

Effectiveness of policy interventions relating to the illegal and unsustainable wildlife trade

Policy brief



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The purpose of this brief is to summarize the findings of an investigation into the effectiveness of policy interventions aimed at addressing the illegal and unsustainable trade in wildlife and wildlife products. Such interventions include (but are not limited to): legislative and enforcement measures; measures to influence consumer behaviour; trade policy responses; and engagement of local communities. The scope of analysis includes both domestic and international wildlife trading activities but is limited to those that are officially designated as illegal in one or more jurisdictions. Where possible, the analysis refers to direct empirical evidence; however, given that such evidence remains quite limited for this topic, it also draws upon a broader evidence base, including widely accepted insights from theoretical work³.

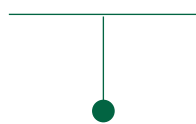
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Introduction

Biodiversity loss remains a serious and urgent environmental concern for humanity, making wildlife conservation a top priority for policymakers concerned with the earth's social-ecological sustainability⁴. Wildlife trade, which involves the harvest, commercial exchange, and end use of wild organisms and their derivatives, is closely linked to two identified direct causes of biodiversity loss, namely overexploitation and the spread of invasive species⁵. However, not all wildlife trade adversely affects biodiversity – if appropriately regulated and structured, legal and sustainable trading activities may improve human well-being⁶ and even support in situ wildlife management efforts⁷. It is therefore imperative for policymakers to distinguish instances of wildlife trade that support the pursuit of globally-accepted social and environmental policy objectives from those that do not.

Convention on International
Trade in Endangered Species
of Wild Fauna and Flora
CITES



1975

to ensure
that international trade
in specimens of wild
animals and plants
does not threaten
their survival

The legal frameworks and other institutions aimed at protecting wildlife have evolved over many centuries. Measures to specifically outlaw commercial wildlife trade have existed since at least the year 1900, with the passing of the Lacey Act in the United States. Increasing recognition of the transnational nature of much commercial wildlife trading activity led to the ratification of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975. Since then most of the world's nation states have joined CITES⁸, which currently provides the essential international framework for regulating wildlife trade, and under which some of it becomes designated as illegal.

Since the founding premise of CITES and associated national wildlife trade regulation is to provide legal protection to species that are threatened with extinction in the wild, trade legality is expected to be informed by scientific assessments of whether such trade is associated with threats to designated species. However, in practice the links between official trade legality and sustainability (both biological and socio-economic) are sometimes unclear or even contested⁹. Notwithstanding such issues, the purpose of this brief is not to question the historic appropriateness or social legitimacy of any previously declared legal status of trade in particular species, but rather to examine the effectiveness of the various consequent policy interventions that are intended to support their conservation (which might also include future establishment of legal markets). The analysis here therefore relates to existing classified illegal wildlife trade (IWT) activities and specific policy interventions to mitigate them and any associated unsustainable impacts on wild species populations.



A policy-relevant framework for understanding Illegal Wildlife Trade

Wildlife trade legality and unsustainable harvest

Thousands of species across various taxa are harvested and traded by humans, alive or dead, whole or in part, for a wide range of consumer purposes, ranging from subsistence to luxury forms of use¹⁰. Harvest may be motivated by direct subsistence needs of the harvesters, but also by other factors, such as opportunism, commercial gain, recreation, or even protest. Many forms of harvest and use are linked to traditional practices, and actors may be unaware of the conservation status and sustainability of harvest of the species in question. Species harvest – and subsequent trade-related activity – can be considered sustainable if the rate of offtake does not exceed the natural rate of population growth. However, in the absence of sufficient information and control relating to the impacts of harvesting, overexploitation and depletion of wild populations may occur.

If wildlife management authorities consider it necessary to reduce harvesting rates, or prevent harvesting entirely, they may do so by employing various regulatory measures, including restrictions on takings and limiting access to wildlife habitats. Violating such regulations for the purpose of subsequent commercial gain constitutes the first stage of IWT. However, it is also possible for legally and sustainably harvested wildlife products to be subsequently traded illegally¹¹. This is especially prevalent when transactions take place across jurisdictional boundaries and traders seek to avoid taxes and various regulations or standards relating to handling, transport, and sale of wildlife products. Not all wildlife trading activity that is technically illegal should necessarily be of equal concern to species conservationists.

Wildlife trade, institutions and economic drivers

Aside from biological factors, various critical institutional factors determine the relationship between trade-related activity and sustainability of harvest. In this context, institutions are defined as both the formal and informal constraints and conventions devised by humans to shape their behaviour¹². Formal institutions comprise official state-enforced rules, such as constitutions, laws, and regulations; informal institutions comprise social norms, including gender roles, typically linked to tradition and culture. Some informal institutions are deeply embedded in society and change over longer time scales than most formal institutions. Recent social science research shows that when newly declared formal legal restrictions on harvest or trading activity contradict established informal institutions, such laws may lack a vital measure of social legitimacy; consequently, illegal trade is both more likely to take place and more likely to be facilitated by corrupt officials¹³.

Institutional analysis (both theoretical and empirical) reveals that property right regimes (e.g. land tenure, fishing rights) are critical for incentivising sustainable levels of wild harvesting in both terrestrial and marine environments. Commercially valuable wildlife that exists under open access conditions is far more likely to be unsustainably harvested than wildlife that is owned and controlled by directly interested and affected actors¹⁴. This is consistent with the well-known principal-agent model from economic theory¹⁵. Economists typically recommend establishing strong (clear, appropriately assigned and enforceable) property rights over in situ populations and habitat of commercially valuable wildlife as a first step toward preventing overexploitation¹⁶. This is especially so in developing countries in which wildlife occupies terrestrial environments with (i) high economic values to be gained from land conversion and/or (ii) heavily competing demands on limited state management resources¹⁷.

In recent decades institutional theorists have added further insights and tools to support sustainable environmental governance and natural resource management in complex-adaptive social-ecological systems¹⁸. These include a deeper understanding of polycentric governance, under which there are multiple centres of decision making in multiple jurisdictional centres, often at different scales¹⁹. This is relevant to many instances of illegal wildlife trade, which frequently crosses jurisdictional boundaries, most often with varying levels of legality, social legitimacy, and enforcement. Further insights are provided by the related concepts of institutional scale, fit, interplay, and dynamics, which highlight the governance benefits of aligning both formal and informal institutions across scales and boundaries over time²⁰.

Institutions of trade evolve in response to changing human tastes and preferences and have been comprehensively studied within the discipline of economics. Economic research reveals that entrepreneurs seek to gain property rights over economically valuable resources, including wildlife, in order to obtain private benefits from these. For commercially valuable

wildlife under open access or poorly enforced public ownership, there are strong incentives to harvest it, dead or alive, for private gain. If trade is illegal but remains at least somewhat socially legitimate, actors will weigh up the economic benefits of harvesting against the perceived risks and costs of being apprehended and punished by enforcement agents.

Market prices provide a strong indication of social commercial value of wildlife products, and rising prices typically signal increasing relative product scarcity. Rising prices also provide increasing benefits to entrepreneurial harvesters and product suppliers and are thus likely to stimulate further efforts to supply such products, legally or illegally. The dilemma for commercially valuable threatened species is that as they become increasingly scarce, if user demand persists or increases, their prices will tend to rise, thereby stimulating further harvesting¹⁹ or other attempts to supply their products (for example, by farming them). Under such circumstances, the only factor that will mitigate further pressure from illegal harvesting is a meaningful shift in consumer preferences (i.e. demand) away from illegally-sourced wild products.

A taxonomy of interventions

For policymakers concerned with maintaining wild population levels of threatened species, there are numerous choices of specific interventions to tackle IWT and unsustainable levels of harvesting²². That said, the current CITES framework tends to entrench a divide between two substantially different approaches: prohibition (typically associated with Appendix I-listed species) and sustainable use (typically associated with Appendix II-listed species). Under the first approach, the policy objective is to penalize all contributing aspects of commercial trade in the species of concern. The second approach is more discriminating and seeks to encourage trading activity that is legal and originates from sustainable harvesting practices (including farming) while penalizing trading activity originating from illegal and unsustainable wild harvest.

Within the broader framework of these two approaches, interventions may take place at one or more of the three basic levels of activity and may accordingly be classified as supply-side, transactional, or demand-side interventions. These are aimed, respectively, at (i) harvesters and producers, (ii) traders and other intermediary actors, and (iii) end users. Ideally, interventions should be consistent, if not integrated, across all levels of activity – in other words, interventions employed at one level should support, and not conflict with, those employed at another.

Supply-side interventions typically involve both physical and legal measures to deter uncontrolled wild harvesting and thereby protect the species in its habitat. In pursuit of the sustainable use approach, supply-side interventions may also include attempts to establish legal and sustainable supply sources from either controlled wild harvesting or farming operations. In some instances, the economic benefits of such legal supply regimes may be redirected towards protection of wild populations and their habitat, either by

supplementing management and enforcement expenditure, or by providing benefits to interested and affected local communities (or both). As a variant of the last approach, supply-side interventions may include the provision of alternative livelihood opportunities and human-wildlife conflict mitigation assistance to local people who might otherwise act as illegal harvesters.

Transactional interventions, which may assume many different specific forms, all essentially seek to raise the transaction costs of illegal trading activity, including purchase, transport, storage, smuggling, advertising, and sale of trafficked wildlife products. Criminal deterrence is achieved through effective detection of illegal activity, followed by apprehension and punishment of the perpetrators. When parallel legal markets exist, interventions will also seek to establish and certify traceability of legal products to deter potential laundering of illegally harvested products through legal markets.

Demand-side interventions aim to discourage consumers from purchasing or using wildlife products from illegal sources. Under the prohibitionist approach, these interventions will aim to direct consumers away from any products of the species in question (including possible look-alikes or fakes). Such interventions may take the form of general awareness raising and targeted messaging to promote voluntary behaviour change, or even coercive measures such as legal restrictions on possession or use. Following a sustainable use approach, demand-side interventions may seek to encourage consumers to switch to supply sources that can be verified as being ultimately supportive of wild populations rather than harmful to them²³. To succeed, such interventions may depend on credible methods of traceability and certification. Demand-side interventions may also encourage end users to simply reduce their frequency of use of particular wild products, or otherwise switch to (i) certified farmed sources of the same species, (ii) less threatened substitute species, or even (iii) synthetic substitutes.



Evaluating Policy Interventions

Considering the wide range of policy interventions to address IWT, and the substantial efforts to date by governments, inter-governmental agencies, and non-governmental organisations (NGOs), there has been surprisingly limited empirical evaluation of their effectiveness. However, scientifically valid evaluation is not a simple task. To correctly determine the effectiveness of an intervention requires the pursuit of a protocol that is recognised as standard in the field of impact evaluation: an intervention must be assessed by its ability to achieve a stated outcome, which can be determined by one or more specific measurable indicators, while controlling for confounding factors. The intervention must result in a change of those indicators that is statistically distinct from the counterfactual, i.e., what would have happened in the absence of the intervention, everything else being equal²⁴. Without following such a protocol, one is unable to assert a causal relationship between the intervention and the outcome.

This raises the question of selecting appropriate indicators. Given the objective of conserving biodiversity, the ultimate indicator of a successful IWT policy intervention would be a measurable biodiversity-positive result. However, the measurement of biodiversity itself is fraught with complications, especially given that scientists have identified multiple static and dynamic biological indicators of environmental health at different scales, i.e., at ecosystem, species and genetic levels. At the species level, the most obvious measure to use might be numbers of extant wild specimens, however very few species are easily counted and monitored in the wild, even large terrestrial mammals such as rhinoceroses and elephants. Furthermore, rhino and elephant specialists assert that simple numbers alone are insufficient measure of conservation success: individual population sizes and distribution, growth rates, and persistent human threats to both the animals and their habitat all remain relevant.

In practice, species conservation success is somewhat loosely monitored by the IUCN's taxonomic specialist groups, whose input is periodically reflected in the IUCN Red List, with success typically measured by a change in Red List status. For many interventions, which must take place and yield results over shorter time scales, this is an inadequate benchmark. This has led to the use of proxy measures. For example, given the significant difficulty and cost of counting elephants, added to the challenges of controlling for other confounding factors that might influence their numbers, the Parties to CITES have established a complex system to monitor levels of

illegal exploitation, using poaching levels (MIKE) and ivory seizures (ETIS) as indicators. However, even the use of these fairly sophisticated techniques has not been without controversy²⁵, with some critics questioning the methods and others clearly more concerned with other objectives, such as protecting individual animals from harm or simply eradicating human use of products such as ivory altogether.

It is increasingly apparent that, despite the assumed shared principal objective of species conservation, policy proponents within CITES processes have fundamentally differing opinions over the purpose of IWT policy interventions, reflecting deeper differences in underlying values²⁶. For example, some NGOs increasingly promote the welfare of individual animals as a target of primary concern, whereas other interest groups emphasize economic benefits to people at various scales (from local community up to national levels) as a prerequisite for conservation success in developing countries. In some instances, these different approaches are not easily reconciled and may lead to conflict.

Appropriate policy evaluations must take such potential conflicts into account, given that they may undermine the long-term success of interventions whose principal aim is the conservation of viable populations of species in their natural habitat (rather than animal or human welfare considerations, which may or may not assist as secondary aims). Furthermore, the evaluations themselves – and the indicators they use – must be viewed in the light of the interests and objectives of those undertaking them. Ideally, evaluation of interventions should be performed by impartial parties with no vested interest in the outcome. However, it appears that appropriate independent funding sources for this type of work are scarce.

Effective IWT policy evaluation is therefore both nascent and challenging. A review in 2002 of the impact of wildlife trade regulation on wildlife and local livelihoods yielded somewhat limited and ambiguous results and concluded that there were more questions than answers²⁷. A more recent review focused specifically on international wildlife trade regulation and identified a limited sample of appropriately designed evaluation studies, although noted the existence of further examples relating to domestic trade²⁸. Replicating the initial search for the period subsequent to that review up to late 2018 reveals that while substantially more has been published on topics relating to wildlife trade, appropriately structured intervention evaluations remain limited²⁹. Furthermore, the small number of studies to date focus on a wide range of outcomes, generated from a diverse range of actions, thereby making it difficult to identify clear patterns.

Given this inadequate supply of empirical evidence from IWT policy evaluations to date, it remains challenging to draw too many generalisable conclusions about universally successful interventions across taxa and jurisdictions. However, by combining appropriate insights from interdisciplinary theoretical research with other indicative empirical work, policy analysts and researchers can increasingly identify both significant knowledge gaps and interventions that do not obviously support species

conservation objectives. Previous assessments have provided analytical frameworks to guide impact evaluations³⁰. What follows is a brief summary of evidence to date on the effectiveness of interventions, informed by a synthesis of theoretical and empirical work.

Supply-side interventions

Although supply-side interventions appear to comprise the majority of IWT mitigation measures both attempted and evaluated, the evidence on their effectiveness is mostly derived from overviews of relevant literature rather than specific evaluations of policy interventions. Relatively few specific evaluations have assessed direct improvements in the conservation status of the species concerned as a measurable outcome. There is a greater body of evidence on harvesting deterrence, especially through direct enforcement measures, whereas the evidence on alternative supply-side measures is both more limited and contested, in part because they typically also require engagement at transactional and demand-side levels.

The most fundamental supply-side interventions take the form of deterrent measures that aim to discourage illegal harvesters from even attempting to harvest (poach) wild specimens of target species within designated areas. A considerable body of work, blending insights from conservation science, economics of crime and contemporary criminology, supports the notion that pro-active deterrence of poaching attempts is far more likely to deliver effective conservation outcomes than reactive post-incident measures, for two reasons. The first (obvious) reason is that, for species that are lethally or destructively harvested, conservation is better served by preventing such harvest from happening in the first place. The second reason relates to repeated empirical findings in criminology that the probability of early detection of illegal behaviour (followed by apprehension and punishment) is a more critical variable in deterrence than the mere severity of potential future penalties that may or may not be incurred (and are typically highly discounted by poachers with short time horizons)³¹.

A potentially effective long-term form of pro-active deterrence involves gaining relevant local community support by way of entrenched customary conservation norms. In many instances local communities have historically developed traditional institutions to avert the over-exploitation of indigenous species; supporting these might act as a strong disincentive for local people to engage in or tolerate any illegal and unsustainable harvesting activity. However, such institutions may also be undermined by external pressures, including perceived loss of traditional rights to access and benefit from land and associated wildlife. In developing countries with colonial legacies, such feelings of dispossession and alienation from local wildlife and wildlands are common, especially in cases where local people were historically evicted from ancestral lands and traditional harvesting areas to make way for newly proclaimed state-protected areas. It is also important to consider carefully how interventions that aim to interact with traditional institutions may influence existing gender or social inequalities, or disproportionately disadvantage already marginalised groups.

Whether traditional pro-conservation institutions can or should be secured or not will depend on factors that may vary considerably with geography and political context. Some local communities may readily adopt and maintain them, especially if the costs of doing so are low. However, others may be burdened with high potential costs of living with dangerous wildlife, such as large carnivores or elephants, which threaten both lives and livelihoods. Such communities may seek meaningful acquisition of custodial, access, and benefit-sharing rights as adequate compensation for human-wildlife conflict. Accordingly, since the 1990s, pro-conservation interventions have included various attempts to devolve wildlife management authority under the banner of community-based natural resource management (CBNRM).

The range of experience with CBNRM is broad, varied, and difficult to assess in direct relation to mitigating IWT. Although some attempts have been made to evaluate achievement of conservation outcomes and socio-economic benefits of CBNRM, the evidence to date remains limited³². Nevertheless, there is evidence of at least some substantial success (for example, in Namibia³³) and an ongoing commitment to pursuing community-based approaches to addressing IWT with an expectation that further evaluations of this approach will be forthcoming over time³⁴. Forms of CBNRM that involve managed harvesting and trade of species subject to IWT have the added feature of acting as a potential sustainable supply enhancement measure (see below, section on Integrated Interventions). Otherwise, there are numerous examples of community-based projects that avoid harvesting such species, instead aiming to provide alternative livelihoods. A recent (2015) systematic review of this latter approach shows mixed results, suggesting that many other site-specific factors are also relevant³⁵.

In most countries, more strictly protected area categories do not easily accommodate the CBNRM approach and, to the extent that cooperation from local communities does not act as a sufficient deterrent for harvesting within such areas, national and local authorities must resort to more conventional monitoring, interception, and apprehension measures, employing a combination of appropriate technology and personnel. Whereas the specific appropriateness and efficacy of such measures will vary widely with circumstance, a review of experience to date yields three general conclusions. The first is that all protected areas require a minimum amount of sustainable funding to finance such measures. The second is that area managers can make most effective use of their limited funds by employing situational crime prevention strategies to raise the probability of early detection³³. The third is that militarization and excessive use of violence in enforcement can backfire in the longer term, by undermining both the integrity of conservation management and the support of local communities³⁷.

Systematic research into protected area effectiveness is nascent but suggests that only between 20% and 50% of terrestrial and marine reserves are effectively managed, due in large part to insufficient funding³⁸. This is despite the results of a 2016 World Bank analysis of IWT funding, which reveals that the most donor support for IWT interventions is applied to the categories of protected area management and law enforcement³⁹. This

raises the question as to whether simply raising the penalties for illegal harvesting can help improve deterrence. However, a large body of research suggests that not only are there politically and socially acceptable limits to heavy penalties, but that these can even lead to various unintended perverse consequences, for example undermining the probability that offenders will be punished at all, given that judges demand better evidence before passing more onerous sentences and that local law enforcement officials are more likely to accept bribes from offenders if they themselves do not consider the offences sufficiently serious.

Whereas long-term local community support is highly desirable to deter illegal harvesting, short-term deterrence will depend on appropriate situational measures aimed at early detection and rapid apprehension of attempted illegal harvesting activity, for which adequate and sustainable funding is critical. However, local successes may not translate into more general successes for a species, as they may simply displace illegal harvesting activity to other, more vulnerable and less effectively protected populations⁴⁰. Faced with persistent or potentially growing demand for wildlife products, conservation managers in general will need to find sustainable and growing sources of funding while attempting to improve the efficiency of deterrent anti-poaching methods. Failing this, they may need to consider other measures to address potentially growing disparities between demand and supply and possible consequent growing incentives for illegal harvesting driven by rising product prices. Such other measures include transactional and demand-side measures, as well as legalisation and enhancement of supply, the latter of which amounts to a form of integrated intervention.

Transactional interventions

Transactional interventions are diverse and operate across multiple spatial scales, presenting a challenge for assessing their effectiveness. For example, transactional approaches for a species may include imposition of domestic trade restrictions and enforcement measures, CITES listing, enhanced enforcement at known jurisdictional border crossings, or detection methods for improved traceability, all of which may operate simultaneously and alongside various supply- and demand-side interventions. This can make it difficult to assess the evidence for the effectiveness of specific transactional interventions, especially top-down approaches that operate at broad international scales. For example, even where stricter international trade regulation through CITES Appendix I listings can be shown to correlate with reduced poaching of that species, it is typically not possible to disentangle the direct effect of up-listing from other interventions taking place⁴¹. Further challenges stem from the use of seizure data or enforcement records of arrests to assess whether illegal trade levels change following an intervention. These data have taxonomic and geographic biases in collection and reporting and, whilst there has been some effort to account for certain biases in these data for specific taxa (e.g. elephants)⁴², for the majority of regulated species the extent of these biases is unknown.

Transactional measures can be broadly classified into three categories. The first category concerns the physical detection of illegal products in trade and relies on the vigilance of enforcement agents assisted by appropriate techniques and technologies. Such measures mostly fall within the ambit of regular anti-smuggling practices employed in the detection and interception of contraband. They include both routine and random inspections of vehicles, vessels and goods consignments, with the assistance of technologies ranging from sniffer dogs to x-ray and other sensing devices. Inspections are frequently complicated by the presence of legal trade of similar products or 'look-alike' species and to overcome these may require the employment of traceability measures ranging from sampling and forensic analysis to tagging and certification.

These physical detection measures are widely practiced to varying degrees across diverse jurisdictions and taxa, the extent to which is typically dictated by constraints on resources and enforcement agency capacity. Although there have been assessments on the application of specific techniques under specific circumstances, it is difficult to draw generic conclusions about the effectiveness of such interventions, which need to be evaluated in the context of local real-world conditions. The same is true for the second category of transactional interventions, which concerns the identification and disruption of both networks of illegal actors and the enabling environment for illegal activity. Again, this is the domain of law enforcement agencies, although also often with support and prompting of NGOs. Such interventions typically involve intelligence gathering (using techniques such as social network analysis⁴³) and require cooperation across multiple jurisdictions; they may also overlap with attempts to address other forms of crime including arms, drugs, and human trafficking, as well as financial crimes such as tax evasion and money laundering. They have led to some success in disrupting illegal networks⁴⁴, but it is difficult to find evidence linking such disruptions to conservation outcomes.

The third category of transactional interventions involves regulatory constraints imposed at various jurisdictional scales, supplemented by market-driven measures to promote or discourage certain types of trade. CITES provides the main international regulatory framework for transactional interventions, and despite claims of it being a highly successful treaty⁴⁵, this appears to be based largely on accession by Parties rather than established causal links between CITES-related transactional measures and conservation performance. Some claims of success may involve case studies in which transactional measures have been employed as part of an integrated approach (e.g. vicuña and crocodilians, as discussed below). However, there has been no evaluation carried out on the effectiveness of CITES-listing for the majority of species in the Convention's appendices and there are reports of widespread non-compliance for various taxa, such as orchids⁴⁶. Even where successes are reported it is often not possible to determine the role of CITES-listing alongside other simultaneous supply and demand-side interventions⁴⁷.

CITES provides the over-arching framework, to which national governments (as Parties to the Convention) are expected to comply by enacting adequate domestic laws and regulations to implement the Convention, also abiding by

other provisions, e.g., resolutions and decisions. States are supported in implementation by inter-governmental agencies and non-state actors such as NGOs. However, in practice only 55% of Parties currently have legislation in place that is adequate to implement the Convention and the rules do not always align⁴⁸. In many cases, the rules are poorly enforced even when they do align⁴⁹. As a result, the governments of certain importing nations may elect to impose stricter domestic measures (such as domestic trade bans) and some NGOs have lobbied private companies in sectors such as finance, information technology, and transport, to assist with thwarting potential illegal trading activity. However, these measures are not always welcomed by the governments of exporting countries and there is some evidence that they may have perverse effects. As an example, some countries have unilaterally restricted imports of legal hunting trophies and some airlines have refused to transport them, potentially undermining established CBNRM initiatives in countries such as Zimbabwe and Namibia and more broadly threatening both conservation and livelihoods in a number of African and Asian countries⁵⁰. Although research into this aspect is nascent, it appears that the effectiveness of transactional interventions is undermined when they conflict across jurisdictional boundaries, scales, and cultures⁵¹.

Demand-side interventions

Demand side interventions are increasingly recognised and employed as a key long-term approach to tackling IWT⁵². They focus on influencing consumption patterns either by coercing consumers through legal instruments or by prompting voluntary behaviour change⁵³. Most demand reduction efforts for illegal wildlife products have focused on the latter approach, with interventions that range from simple information provisioning to more strategic actions structured around insights from the behavioural sciences. Thus far demand reduction campaigns have had a clear taxonomic bias, with large terrestrial mammals, in particular rhinos, elephants and big cats, receiving most of the attention, and with Asia as the most targeted region. By contrast, plants have been largely ignored, despite the fact that they represent the majority of species listed in CITES and include very high market value groups such as timber species.

One major shortcoming of the design of demand reduction interventions has been a reliance on anecdotes, conventional wisdom and personal experience instead of systematic and structured consumer research to define the messages, channels and target audience of demand reduction campaigns⁵⁴. For example, men are often assumed to be main consumers of wildlife, but consumer research has shown that this is not the case for all wildlife products⁵⁵. Similarly, while receiving much attention in the popular media, there has been very limited research on the effectiveness of using of celebrities from the entertainment and sports world as key influencers⁵⁶. Existing research suggests that there are clear trade-offs in the use of these influencers, with celebrities increasing public willingness to engage but lowering message recall. In term of evaluating impact, the limited existing evidence is inconclusive as to whether past demand reduction efforts have been effective.

A major challenge in the evaluation of demand reduction interventions is the appropriate measurement of demand. Asking consumers about their consumption patterns is often challenging in situations where the use of wildlife product is illegal or socially sensitive, while indicators related to price can be affected by both supply and demand factors, making them difficult to interpret. To address these challenges, conservation scientists have increasingly adopted specialised survey techniques that ensure respondent anonymity and thus reduce non-response and social desirability biases⁵⁷.

When outcomes of demand reduction interventions are reported, their usefulness is often undermined by a focus on changes in knowledge or attitudes, indicators that most often do not correlate with behavioural change. Coupled with reliance on experimental designs that have a high risk of bias (e.g., uncontrolled before-after designs) and the knowledge that changes in demand for a product can be the result of factors unrelated to conservation effort (e.g., macroeconomic trends, legislative measures aimed at other issues), this means that establishing cause-effect relationships is impossible in almost all cases. This is true even in widely cited success cases (such as the reduction in demand for ivory use in Japan, rhino horn in Yemen, and shark fin in China) where little effort has been made to rule out competing explanations for the changes observed. In many cases these changes have occurred over the long term, often more than a decade, during which there have been radical changes in political, economic and social contexts, both national and internationally, thus providing competing explanations for observed changes.

Notwithstanding the above caveats, there have been recent examples of success of demand reduction demonstrating that robust impact evaluation is possible in the context of IWT. One used randomized control trials to evaluate demand reduction interventions for wild meat in a major urban centre in the Amazon⁵⁸ and another used general elimination theory, a qualitative impact evaluation method, to understand the role played by demand reduction efforts in the recovery of the Yellow-shouldered Amazon parrot in Bonaire over several decades⁵⁹. In both cases demand reduction interventions were found to have yielded positive results; the latter case also included a synergistic supply-side intervention and thus comprised an integrated approach. There are also increasing reports of cases in the literature of interventions that did not achieve their stated aims, but which provide important insights to guide the implementation of future interventions⁶⁰.

The examples above make it clear not only that success is possible but also suggest that the growing literature around demand reduction is increasingly concerned with obtaining an unbiased picture of the impact of interventions to influence consumers of illegal wildlife products. While challenges remain, chiefly among them a common definition of demand, a robust way of measuring the prevalence of illegal behaviour, and willingness to share insights from interventions that have not fulfilled their stated objectives, this largely nascent field will certainly continue to evolve rapidly in the next decade.



Integrated interventions

As indicated above, IWT interventions are more likely to be effective if they are appropriately aligned across supply chains, jurisdictions, scales, and cultures. Integrated interventions should meet these criteria, ensuring a sensible synergy between measures taken at supply, transactional and demand levels. International IWT interventions must take place within the framework of CITES to co-ordinate law enforcement measures aimed at ensuring that harvesting and trade flows are maintained within sustainable levels. Some integrated approaches, such as the above-mentioned Amazon parrot example, may simply focus on reducing supply and demand. Alternatively, others may involve a form of supply enhancement, i.e. the deliberate provision of legal and sustainable alternatives, to displace consumer demand for illegal wildlife products. Since applying this latter approach to an existing illegal product necessarily involves at least some regulatory reform (i.e., legalisation), it requires synergistic interventions at other levels of the supply chain.

There are several variants of the supply enhancement approach, ranging from legal wild harvesting and sale with reinvestment of the proceeds into conservation, through diverse forms of wildlife ranching and farming to produce and sell wildlife products, to replacement with other substitutes. Such approaches appear to have had mixed conservation success, again depending on a range of specific factors that include geography, the biology of the species concerned⁶¹, and various institutional and management features. Frequently cited examples of success include the vicuña and most crocodylian species, whereas legal elephant ivory sales are widely held to constitute a failure. However, a closer inspection of claimed successes and failures reveals many confounding factors, including institutional, transactional and demand-side issues, such that species conservation outcomes (negative or positive) can seldom be attributed to the supply enhancement intervention alone.

There are relatively few cases of long-term stable trading arrangements under which significant portions of wild harvesting proceeds are reinvested directly into habitat conservation, management, and protection of the affected species. However, one of the clearest examples of this is in South Africa, where individuals of both the white and black rhino species may be privately owned, by individuals and various corporate entities. Private rhino owners are entitled to sell recreational hunts with legal trophy exports, and typically reinvest the proceeds into rhino management and security, thereby supporting population growth and providing vital protection against poaching. The success of this approach relies on regimes of land tenure and property rights under which financial benefits of harvesting are readily linked and reapplied to management and security measures.

Somewhat different from the rhino example is that of the vicuña, a camelid that occurs in four South American range states and yields a highly prized wool. Following a total trade ban during the 1970s, which allowed vicuña numbers to recover, various forms of managed non-lethal harvest and legal international exports have been reintroduced gradually since 1980, following which numbers have recovered substantially further⁶². Unlike for South African rhinos, there is little evidence that financial benefits from the trade are directly reinvested into conservation. Instead, local communities have been granted rights to shear, process and trade the wool from wild populations. The international legal wool market is largely controlled by a single company and the local community share of the total economic benefits is relatively low; nonetheless, these benefits appear sufficient to act at least as a partial disincentive for poaching, and wild populations are now thriving in comparison with the 1960s and 1970s.

Crocodylians are considered as a good example of a successful conservation-positive example of establishing and expanding a legal product supply⁶³. As with the vicuña, most crocodylian species were initially subjected to CITES-related trade restrictions, which have been progressively relaxed over time as various range states have developed regulated legal supply sources, ranging from intensive farms through ranching operations to sustainable wild harvesting schemes. With the notable exception of one species, the Siamese crocodile, crocodylian species have recovered significantly across the world as these legal and sustainable supply sources have replaced the illegal ones. Critics of the legal crocodylian supply approach point to increases in intensive production methods and cite animal welfare concerns. However, the collective impact of this integrated legal supply approach appears to have been overwhelmingly positive in conservation terms, as indicated by the widespread recovery of wild populations.

Legal elephant ivory sales are frequently cited as a failed supply-side intervention, given that elephant poaching rates and illegal trading activity evidently increased following the second (2008) CITES-authorized one-off international sales of accumulated stockpiles from four African countries to two East Asian ones⁶⁴. However, unlike the vicuña and crocodylian examples, these sales were rigidly structured so as to create intermediary monopolies in the buying countries, thereby undermining both the objectives of raising adequate revenue for conservation and providing a substantial, continuous, and competitively priced supply source to consumers. The second sale also coincided with the announcement of a ten-year moratorium with no guaranteed future supply, following which numerous countries started destroying their ivory stockpiles. With no clear policy direction and other possible confounding factors such as the simultaneous global financial crisis, the 2008 elephant legal ivory sale can be neither regarded as an appropriate and unambiguous implementation of an integrated supply-side intervention nor evaluated as an exemplar of such.

Mammoth ivory provides an example of legal trade in a substitute product that has been acting as a type of supply enhancement measure. Although only a partial substitute for elephant ivory, recent research suggests that

the supply of mammoth ivory plays a role in depressing the prices for elephant ivory and, by implication, incentives for elephant poaching⁶⁵. Whereas there have been proposals to introduce species product substitutes created by synthetic biology, there is no clear way of assessing the potential impacts beforehand, and the effectiveness of such an intervention would be influenced by potential adverse impacts on law enforcement capability and the willingness of existing wild product consumers to switch to such products⁶⁶. Unless these types of supply enhancement measures generate financial benefits for conservation managers or relevant local communities, their effectiveness will be determined purely by their ability to depress market prices for the illegal wildlife product of concern, without undermining existing law enforcement. Such measures should also align with any existing demand-side interventions.

The importance of considering gender when designing and evaluating wildlife trade policy interventions.

Despite increasing awareness of the importance of considering gender in conservation policy and practice, there is currently little evidence that gender is being actively accounted for in interventions related to the illegal and unsustainable wildlife trade. There is evidence of gender differences in the harvest and trade of different wildlife products, such as gendered roles in the supply chain for bushmeat⁶⁷ and wild plants⁶⁸. Further, whilst gender does not influence wildlife consumption for all products, some studies have found evidence of gender differences in type and frequency of consumption (e.g. turtle meat⁶⁹; ornamental orchids⁷⁰). Considering the role of gender, policy interventions may fail to adequately address the root cause of illegal or unsustainable trade, or may result in unintended outcomes that increase gender inequality and disadvantage certain groups (e.g. promoting farming over wild-harvesting for medicinal plants may disadvantage women where they do not have equal land tenure rights⁷¹). Further, the influence of gender can vary greatly between different supply-chains, such that one-size-fits all approaches may have unpredictable outcomes if gender is not carefully considered. To address these risks, policy interventions should be designed with gender as a core factor, and their evaluation should include gender-disaggregated data, where appropriate.



Conclusions and recommendations

When selecting among the large variety of possible interventions to address IWT, policy-makers should consider the particular attributes and circumstances of the species of concern, recognising that the effectiveness of interventions will vary across time, space and scale. In particular, policy-makers should consider the complex and multi-faceted nature of the threats facing species, taking care to avoid overly simplistic interventions that may result in unintended negative feedbacks within relevant social-ecological systems⁷². For example, gender is rarely considered during the design of IWT policy interventions but may play a key role in determining their success (see above), and further efforts are needed to collect data on the links between gender and IWT.

The evidence to date suggests that protecting biodiversity (i.e. species in their natural habitat) from IWT can be achieved at its source by establishing and securing clear property rights, controlling access to protected areas and (where possible) protected species outside of protected areas, and employing harvest deterrent measures informed by principles of situational crime prevention, ideally with the support of local communities. Such support is more likely if there is no unresolved history of local dispossession and human-wildlife conflict, and if anti-poaching laws align with indigenous institutions (i.e. local customs and culture)⁷³. Excessive use of violence and high penalties, while possibly effective in the short-term, runs a high risk of delivering perverse results in the longer term.

However, supply-side protective measures are often constrained by limited financial resources and, to prevent unsustainable exploitation of species, can benefit from being supplemented by transactional and demand-side measures and, in some instances, from other supply enhancement interventions. The evidence on the ultimate conservation effectiveness of such additional measures remains limited, but it is still possible to draw a few conclusions. The first is that supplementary interventions should align (and not conflict) with other measures employed along supply chains, ideally forming part of an integrated strategy, either consistent with a sustainable use approach (aligned with CITES Appendix II-listed species in the case of international trade) or one of prohibition (aligned with CITES Appendix I).

If socially acceptable, and supported by adequately enforced property rights, establishing sustainable harvesting and trade regimes offers a potentially viable intervention to mitigate existing IWT. To ensure sustainability, this supply enhancement approach can be supported by transactional interventions such as quotas, traceability mechanisms and enforcement action against non-compliant actors, as well as demand-side interventions to promote the purchase of verified sustainable and legal products

only. The evidence to date suggests that the most successful sustainable supply interventions to mitigate IWT are likely those that not only compete effectively with illegally harvested products on price and quantity, but that also generate direct financial returns to conservation management and relevant local communities.

In cases for which it appears unfeasible to establish sustainable harvesting and trading regimes, either due to a lack of social legitimacy or capacity to protect the species in situ, the alternative approach is prohibition, consistent with CITES Appendix I listings and domestic trade bans. Evidence suggests that prohibition of trade in high value species could provide an effective long-term integrated strategy to significantly reduce poaching if it is accompanied by a dramatic shift in social attitudes (i.e. a change in social legitimacy, leading to a collapse in demand and widespread support from enforcement agents). However, there are relatively few historical long-term precedents for this. Whereas this approach does appear to have succeeded with certain neotropical parrot species, even a near total prohibition on rhino horn trade since 1977, thought to have finally achieved success in the mid-1990s, has subsequently proven to remain ineffectual⁷⁴.

There is more evidence to support the efficacy of prohibition as a short-term measure, due to its disruptive effect on markets, especially if consumer demand for the product is relatively price elastic (i.e. sensitive to increases in market prices); however, if demand persists or shifts elsewhere, trade tends to resume under the control of organised criminal networks, assisted by corrupt government officials. Excessive and injudicious use of prohibition may therefore simply entrench organised criminal activity, with many undesirable socio-economic side-effects. A further disadvantage of long-term prohibition is that it fails to address other long-term threats to species, such as habitat conversion, which remains the single largest overall threat to terrestrial wildlife populations. Commercially devaluing renewably harvestable species may thus create other perverse long-term effects, and in certain cases establishing enabling conditions for sustainable use may deliver better conservation outcomes, as has been achieved for vicuñas and crocodilians.

Whereas transactional interventions may impede IWT, the evidence for their ultimate conservation effectiveness remains limited. Simple transactional interventions, such as legal trade restrictions and enforcement thereof, will vary in effectiveness depending on contextual factors. At an international level, such interventions require significant co-operation across countries and agencies. Despite attempts to at international collaboration through institutions such as the International Consortium on Combatting Wildlife Crime (ICWC), this tends to be slow and costly compared with the speed and agility of transnational criminal networks. It also appears that some transactional interventions have perverse effects, encouraging greater gains in ingenuity and efficiency by criminals.

For certain species, demand-side interventions may provide an essential component of integrated strategies to reduce IWT to sustainable levels. Although there is already some evidence of social change in certain sectors

of society, the evidence on the effectiveness of specific consumer behaviour change interventions to date remains very limited. However, as with transactional interventions, the existing weak body of evidence relating to effectiveness does not negate the need or usefulness of such interventions, but rather simply highlights a need for better evaluation and research, especially to establish links back to conservation outcomes.

To conclude, this assessment of IWT policy interventions has revealed substantial knowledge gaps relating to their conservation effectiveness. To improve the effectiveness of future interventions, policy-makers should consider the following recommendations:

- Policy-makers and donors to particular interventions should strive toward evidence-based policy. Policy design should incorporate scientifically sound impact evaluation and donors supporting particular policies should insist upon such evaluations, for which the results should be publicly available.
- Since most interventions are targeted at changing human behaviour at various levels of trade chains, there is a strong need for social science analysis, including gender perspectives, to be better integrated into all IWT policy decision-making and evaluative processes, including mechanisms such as CITES non-detriment findings.
- Given the significant role of consumer demand in driving IWT, substantially better research is required on potential consumer responses to policy changes. Demand reduction interventions should be informed by tried and tested frameworks such as social marketing, which draws on insights from behavioural science. There is also a strong case for conducting appropriately monitored behaviour change experiments that employ voluntary measures prior to implementing any coercive strategies, to determine whether the latter might lack social legitimacy and might therefore fail or otherwise deliver perverse results.
- Fundamental decisions on regulatory approaches (prohibition versus sustainable use) should be taken on a case-specific basis, related to the feasibility of implementation across the entire supply chain, and should strive to mitigate the effects of possible conflicting policies between jurisdictions. Significant changes in policy direction should take full account of the potential consequences, both in the short- and long term, including socio-economic impacts (e.g. on local livelihoods and gender equality) and potential adverse feedback effects. This is equally true of CITES Appendix I up-listings and other forms of trade prohibition, as it is of attempts to legalise trade and establish various sustainable supply mechanisms.



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