Poaching is more than an Enforcement Problem

Daniel W.S. Challender & Douglas C. MacMillan

Durrell Institute of Conservation and Ecology (DICE), University of Kent, Canterbury, Kent CT2 7NR, UK

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Correspondence
Daniel W. S. Challender, Durrell Institute of Conservation and Ecology, Marlowe Building, University of Kent, Canterbury, Kent, CT2 7NR, UK. Tel: +44-7745-547585.
E-mail: dc344@kent.ac.uk

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Abstract

Today record levels of funding are being invested in enforcement and antipoaching measures to tackle the "war on poaching," but many species are on the path to extinction. In our view, intensifying enforcement effort is crucial, but will ultimately prove an inadequate long-term strategy with which to conserve high-value species. This is because: regulatory approaches are being overwhelmed by the drivers of poaching and trade, financial incentives for poaching are increasing due to rising prices and growing relative poverty between areas of supply and centers of demand, and aggressive enforcement of trade controls, in particular bans, can increase profits and lead to the involvement of organized criminals with the capacity to operate even under increased enforcement effort. With prices for high-value wildlife rising, we argue that interventions need to go beyond regulation and that new and bold strategies are needed urgently. In the immediate future, we should incentivize and build capacity within local communities to conserve wildlife. In the medium term, we should drive prices down by reexamining sustainable off-take mechanisms such as regulated trade, ranching and wildlife farming, using economic levers such as taxation to fund conservation efforts, and in the long-term reduce demand through social marketing programs.

Introduction

Poaching and illicit trade in high-value species in demand in East Asian markets, including the tiger (*Panthera tigris*), pangolins (*Manis* spp.), elephants and rhinoceroses, is currently increasing or at conspicuous levels, for use as medicine, luxury foods and curios (Challender 2011; NTCA 2012; Biggs *et al.* 2013; Underwood *et al.* 2013). As demonstrated at CoP16 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in March 2013, strong support exists within the international community, backed by animal welfare and conservation NGOs, to counter this problem by strengthening enforcement of trade regulations and establishing trade bans (Thorson & Wold 2010; O'Criodain 2011; Duffy 2013; EIA 2013). This is exemplified in policy briefings and powerful marketing communications, for example, "*Ban the trade, burn the ivory, stop elephant poaching*" (Born Free 2013), to mobilize public support for this policy (also see Stiles 2004; Born Free 2007; Duffy 2013; EIA 2013).

However, trade restrictions agreed through CITES are failing in many instances. Despite near universal accession to the Convention (currently 179 member countries or "Parties"), high volumes of illegal trade in CITES-listed species take place annually, which is currently worth an estimated US$20 billion globally, and is having a serious and seemingly unsustainable impact on species of high conservation value (see Rosen & Smith 2010; Phelps *et al.* 2011; South & Wyatt 2011; Duckworth *et al.* 2012; Stoner & Pervushina 2013). Indeed, despite nearly 40 years of regulation, CITES boasts few measurable conservation successes and these are generally characterized by local community engagement in combination with regulated trade, as opposed to strict prohibitions under trade bans (see Jenkins 2000; Martin 2000; Jenkins *et al.* 2004; Amin *et al.* 2006; McAllister *et al.* 2009).

In this article, we argue that focusing principally on enforcement and antipoaching measures, or the metaphorical "war on poaching" as it is frequently termed (see Neumann 2004), risks making the same mistakes as the "war on drugs" approach, which failed despite increasing enforcement effort (see Poret & Téjédo 2006; Werb *et al.* 2013), as it is typically grounded in ethical concerns and western perceptions of the killing of animals, rather than an adequate understanding of the real drivers of poaching and illegal trade. Using mainly economic arguments, supported by data where appropriate, we assert that pervasive and powerful market forces in China and the Far East, coupled with crippling poverty in source areas, may overwhelm future enforcement efforts especially in countries where implementation is undermined by corruption and weak governance. Consequently, international funds should be increasingly directed toward a broader range of interventions in a multifaceted approach that directly address the drivers of illicit trade. These interventions include a commitment to end rural poverty in wildlife source countries by introducing generous development benefits for local communities to incentivize them to protect and/or sustainably manage wildlife populations, a resumption of carefully regulated trade in high-value species where appropriate, using tax revenues to support sustainable management and encouragement for research and development of wildlife farming and ranching, and major investments in demand reduction social marketing programs in nations such as China.

Why poaching is more than an enforcement problem

The principal approach to addressing poaching of wildlife for international trade has to date been regulatory, relying on individual Parties enforcing CITES (Hutton & Dickson 2000; Broad *et al.* 2003). Entering into force in 1975, CITES was conceived in recognition of the threat international trade poses to the survival of species and functions by regulating or prohibiting international trade in c.35,000 species, to ensure that it is not detrimental to their survival in the wild (Wijnstekers 2011; CITES 2013). It does so by listing species in one of three appendices and restricting trade using a combination of trade controls and bans, implemented through national legislation and enforcement mechanisms of its Parties (Reeve 2002; CITES 2013).

Despite existing investment in enforcement and antipoaching measures however, illicit international trade in many CITES-listed species is currently increasing or is at record or conspicuous levels (e.g., Rosen & Smith 2010; Challender 2011; Milliken & Shaw 2012; NTCA 2012; Underwood *et al.* 2013) and there is growing recognition that existing interventions maybe insufficient to curb poaching (e.g., Drury 2011; Veríssimo *et al.* 2012; Biggs *et al.* 2013). Table 1 lists some of the more valuable species that are being affected by illegal trade, despite being CITES-listed, and in some cases despite huge sums being invested in enforcement. For example, despite historical investment in antipoaching and the commitment of US$113.8 million by tiger range states to directly tackle poaching over the first 5 years of the Global Tiger Recovery Programme (GTRP), which aims to double the number of wild tigers globally by 2022, tiger populations are continuing to decline (GTRP 2012). This is exemplified in India, a tiger stronghold, where the number of tigers poached for trade hit a record high in 2012 (NTCA 2012; Stoner & Pervushina 2013). Equally, Chinese and Sunda pangolin populations are estimated to have fallen rapidly in recent decades, in the case of the Chinese pangolin (*Manis pentadactyla*) by greater than 94% in China and its border regions since the 1960s (Wu *et al.* 2004; Duckworth *et al.* 2008). Similarly, the Asiatic Black Bear (*Ursus thibetanus*) is threatened by international trade in its parts (e.g., gallbladder and paws), contributing to recent estimated population declines globally of 49% (Garshelis & Steinmitz 2008). Although global populations of African elephant (*Loxodonta africana*) and White rhino (*Ceratotherium simum*) are not declining, they are currently subject to record levels of poaching, for ivory and rhino horn, respectively (Biggs *et al.* 2013; Underwood *et al.* 2013) and some national populations are decreasing as a result, for example, Tanzania (TAWIRI 2010). Equally, it is forecast that at current rates of increase in rhino poaching, populations of the White rhino in South Africa, which holds roughly 93% of the global population, could be extinct by 2025 (Ferreira *et al.* 2012; Martin 2012).

Although these species are highly valued alive and in situ by conservationists, largely for their existence value, they are equally in demand by those seeking to profit from them through lethal harvesting, be this for financial profit or sociocultural or livelihood reasons (e.g., t'Sas-Rolfes 2000; Roe *et al.* 2002; Donovan 2004; Biggs *et al.* 2013). In our view, the decision to reduce the complex social, cultural, and economic nature of wildlife trade into a simple law enforcement problem therefore fails to address the underlying drivers of poaching and trade (Velasquez Gomar & Stringer 2011). It also lacks legitimacy in source countries where it typically translates into disincentives for rural people to conserve wildlife and conflicts with local livelihood strategies, traditional practices, and cultural norms (e.g., Roe *et al.* 2002; Donovan 2004; TRAFFIC 2008; Abensperg-Traun *et al.* 2011; MacMillan & Nguyen 2013). Although CITES has adopted provisions to consider potential impacts of listing-decisions on livelihoods of the poor (e.g., Res Conf. 8.3; Rev. CoP15), it does so only in implementation terms and not in decision-making, which remains focused on establishing trade controls (Mathur 2009;

Table 1 Ten high-value CITES-listed species subject to on-going illicit international trade

Species							
Common name	Scientific name	IUCN Red List status	CITES Appendix	Population trend (taken from IUCN Red List)	Poaching pressure	Estimated retail value (USD)	Price trend
Tiger*	*Panthera tigris*	EN	I	Decreasing	Increasing	50,000/animal	–
Chinese pangolin†	*Manis pentadactyla*	EN	II	Decreasing	Increasing	1,550/animal	Increasing
Sunda pangolin†	*Manis javanica*	EN	II	Decreasing	Increasing	1,550/animal	Increasing
Musk deer‡	*Moschus spp.*	EN/VU	I/II	Decreasing	Persistent	250,000 kg^{-1}/musk	Increasing
Saiga antelope§	*Saiga tartarica*	CR	II	Decreasing	Persistent	877 kg^{-1}/horn	Increasing
Snow Leopard¶	*Panthera uncia*	EN	I	Decreasing	Persistent	73–1,670 kg^{-1}/ bone, ≤10,000/skin	–
White rhinoceros**	*Ceratotherium simum*	NT	I/II	Increasing	Increasing	65,000 kg^{-1}/horn	Increasing
Asiatic Black bear††	*Ursus thibetanus*	VU	I	Decreasing	Persistent	110-109,700 kg^{-1}/ gallbladder, 710/paw	–
African elephant‡‡	*Loxodonta africana*	VU	I/II	Increasing	Increasing	6,500 kg^{-1}/ivory	Increasing
Sumatran Rhino**	*Dicerorhinus sumatrensis*	CR	I	Decreasing	Persistent	65,000 kg^{-1}/horn	Increasing

*Increasing poaching pressure based on NTCA (2012) and Stoner & Pervushina (2013), estimated retail value based on Moyle (2009); reliable data on retail prices over time unavailable.
†Poaching pressure, prices, and price trends based on Challender (2011; unpublished data).
‡Estimated retail value, price trend, and poaching pressure based on Homes (1999) and Meng *et al.* (2012).
§Poaching pressure, estimated retail value, and price trend based on von Meibom *et al.* (2010).
¶Poaching pressure and estimated retail value based on Theile (2003) and EIA (2012); reliable data on price over time unavailable.
**Poaching pressure, estimated retail value, and price trend based on Biggs *et al.* (2013) and Orenstein (2013). Price of Asian rhino horn estimated at the equivalent of African horn.
††Prices based on Foley *et al.* (2011) and Challender (unpublished data) and poaching pressure on Garshelis & Steinmitz (2008); accurate data on retail price over time unavailable.
‡‡Poaching pressure based on increasing levels of trade (e.g., Underwood *et al.* 2013) and declining populations (e.g., TAWIRI 2010). Stated price is for 2008 though current prices are understood to be higher based on Wittemyer *et al.* (2011) and Orenstein (2013).

Abensperg-Traun *et al.* 2011; Cooney & Abensperg-Traun 2013). As a result, there is a marked dichotomy between globally defined conservation strategy and socioeconomic reality in developing countries (Broad *et al.* 2003; Abdullah *et al*. 2011; Velasquez Gomar & Stringer 2011).

Similarly, at the other end of the trade chain, regulation does little to address consumer demand, especially in status-conscious markets in East Asia where demand for species such as those in Table 1 is strongest. This is despite studies suggesting that changes in demand for wildlife products have been more effective in controlling trade, leading to population recovery, than a purely regulatory approach (see IUCN 2001; Stiles 2004; Phillip *et al.* 2009). Rising prices and increased levels of off-take for high-value species indicate that demand may also be growing and an understanding of consumer demand is therefore crucial in terms of predicting the efficacy of enforcement action (Table 1; Wittemyer *et al.* 2011; Underwood *et al.* 2013). For example, if demand for high-value species or their derivative products is price-inelastic, that is quantity of a given product consumed changes little with a proportionate increase in price, which although is difficult to quantify has been suggested for Rhino horn (see Biggs *et al.* 2013), this could lead to large increases in price, but

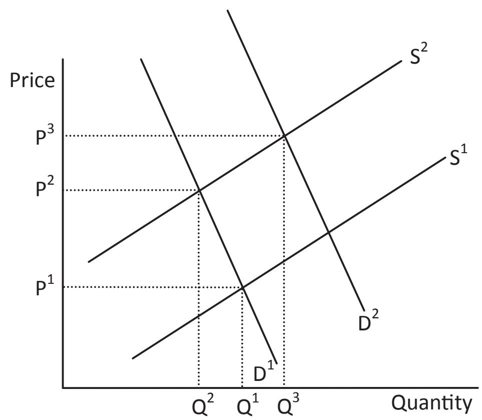

Figure 1 Enforcement shifts supply to the left (from S^1 to S^2) but there is little change in quantity consumed (Q^1 to Q^2) but a large increase in price (P^1 to P^2). An increase in demand due to rising incomes shifts the demand curve to the right (D^1 to D^2) that leads to further prices increases (P^2 to P^3) and an increase in the quantity illegally traded and consumed (Q^2 to Q^3). Price-inelastic demand is represented by the near vertical demand curves.

have only a minor impact on the quantity of the good demanded (see IUCN 2001; MacMillan & Han 2011; Conrad 2012). Figure 1 illustrates the consequences of enforcing a trade ban on prices where demand is growing and is inelastic, represented by the near vertical demand curve. While enforcing a trade ban causes a reduction in supply, represented by a shift in the supply curve from S^1 to S^2, there is little change in quantity consumed, from Q^1 to Q^2, but a large increase in price from P^1 to P^2. Growing price-inelastic demand, represented by a shift in the demand curve from D^1 to D^2, leads to even higher prices, P^3, and an increase in quantity illegally traded and consumed, Q^3—a combination that inevitably points toward an extinction pathway.

Although obtaining market information is difficult due to the clandestine nature of illegal trade, where available it suggests prices for high-value species and their derivatives are rising, which, in turn, is leading to higher poaching incentives (Table 1; Wittemyer *et al.* 2011; MacMillan & Nguyen 2013). This is largely as a result of growing and potentially price-inelastic demand from the burgeoning metropolises of East Asia, where urban elites seek to consume wildlife as "luxury" wild meats, as ingredients in traditional medicines, and as curios (Anon 2010; Nijman 2010; Drury 2011). For example, the retail price of rhino horn in Vietnam, which evidence suggests largely comprises African rhino horn (e.g., Milliken & Shaw 2012) has reportedly increased to US\$65,000 kg^{-1} in recent years, substantially higher than comparable prices in preceding decades in Asia, the retail price of pangolin scales (kg^{-1}), used in traditional medicines, increased more than 30-fold in China between 1992 and 2012 (Challender, unpublished data), while similarly, prices for ivory have reportedly doubled in recent years both in end markets and source areas (Wittemyer *et al.* 2011; Orenstein 2013) and evidence suggests that prices for other high-value derivatives are also increasing (Table 1).

The growing relative poverty gap between source areas for high-value wildlife and end markets is also crucially important in understanding current levels of illegal trade. High economic growth rates in China, Vietnam, and Taiwan, averaging in excess of 7% in the last 2 decades (IMF 2012), contrasts sharply with the economies of major source countries for ivory for example, in East Africa. For instance, Chinese GDP per capita in 2012 was US\$6,188.19, approximately 10 times that of Tanzania (US\$608.85) and 5 times that of Kenya (US\$864.74) based on World Bank (2013) figures. Similarly, Figure 2 shows the increasing disparity between key end-markets for ivory, China, and Thailand, where increasing numbers of people now have the financial means to acquire ivory, and major source countries, Kenya, Tanzania, and Zimbabwe (Underwood *et al.* 2013). Growing relative poverty within Asia is also an important factor in understanding current dynamics of illegal trade and is working against antipoaching measures. Economic growth rates in more remote, rural areas, where much remaining biodiversity survives, are generally much lower and this generates pressure on wildlife resources as villagers try to "keep up" and increasingly seek the trappings of wealth in a global economy (e.g., mobile phones, televisions, cars, motorbikes, and designer clothes; see Anon 2004, MacMillan & Nguyen 2013).

Using Vietnam as an example, Figure 3 shows economic growth per capita for selected urban and rural provinces here between 1996 and 2010. Growth has been much stronger in the main urban centers of Ho Chi Minh (HCM) city and Hanoi than in the rural provinces where highly valued species such as pangolins may be found (Anon 2004). In Hanoi and HCM city, the economy is being driven by high-growth modern industries in the finance and high tech sectors, whereas rural areas remain heavily dependent on primary production. Although food prices have risen significantly in the last year, this decade has seen food prices at their lowest level in 4 decades in real terms (The Economist 2007) and to small-scale farmers who are struggling to keep up, the capture and sale of wildlife represents a relatively easy way of earning disposable income to buy sought after commodities (MacMillan & Nguyen 2013).

Implementing sustained and determined enforcement action to protect highly valued CITES-listed species, especially enforcing trade bans, is not inherently effective either. This is because it is increasingly driving trade "underground" and into the hands of highly organized criminal syndicates attracted by the high profits available, and who have the know-how to avoid legal penalties given their experience in other illicit trades such as smuggling people and drugs ('t Sas-Rolfes 2000; Leader-Williams 2003; Zimmerman 2008; South & Wyatt 2011; Conrad 2012). Although reliable data on the profitability of illicit trades are difficult to obtain, increases in the price of rhino horn were apparent following the 1977 rhino trade ban, as was speculative stockpiling due to the apparent high profits that could be made ('t Sas-Rolfes 2000), and more recently following the government crackdown on whaling in South Korea in 2004 (MacMillan & Han 2011). The engagement of organized criminality is important because criminal gangs can quickly funnel wildlife into booming demand centers based on their know-how, their resources to bribe officials at all levels, and their willingness to use violence and other forms of intimidation where necessary to coerce local people into poaching and smuggling wildlife. What is more, in instances where arrests are made, fines can be relatively trivial in relation to the size and profitability of the business and therefore do not act as a deterrent (Wellsmith 2011; St. John *et al.* 2012). Yet, even where substantial fines are issued, they may easily be paid. For example, in a recent pangolin smuggling incident, the perpetrator

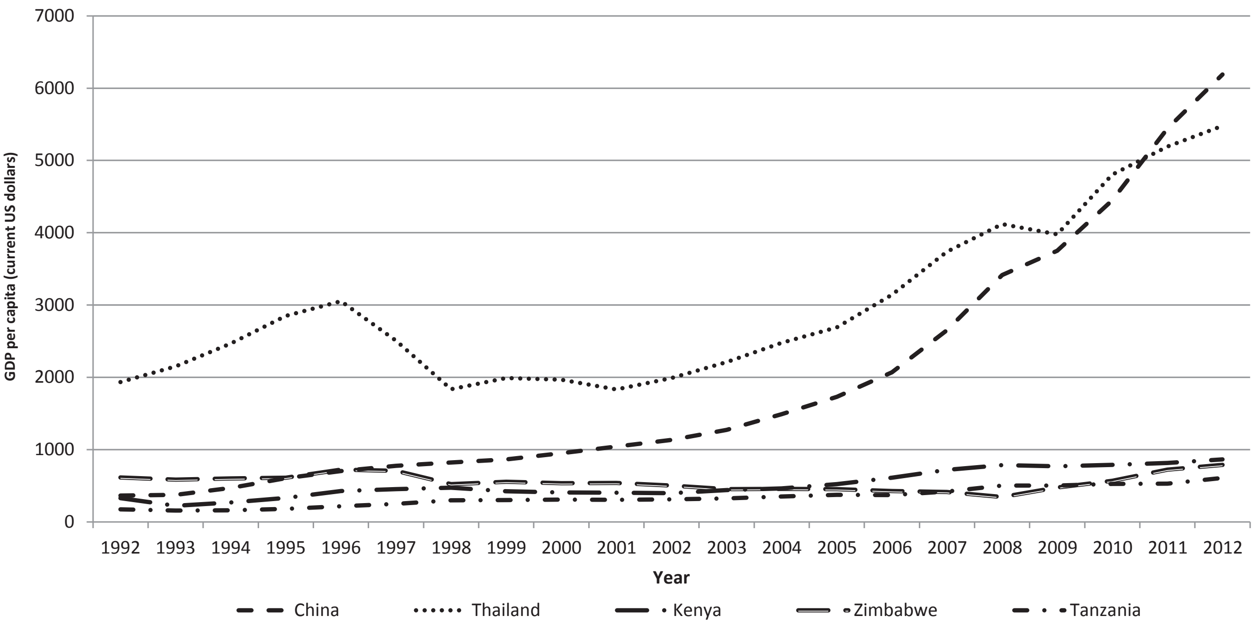

Figure 2 Changes in GDP per capita (current U.S. dollars) between selected key markets for elephant ivory (China and Thailand) and primary source countries (Kenya, Tanzania, and Zimbabwe) between 1992 and 2012 (Source: World Bank 2013).

was fined US$75,000 for trading pangolins (with a retail value in China of over US$170,000) and the fine was paid in full, in cash within hours of arrest (Hance 2012).

Toward a multifaceted international response

In our view, there is a compelling case to consider a change in approach to combat poaching of high-value wildlife that should reflect the real drivers of illegal trade by acknowledging market conditions, consumer preferences for wildlife products, species' biology and ecology, and the socioeconomic needs of communities at the local and national level. In this section, we outline possible short-, medium- and longer-term strategies that would favor proconservation outcomes over poaching.

In the short-term local communities living in the vicinity of high-value species offer the best chance of conserving them (e.g., Roe 2011; MacMillan & Nguyen 2013). Despite the threat of legal sanctions, the poaching and sale of wildlife remains an attractive option to local people who seek greater disposable income, may have a long cultural association with hunting but who may also be intimidated into poaching by organized criminal gangs (TRAFFIC 2008; MacMillan & Nguyen 2013). In order to encourage local communities to conserve rather than kill valued species, we need to provide incentives that help them meet their livelihood expectations (Aziz *et al.* 2013; Harihar *et al.* 2014). These incentives could take many forms, including but not limited to, greater disposable income, retraining, local empowerment, secure tenure over land and resources, better access to health and educational services and payments for conservation services. These demands could be met by the state as well as nonstate actors based on performance in managing or protecting species, even protecting wildlife in a fort-holding approach where appropriate, and which could be validated by periodic population surveys (MacMillan & Leader-Williams 2008; Zabel & Holm-Muller 2008; Dinerstein *et al.* 2012; Duckworth *et al.* 2012; Harihar *et al.* 2014). Critically, in developing these community conservation packages, we must look beyond compensation payments based on opportunity costs, which may not always incentivize conservation (Harihar *et al.* 2014), and look to create prosperity locally from managing the conservation of high-value wildlife, such is the case in the Ngorongoro crater, Tanzania. Compensation in return for losses associated with living with endangered species has become an established practice (e.g., livestock predation), yet even when payments are paid in full and in a timely manner, it begs the question why do we restrict payments to relatively small sums as compensation for losses, or opportunity costs, such as labor? Instead, why not pay local communities much more in order to reflect the value of the service they would provide by protecting species that are highly valued globally? Willing-to-pay studies have shown

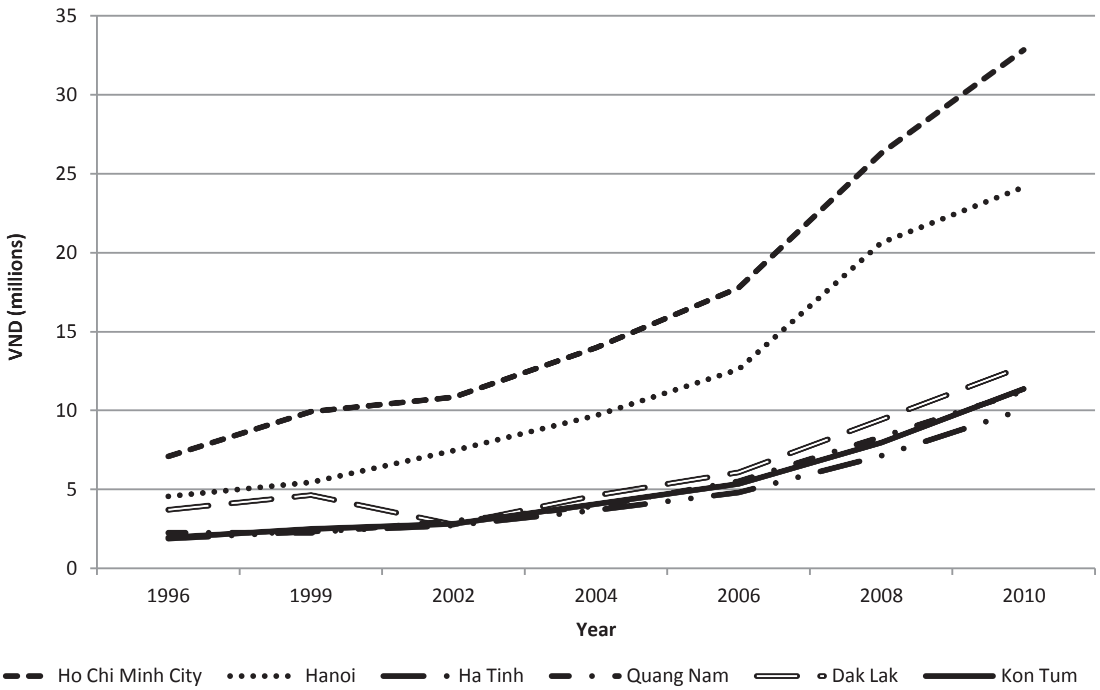

Figure 3 Annual average income per capita (VND millions) for selected urban (Ho Chi Minh City and Hanoi) and rural provinces (Ha Tinh, Quang Nam, Dak Lak and Kon Tum) in Vietnam between 1996 and 2010 (Source: Vietnam Households Living Survey Standards 1996-2010).

that the conservation or "existence" value of wildlife is considerably higher than its value as a commodity, the opportunity costs of coexistence, or as an extinct species (MacMillan *et al.* 1996; MacMillan *et al.* 2004; Ninan 2007). We therefore assert that mechanisms to more generously reward local communities for partnership in conservation should be established. Such approaches would likely be affordable, efficient, and once introduced would undermine the economic incentive for poaching locally, while enforcing resource and land rights would offer security against poachers coming in from outside.

Incentives need not be restricted to economic benefits either as they do not have inherent universal appeal especially where the targets of the policy are those with relative wealth or already endowed with hunting rights (e.g., MacMillan & Philip 2010). However, understanding and working with local cultures and beliefs can create significant opportunities for conservation. For example, a successful approach may necessitate local traditional hunting activities to ensure local elites, who have traditionally had major roles in hunting, "buy in" to conservation (MacMillan & Nguyen 2013). Or, as in the case of the Tibetan antelope (*Pantholops hodgsonii*), a marked reduction in poaching following stronger policing of the Shahtoosh trade by Chinese authorities in the 1990s was underpinned by strong support from Tibetan communities involved in antipoaching patrols.

The mainstream adoption of this strategy would represent a radical shift from an enforcement geared approach, at ever increasing cost, to more community-based natural resource management (CBNRM), an approach that has previously proven key to conservation successes in the past. A resounding example is the recovery of the Vicuña (*Vicugna vicugna*) in South America (McAllister *et al.* 2009). In Peru, for example, local campesino communities, in return for jobs, the construction of a school, and income from the sale of Vicuña products, bought in to conservation of the species over which they were eventually given tenure and property rights, which ultimately contributed to a reduction in poaching (Wheeler & Domingo 1997). Although the Parties to CITES have recently reiterated the importance of local community livelihoods in regulating trade, with the adoption of Resolution 16.6 (CITES and livelihoods), it is essential that this policy is converted into action with livelihoods given greater attention in listing decisions, implementation and funding. While we recognize that a community-based approach is not a panacea against sophisticated criminal gangs, this new strategy will remove the disincentives to conserve wildlife under current regulatory systems and may offer the best chance of conserving high-value species in the short term (Hutton & Leader-Williams 2003; Dickman *et al.* 2011; Clements *et al.* 2013; MacMillan & Nguyen 2013).

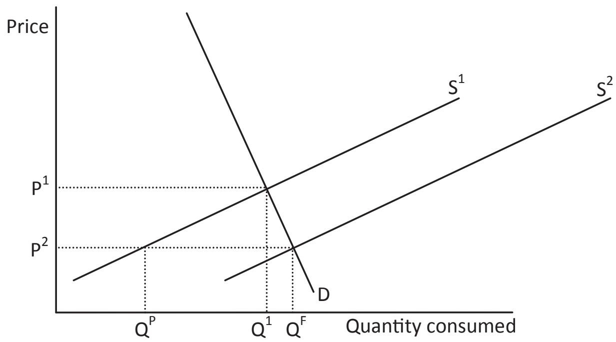

Figure 4 An increase in supply from S^1 to S^2 theoretically reduces quantity poached in the wild from Q^1 to Q^P (Q^P to Q^F comprises production from farming) and reduces price from P^1 to P^2.

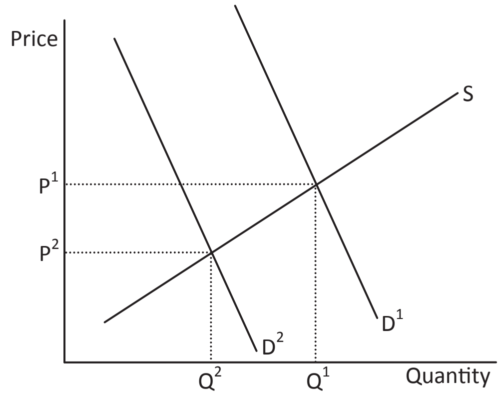

Figure 5 A reduction in demand from D^1 to D^2 theoretically reduces both price, from P^1 to P^2, and quantity consumed, from Q^1 to Q^2, of a given wildlife product.

The introduction of regulated trade and ranching and farming of high-value endangered species should also be reexamined in the medium term, informed through further research into consumer preferences as well as biological feasibility. This approach has previously proven successful for crocodilians and led to reduced poaching pressure on wild populations, even in countries with weak governance (Hutton & Webb 2003; Jenkins *et al.* 2004). Recent research has also suggested the potential for a regulated trade in rhino horn (see Biggs *et al.* 2013), though some issues for investigation were identified here, for instance, understanding the implications for the wild population in terms of both supply aspects (e.g., transaction costs burden the legal supply chain) and demand (e.g., the relative prices of illegal and legally sourced products and the overall impact on demand). Nonetheless, should such issues be addressed, farming high-value wildlife to increase supply should theoretically reduce the price of wild species and hence reduce incentives to poach (Bulte & Damania 2005). Figure 4 illustrates how an increase in supply from S^1 to S^2 due to farmed production causes a reduction in price from P^1 to P^2 and crucially, reduces the off-take by poaching from the wild population. With reduced poaching and farming, the majority of consumption could comprise farmed products, Q^P to Q^F in Figure 4, with supply from the wild reduced, from Q^1 to Q^P. Although opponents of wildlife farming have suggested that this is not a solution (e.g., Mockrin *et al.* 2005; Gratwicke *et al.* 2008; Kirkpatrick & Emerton 2010), the option needs to be considered carefully based on more, impartial and in-depth research into supply and demand for farmed wildlife products given the potential conservation gains, not least the sustainable flow of money legal trade could create, and should not be overlooked because conservation groups are ethically opposed to producing animals to be killed for human consumption.

Historically, significant changes in demand, rather than increased enforcement, have played a crucial role in reducing trade volumes and species recovery (Roe *et al.* 2002; Philip *et al.* 2009). The conservation of high-value trade-threatened species therefore necessitates coordinated efforts to manage demand, for example, reducing consumer demand through investments in ambitious social marketing campaigns targeted to consumers of wildlife and their social networks. This approach should ultimately lower incentives to poach by causing a reduction in quantity demanded and therefore price. This is represented in Figure 5 by a shift in the demand curve from D^1 to D^2 and the lowering of price from P^1 to P^2, and quantity demanded from Q^1 to Q^2. However, despite the urgent predicament facing many high-value species and the apparent need to reduce demand, as well as recent efforts to understand it in East Asia (e.g., Drury 2011; Dutton *et al.* 2011), there is little evidence of strategies to reduce demand having been effective here, i.e., led to measurable changes in consumer behavior. As such, more in-depth research into East Asian consumers is essential with which to inform effective interventions (Veríssimo *et al.* 2012). This necessitates a focus on consumer preferences and purchasing behavior, in particular key attributes of wildlife products and species, as well as the social dynamics of purchasing and consumption, so that the right audience can be targeted with the right message, through the right communications medium. Devising interventions to alter behavior is crucially important and can only be achieved through multidisciplinary research approaches combining consumer psychology, social marketing, economics and education to ensure that interventions go beyond merely raising awareness about wildlife consumption.

Conclusion

Regulation remains the principal tenet of conserving species threatened by poaching for international trade and the use of trade restrictions and bans continues to be widely and universally promoted. Although we believe that enforcement of regulation remains a necessary instrument for governing trade, our view is that reliance on this approach alone is doomed to fail because it cannot cope with the complexity of trade, the powerful market dynamics of illegal products or the role poverty plays in driving trade, especially where high-value species are concerned. Conservationists, therefore, need to design new strategies that actually reflect the powerful forces that shape the modern world, forces that regulations such as CITES cannot withstand. As more realistic approaches are beginning to emerge to tackle other international crimes such as drug trafficking, it is imperative that conservationists stop promoting regulation as the only solution because it reflects their own personal beliefs about animal welfare and exploitation and instead focus more on policies and strategies that reduce the price of illegal wildlife products and increase the opportunity costs of poaching by contributing to the eradication of rural poverty. We appreciate that implementing some of these measures will not be easy and will require considerable political courage with no guarantee of success, but engaging with and negotiating with local communities that are best placed to conserve wildlife, and using economic levers to both manage trade and support local communities are the essential first steps to preventing the immediate risk of extinction of the world's most valued species.

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