that hunting regulation is a complicated matter. Public calls to restrict recreational hunting are motivated in part by emotional responses and ethical concerns relating to the welfare of non-human animals, against which conventional economic and consequentialist arguments may be regarded as less persuasive (Nelson et al 2016, Macdonald et al 2016a). Recent discussions on the acceptability of trophy hunting as a conservation tool have become highly polarized (Muposhi et al 2016). Influential international environmental groups increasingly oppose all forms of hunting and actively challenge arguments that support it1.

Given these conflicting world views and changing socio-ecological contexts in Africa, what are the implications for future hunting regulation and associated conservation impacts? Related to this question, Macdonald et al (2016b) ask whether existing models of conservation financing that depend on lion trophy hunting revenues can be replaced effectively by a global conservation governance regime that does not. Others question whether hunting bans will protect wildlife and wildlands or simply devalue them and lead to their demise. This article proposes that the answers to such questions are illuminated by analysing the nature of evolving and interacting institutions, informed by contemporary institutional and governance theory.

Building on this notion, and embedded in a complex adaptive socio-ecological systems framework, this contribution explores the interplay between regulatory institutions of African conservation governance and the consequent incentives of hunters to comply with them. It posits that the effectiveness of regulations depends on the socio-ecological context in which they are established2. To explore this proposition and gain deeper insights into the effectiveness of various regulatory measures, I draw on two case studies, namely rhino hunting and lion hunting, in an Africa-wide context. My analysis introduces institutional perspectives by employing principles identified in the emerging field of evolutionary institutional economics (Potts 2007, Beinhocker 2007).

2. Hunting and institutions

Hunting may have either a positive or negative influence on African wildlife conservation, depending on the formal and informal institutions that shape the incentives of hunters within socio-ecological systems. To effectively promote conservation, regulatory interventions—a form of institutional change—should take full account of the incentives that drive human behaviour within these systems (Milner-Gulland 2012). Accordingly, I examine human behavioural motives for hunting and how these may be influenced by regulations and other institutions over time.

2.1. Hunting

Hunting is the active pursuit and harvest of wild animals. Loveridge et al (2006) identify three different types of hunters, based on motivation: (i) subsistence hunters, who seek to acquire food and other useful products for themselves and their immediate families; (ii) market or commercial hunters, who seek to acquire animal products to sell for profit; and (iii) recreational hunters, who enjoy the practice of hunting as a sport or leisure activity, albeit harvesting products such as meat or trophies. Fischer et al (2013a, 2013b) provide more detailed models of hunting motivations and functions, further identifying (iv) hunting for socio-cultural reasons and (v) perceived managerial needs to selectively control animal numbers or eliminate designated problem animals (i.e. culling). These analyses also reveal that motives for hunting are often mixed, confounding simple typologies. Hunting may also take place either legally or illegally. The latter practice, commonly termed ‘poaching’, is typically linked with rural poverty (Duffy et al 2016, Knapp et al 2017).

Within the conservation literature, there are three distinct focal points of discussion relating to hunting and appropriate policy responses. First is the so-called bushmeat crisis (Milner-Gulland and Bennett 2003, Bennett et al 2007), which is driven by expanding nutritional demands of human populations and changes in scale of hunting for meat from subsistence to commercial levels (Fa and Brown 2009, Brashares et al 2011, Lindsey et al 2013). Second is the transnational commercial poaching crisis, typically labelled as the ‘illegal wildlife trade’, which concerns market hunting to harvest valuable products such as elephant ivory, rhino horn and pangolin scales (Warchol 2004, Challender and MacMillan 2014).

The third focal area concerns recreational hunting, including trophy hunting, which is extensively discussed and debated in the literature (e.g. Dickson et al 2009). Some analysts argue that trophy hunting plays a vital supportive role in African wildlife conservation and caution against bans and excessive restrictions; others disagree (Naidoo et al 2016, Jacquet and Delon 2016, Ripple et al 2016c, Di Minin et al 2016b). Muposhi et al (2017, 2016) comprehensively

1 For example, assessments of the economic and conservation contributions of trophy hunting by conservation scientists (Lindsey et al 2007) and consultants representing the hunting lobby (Southwick 2015) have been publicly contested by other economic consultants hired by protectionist groups (Campbell 2013, Murray 2017).

2 Conventionally, conservation regulations are set by government agencies, aimed at private actors, and may relate to a species, a geographic area, or both. Hunting is regulated by issuance of licenses, quota-setting, seasonal or other time-based limits, specification of allowable techniques or equipment, area-based restrictions on access and activity, and outright bans.
review trophy hunting as a conservation tool, detailing problems with illegal hunting, inadequate monitoring systems and hunting bans. They argue that recreational hunting retains potential to incentivize conservation and contribute to rural development, but that more research is needed at local, regional and international levels to inform policy.

Contemporary opposition to hunting, especially trophy hunting, is also motivated by ethical concerns related to animal welfare, animal rights, aesthetics and objections against wildlife commodification (Varner 1998, 2011, King 2005, ‘Sas-Rolfe 2016). These concerns underpin an emerging compassionate movement that emphasizes protection of individual animals in addition to species (Vucetich and Nelson 2013, Ramp and Bekoff 2015), but which is not universally accepted by conservationists (Nelson et al 2016). Moral philosophers note that there are multiple ways to address ethical issues (moral pluralism), that ethical codes vary with culture and context (moral relativism), and that it is problematic to legally enforce ethical principles that are not universally shared (Brennan 2011, Rachels 1993, 2004). Accordingly, ethical approaches may influence public opinion and the positions of specific interest groups, but may not provide a firm basis for universally applicable hunting regulation. However, ethical codes clearly underpin varying informal institutions.

2.2. Institutions

Separate strands of institutional thought within the fields of political science and economics are starting to converge under the influence of evolutionary theory, increasingly recognizing institutions as both structures and processes (Hodgson 2007, Lewis and Steinmo 2012, Potts 2007). Consistent with contemporary approaches, North (1991, p. 97) defines institutions as ‘the humanly devised constraints that structure political, economic and social interaction’, noting that they ‘consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights).’ An evolutionary institutional economics approach examines and elucidates the dynamic interactions between these various institutions and the behaviour of humans motivated by economic incentives, and is grounded in seminal work by North (1990), Ostrom (1990) and Williamson (2000). This work is extended by richer theories of institutional links to socio-ecological systems and polycentric forms of environmental governance (Ostrom et al 2002, Ostrom 2005; 2010, Young et al 2006, Paavola 2007), and illuminated by the important concepts of institutional interplay, fit, scale, and dynamics (Young 2002, 2010).

The core insight to be gleaned from this literature is that setting effective regulation is a complex undertaking. Allocations of rights profoundly influence human behaviour, and regulations do not always guide behaviour in simple and direct ways. Regulators and lobbyists should consider the interplay between institutions at multiple scales and across geographies, and be mindful of how formal institutions interact with informal institutions—i.e. whether rights and regulations are inclusive or serve the vested interests of a minority or elite group. Failure to do so may result in significant second-order effects and unintended consequences that undermine the original intent of the regulations and create collateral and possibly even larger long-term problems. This last point, already well known to economists (Acemoglu 2006, Bastiat 1850), highlights the importance of understanding and anticipating institutional dynamics, and generally supports bottom-up approaches to regulation that involve all relevant stakeholders rather than top-down approaches that do not.

These paradigm shifts are evident in more recent direct applications of institutional and governance theory to African conservation and natural resource management (see Child et al 2008, Barnes and Child 2014, Muchaponwa and Stage 2015) and even specifically to hunting (Fischer et al 2013b). Much of this line of inquiry is nascent and unacknowledged in mainstream conservation science literature. Nonetheless, at least some conservationists recognize the significance of social values and role of political ecology (Jepson and Canney 2003, Adams and Hutton 2007). Accordingly, some academics and practitioners also seek to incorporate social development goals into African conservation policy, invoking the principle of sustainable use of natural resources (Prins et al 2000, Child 2004, McShane et al 2011), while others acknowledge that social values cannot be readily changed for the sake of conservation (Manfredo et al 2017).

Muposhi et al (2016) shed light specifically on African hunting institutions, following a detailed historical review in Zimbabwe. They affirm that hunting has deep traditional roots in human civilization and that many indigenous African communities sustainably regulated their hunting activities by way of customary frameworks (de-marcation of sacred areas, use of totems, and other social norms) throughout pre-colonial history. These institutions were largely displaced during the colonial era and ultimately superseded by the establishment of state protected areas and strictly regulated recreational hunting in designated areas, with access often limited to paying outside visitors.

Social scientists have recently provided insights into underlying social tensions, the significance of power relationships, and mismatch between formal and
informal institutions in other African countries where both legal and illegal hunting is prevalent. These studies highlight that many institutional arrangements for African wildlife conservation and commercial hunting remain inherently socially unstable and that significant reforms may be needed to ensure future sustainability. Much of this instability, it is argued, is linked to a history of dispossession—widespread instances of local communities losing their customary rights to land and wildlife use—and apparent strong desires to reappropriate such rights from the government agencies, national elites, foreign investors, and foreign consumers who currently claim them. Trickle-down economic benefits from existing commercial hunting enterprises are frequently seen as inadequate, and more fundamental devolution of power or transfers of rights may be sought to address perceived past injustices, failing which conservation efforts may be impaired.

As Muchapondwa and Stage (2015) have thus noted, addressing elite capture, stakeholder disengagement and distributional issues remain key issues for African wildlife conservation governance. In the realm of hunting, two additional issues emerge. The first pertains to an alternative method of producing hunting stock: intensive and selective breeding, which has been enabled by the development of wildlife market institutions and raises new concerns for conservationists. The second relates to complex interdependent interactions between hunting and wildlife trade regulation, and the conservation consequences thereof. Both issues are highlighted in the following two case studies.

3. Case studies

To gain a deeper understanding of institutional dynamics and interplay in relation to contemporary African hunting regulation, I consider rhinos and lions as illustrative subjects. The details of these case studies were obtained by research and participant observation, the latter through direct engagement of the author with policy analysis and consultation on both topics. Given sensitivities related to these cases, not all relevant supporting data are available in the public domain, especially not in peer-reviewed literature; accordingly, most of the facts are presented generally and qualitatively rather than specifically and quantitatively. This section deals only with key aspects relevant to the research approach. Further background information is provided in supplementary appendices A and B available at stacks.iop.org/ERL/12/115007/mmmedia.

The two cases share a few significant characteristics. Both rhinos and lions play key functional ecological roles and are popular icons among trophy hunters, eco-tourists, the wildlife media, conservationists and animal welfare activists alike. Because they are potentially dangerous to humans, neither are compatible with human settlement outside of more remote rural areas, and they may be targeted for removal as problem animals.

Previously widely hunted for sport under open access regimes during colonial times, rhinos and lions are now largely restricted to protected or managed areas in which hunting is either forbidden or tightly regulated. Both also have a unique history in South Africa, where the development of market institutions such as private property rights and live animal trade has engendered novel commercial breeding practices. This has resulted in more rapid population recovery rates, but also led to tensions between private owners and the state, the former having successfully overturned in the courts government attempts to restrict activities for both animals (domestic rhino horn trade and ‘put-and-take’ lion hunting).

In both cases, four distinct informal institutional constellations are apparent: (i) rural African people who share their environment with these animals and have developed customary attitudes toward them, (ii) pragmatic conservationists and private landowners who embrace hunting and other forms of sustainable use, (iii) modern (typically urban) compassionate conservationists who reject sustainable use and support bans, and (iv) traditional markets for rhino and lion body parts (used for medicinal and ornamental purposes, often linked to culture or prestige). These informal institutions interact with formal institutions of wildlife protection and management. Whilst these vary between jurisdictions, they typically follow a standard regulatory model, as exemplified by the Convention on International Trade in Endangered Species (CITES), of which all relevant countries are signatories. To the extent that they vary, some countries claim state ownership of wildlife, whereas others treat it as res nullius (unowned property), with some enabling the devolution of use rights to local authorities. South Africa is the most extreme outlier, enabling full private ownership rights over certain wild animals.

3.1. Rhino hunting

Populations of both African rhino species were abundant and widespread prior to the 19th century arrival of significant numbers of European colonial settlers with guns (Martin and Martin 1983). Treating wildlife as an open access resource, early settlers hunted rhinos extensively for sport, harvesting their meat for food and their horns for trade, sometimes co-opting local Africans as collaborators. Following drastic declines in African big
game numbers, elite Western lobby groups inspired by hunters initiated the international conservation movement in the early 20th century (Jepson and Whittaker 2002). Rhinos benefited from the consequent creation of protected areas and game laws; sport and meat hunting largely ceased. However, rhino horn continued to be valued in Asian markets, inducing illegal market hunting. This prompted a 1977 international rhino horn trade ban under CITES. Initially considered a failure, the CITES trade ban finally appeared to contain poaching levels by 1995, by which time significant consumer countries had acceded to the convention and banned domestic trade.

South Africa’s rhino populations, close to extinction by 1900, recovered impressively during the second half of the 20th century. To achieve this, South Africa adopted a formal institutional model, grounded in sustainable use principles, that enabled both state and private land-owning entities secure and beneficial property rights over individual animals, further allowing regulated commercial trophy hunting and market trade in live animals and their products (‘T Sas-Rolfes 1990). This arrangement enabled both private and public operations to gain additional conservation finance, generated widespread economic benefits, and facilitated significant expansion of rhino range. This contrasted sharply with most other African countries, which maintained strict regulations and hunting bans, but mostly lost their wild populations during this time.

Following resurgent demand and associated rising market prices for rhino horn, from 2003 visiting Asian nationals started masquerading as trophy hunters to exploit the only legal means to export horns out of South Africa. The South African government responded by imposing tighter restrictions on a range of rhino-related activities, including hunting, and a moratorium on the domestic trade in rhino horn. Some wildlife industry participants responded to these restrictions by engaging in illegal practices, and the period 2007–2014 was characterised by a dramatic increase in rhino poaching and spread of related illegal activity across the country and internationally. This period is remarkable for the adaptability and ingenuity displayed by illegal market actors in response to evolving formal attempts to thwart their activities. The illegal market drew in many people, from impoverished rural locals to transnational organised crime syndicates, and involved numerous cases of corruption (Hübshle 2017).

From 2015, rhino poaching levels appeared to stabilize, but this was achieved only with substantial investment in militarized security measures, and poaching pressure remained high. Social scientists warned that this approach alienated local communities, was neither financially nor socially sustainable, and could result in deleterious long term consequences for wildlife conservation (Annecke and MasUBELE 2016, Duffy 2015). Private owners, who harboured a growing portion of the rhino population (more than a third by 2017), mostly supported legalizing the horn trade, hoping to reinforce the successful 20th century sustainable use approach (Rubino and Pienaar 2017). However, an increasing number of privately-owned rhinos were being selectively bred under semi-extensive conditions, outside their core historical range, raising concerns about their long-term conservation role. Although private breeders eventually succeeded in rescinding the domestic trade moratorium, prospects of lifting the international CITES ban remained poor, preventing easy access to Asian consumer markets. NGOs mostly opposed legalizing rhino horn trade and objected to the emergence of rhino farming, with many also campaigning against continued trophy hunting.

3.2. Lion hunting

Once widespread throughout Africa, lion populations have declined due to encroaching human agriculture and settlement, to the point where their future elicits great concern among conservationists (Bauer et al 2015). Lions are killed for sport by (mostly foreign) trophy hunters and for socio-cultural and retaliatory reasons by local Africans such as Maasai warriors (Hazzah et al 2009). In recent decades, lion trophy hunting has become increasingly regulated, if not banned altogether, in most African countries. The Cecil incident highlighted the occurrence of regulatory infractions, prompting conservation biologists to emphasize that exceeding established quotas may have serious negative impacts on lion population dynamics (Loveridge et al 2016).

As with rhinos, the South African institutional environment enabled the development of a commercial lion breeding and hunting industry. Initially intending to supply zoos and safari-parks, captive lion breeders started supplying ‘put-and-take’ trophy hunting ventures, which galvanized protests from animal welfare activists. Already firmly established by 2007, this industry also started supplying lion skeletons, as a by-product from trophy hunts, to Asian export markets. Following evidence that lion bones were being used as substitutes for tiger bones in traditional Asian medicines, conservationists raised concerns that such trade could stimulate commercial poaching of wild lions, but found no evidence that this was happening in South Africa (Williams et al 2015).

Following Cecil’s death and a coordinated campaign against commercial captive breeding, activist NGOs persuaded several Western governments to implement trophy import bans. Most notable among these was a 2016 US ban on the import of trophies from captive-bred South African lions. This ban had a potentially significant impact on the economic viability of both lion breeding and trophy hunting, given that more than 95% of lions hunted in South Africa at the time were captive bred. A further NGO-led attempt to ban all international commercial lion trade under CITES failed. Instead, South Africa’s government negotiated to maintain an annual legal lion skeleton
export quota, supplied from captive bred lions only. No other international trade in wild lion body parts, aside from some hunter trophies, was permitted.

The South African government undertook to review its export quota annually, applying an adaptive management approach subject to the results of research on the conservation impact of wild lions. Although captive-bred lions are considered unsuitable for reintroduction into the wild (Hunter et al 2013) and therefore considered by the US government to have no conservation value, they may play a vital (as yet poorly understood) buffer role for wild populations (Lindsay et al 2012). Experience from the rhino case suggests that reactive attempts to stifle legal commercial activity may have unintended consequences that are ultimately detrimental for conservation. A comparative institutional analysis suggests that a complete ban on lion hunting since 1977 in Kenya failed to prevent the decline of wild populations in that country (Nelson et al 2013). By contrast, in 2015 South Africa appeared to be the only country in which all wild lion populations were increasing (Bauer et al 2015).

4. Discussion

The rhino and lion hunting case studies affirm that hunting regulation is not a simple matter. In these cases, hunting motivations vary from recreation (trophy hunters) to profit (poachers), modulated by informal institutions. The varying socio-cultural attitudes of local African people interact with those of pragmatic conservationists, animal product consumers and protectionist proponents of bans on hunting and trade. Formal institutions at global scale, such as CITES, do not easily accommodate these partly conflicting informal institutions, the influence of which varies regionally and changes over time. For example, pragmatic conservation has tended to dominate policy in Southern African countries since the 1960s, whereas Kenya’s policies have been increasingly dominated by protectionist thinking since the 1977 bans on hunting and international rhino horn trade. Significantly, Kenya supports a regulatory approach that is more closely aligned with influential international NGOs and governments of western countries that tend to dominate CITES policy decisions.

In a similar analysis of elephant hunting, Carruthers (2010) affirms the rising influence of emotional animal welfare concerns on policy toward elephant conservation and management. These concerns reflect evolving social norms: dynamic informal institutions that may over time engender formal institutions. There is clear evidence of a growing social movement that opposes all forms of wildlife hunting, especially of charismatic and threatened African megafauna, on ethical grounds. This movement consistently lobbies for tighter regulations and outright bans to supplement existing legislation and treaties such as the US Endangered Species Act and CITES, and appears to be gaining traction in countries that have traditionally embraced sustainable use policies.

To the extent that the anti-hunting movement succeeds in eliminating legal markets, it may inadvertently foster the growth of illegal markets, with potentially undesirable consequences for conservation. For example, if local rural people who benefit economically from trophy hunting lose their vital income source following a hunting ban, they may be tempted to hunt illegally to supply animal product markets. This case reflects such dynamic interplay between regulatory and market institutions. Market institutions, both legal and illegal, provide support to existing cultural preferences and mediate conflicts between competing consumer demands, albeit not necessarily in ways that align with public policy goals. For example, private rhino and lion breeders in South Africa cater variously to demands from eco-tourists, trophy hunters and consumers of body parts, providing relevant products to each, even if illegally.

The case studies demonstrate the significance of property rights and prices as components of market institutions. Secure property rights that provide revenue-earning potential appear to be correlated with conservation success, whereas insecure or heavily restricted rights appear to discourage conservation: contrast the fate of rhinos on private conservation land in South Africa with those on state land in most other African countries. However, the cases also reveal that if property rights for valuable animals are not easily secured in the wild, private owners may attempt husbandry under more intensive and less humane conditions, thus moving away from desirable conservation and social objectives. Market prices—legal and illegal—serve as indicators of consumer preferences and their responses to changing conditions, providing potentially useful information about relative scarcity over time (Hayek 1945), which may stimulate and guide private entrepreneurial action. Rising black market prices for harvested wildlife products signal strong incentives for intensified poaching and supporting illegal activity, as revealed by the rhino case, and provide a cautionary signal in the case of lion bone trade.

5. Conclusion

Evolutionary economic analysis suggests that strict regulations and complete bans on hunting and trade will fail in the absence of appropriately aligned formal and informal institutions, and possibly even result in perverse effects for conservation. Kenya’s long-standing hunting and trade bans, strongly supported by international NGOs, have failed to prevent substantial wildlife losses and may have even facilitated them in the face of strong incentives to convert wildlife habitat to conventional agricultural uses (Norton-Griffiths 2010, Ogutu et al 2016). This stands in stark contrast
with southern African countries that have employed the sustainable use approach: by enabling regulated and culturally appropriate commercial wildlife harvesting with meaningful benefits flowing to relevant local people, they have witnessed impressive expansion of managed wildlife habitats (Child et al 2012, Child and Child 2015).

With economic development as a political imperative (Kinzig and McShane 2015) and ongoing shortfalls in global conservation funding (McCarthy et al 2012), institutions that raise the economic profitability of legal ownership and management of living wild animals relative to the profitability of illegal harvesting—and channel the benefits to relevant private actors and local communities—seem most likely to succeed in Africa. In this regard, appropriately governed and managed commercial hunting activities may still play a pioneering developmental role in regions that are less suited to other forms of land use, such as conventional agriculture or ecotourism (Child 2000). Conversely, if the growing international anti-hunting lobby succeeds in further restricting existing sustainable commercial hunting activities without providing alternative and culturally appropriate sources of income for relevant local people, conservation is likely to suffer.

This research suggests that future changes to hunting regulation should take greater account of institutional dynamics and interplay across different scales, sectors and geographies. Regulators should consider how informal institutions might shape the incentives and consequent responses of relevant stakeholders, all of whom should ideally be involved in the formulation of inclusive formal institutions that acknowledge hunter motivations. Although more complex, such arrangements are likely to be more socially sustainable and beneficial for conservation. Finally, the rhino and lion hunting case studies suggest further avenues for future research: (i) more specific investigations of the role of property rights, prices and benefit flows in shaping adaptive responses to regulatory change, and (ii) more penetrating comparative institutional analyses of conservation performance between different jurisdictions, relating this to hunting, trade and market metrics.

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