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RESEARCH

Sanction Avoidance and the Illegal Wildlife Trade: A Case Study of an Urban Wild Meat Supply Chain

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The unprecedented global scale of illegal wildlife trade poses threats to humans and ecosystems. Policies calling for increased enforcement to control illicit trade are rooted in the idea that more enforcement will result in greater deterrence, but as yet it is unclear how the illegal wildlife supply chain responds to enforcement actions. To evaluate the impact of formal or informal deterrence, it may be pertinent to consider strategies used by illicit networks to avoid sanction threats. Using an exploratory case study on urban wild meat trade (Republic of Congo), we describe some of the strategies used to avoid detection and consider how the concept of restrictive deterrence can be used to advance our understanding of the broader impacts of sanction threats on offender decision-making in illegal wildlife supply chains.

Keywords: conservation; environmental crime; illicit trade; restrictive deterrence; wildlife trafficking; wildlife crime

Introduction

The global illegal wildlife trade (IWT) is a socio-environmental problem of significant scope and scale (UNODC 2016). IWT poses risks and harms with implications that include animal welfare and species extinction (Albrechtsen et al. 2007; Lyons & Natusch 2011). These harms can be associated with substantial economic and social vulnerability resulting from the loss of environmental capital, erosion of cultural resources, the spread of zoonotic diseases and invasive species, and agricultural loss (Bowen-Jones, Brown & Robinson 2003; Derraik & Phillips 2010; Selier, Slotow & Di Minin 2016; Travis, Watson & Tauer 2011). IWT can be linked with corruption, money laundering, degradation of the rule of law, national insecurity, undercutting sustainable development investments, and convergence with other serious crimes (Brito et al. 2018; Gore et al. 2019; South & Wyatt 2011). Thus, in at least these ways, IWT poses a risk to achieving Sustainable Development Goals (SDGs), including Life on Land (SDG 15), Good Health and Wellbeing (SDG 3), and Peace, Justice and Strong Institutions (SDG 16). Policymakers and donors emphasize law enforcement efforts as an essential part of crime control (e.g., U.S. Wildlife Trafficking Strategy, African Union Strategy to Combat Illegal Trade in Wild Flora and Fauna in Africa). Improving the efficacy of efforts to deter IWT using evidence-based approaches has been highlighted as a high-priority policy objective (e.g., Milner-Gulland et al. 2018).

IWT is an illicit economy not limited to a single commodity or location; offenders across the supply chain may violate multiple laws in multiple jurisdictions as illegal wildlife products move across boundaries (Broussard 2017; Elliott 2009). In many circumstances, efforts are made to disrupt IWT, but once wildlife has been killed and moved, the spatial scale of trafficking expands, making this endeavour extremely difficult (Utermohlen & Bain 2018). One result is new opportunities for offenders to avoid detection through adaptive strategies with enforcement officials responding to ever-changing offender tactics (e.g., Bennett 2011). Although our knowledge of IWT is growing, we currently have limited theoretical and practical understanding of how offender behaviours function in response to law enforcement activities.

Here, we apply the concept of restrictive deterrence—the process whereby offenders alter offense patterns (e.g., frequency or seriousness) to avoid sanctions (Jacques & Allan 2014) and employ strategies to reduce risk (Moeller, Copes & Hochstetler 2016)—to explore sanction avoidance in the context of IWT. We use data from an exploratory case study on urban wild meat trade in Republic of Congo (ROC) as an example of applying this framework and ways it can be used to progress theoretical inquiry on adaptive responses to sanction threats.

Background

Deterrence

Classical deterrence theory posits that if a sanction is sufficiently certain, severe and swift, it will deter criminal activity (Beccaria 1764/2009). Tests of this theory have yielded mixed results and there remains debate as to its explanatory power in the broader criminological literature (Paternoster 2010) and, more specifically, in the study of environmental crimes (Lynch et al. 2016; Moreto & Gau 2017). Researchers have found support for some aspects of classical deterrence and not others; for example, in one review of deterrence across crime types, the perceived certainty of being caught appeared to have a greater deterrent effect than the severity of punishment (Nagin 2013).

Studies on perceptual deterrence examine offenders' decision-making process; this inquiry has mostly focused on measuring perceived or assessed deterrent effects and their impact on specific crime rates in discrete illicit economies. Scholarship has largely focused on two possible outcomes: 1) absolute deterrence, where a potential offender is wholly deterred and does not commit a crime; and 2) an absence of deterrence whereby a potential offender is not deterred and carries out the offence (Gibbs 1975). However, assuming a binary approach to deterrence may miss opportunities to examine responses to sanction threats that neither result in absolute deterrence nor an absence of deterrence (Paternoster 1989). Risk perceptions can vary, meaning that some, but not all may be deterred, by the existence of a sanction threat (Loughran et al. 2012).

The literature has many examples of sanction avoidance strategies in illicit trade. Some crime groups strive for optimal efficiency by responding to risks through active detection avoidance and strategic responses to sanction threats (e.g., bribery) (e.g., Wang & Antonopoulos 2016). One study on drug trafficking mafia groups in Southern Italy showed a clear division of labour designed to protect key network figures from exposure to risk (Calderoni 2012). Another study highlighted how gemstone smuggling through airports or by sea was facilitated by network connections with customs officials and government agents (Duffy 2007).

Basu (2013) noted, '…the primary differences between licit and illicit supply chain actors are in the risk mitigation strategies employed by illicit supply chain actors, the use of supply chain assets and financing instruments designed for concealment and stealth, hyper-flexible operations, and elevated rate of adaptability in supply chain' (319). Illicit economy actors are adaptable, changing trafficking patterns and selecting alternative routes when faced with a law enforcement obstacle (Basu 2013). These adaptive offender strategies may hinder specific law enforcement effectiveness and call into question the general efficacy of sanction threats as a deterrent. Wright (2011) discussed the limitations of policing resources that are spread too thin, resulting in the failure of the war on drugs to deter the illicit trade and reduce harm. Alder and Polk (2005) expressed doubt about the effectiveness of seizures and punishment in the illegal antiquities market, again citing a lack of deterrent effect in the fight against drug trafficking as a failure of such approaches. A potential offender may be deterred from their initial modus operandum of criminal activity and select an alternative strategy to mitigate the risk of being caught or punished. In this regard, they still commit the crime, just in a manner that is behaviourally responsive to enforcement risks, assessed and perceived. Gibbs (1975) referred to this phenomenon as restrictive deterrence, or the 'curtailment of a certain type of criminal activity by an individual … because in whole or in part the curtailment is perceived by the individual as reducing the risk that someone will be punished as a response to the activity…' (33). Considering restrictive deterrence and sanction avoidance strategies may enhance the theoretical scope needed to explain some of the nuanced deterrent effects in an IWT context.

Restrictive Deterrence

Restrictive deterrence characterizes offender behavioural changes in response to a perceived sanction(s) over removing the criminal behaviour (Gibbs 1975; Moeller et al. 2016). In an IWT context, this suggests that an offender who perceives a sanction threat may respond adaptively by 1) altering the frequency or magnitude of crime; or 2) employing strategies to evade detection or reduce potential sanctions (Moeller et al. 2016). Restrictive deterrence falls under the umbrella of rational choice as part of a cost/benefit analysis in offender's decision-making process (Willison, Lowry & Paternoster 2018) such that people adjust their

behaviours based on perceptions of risk (Moeller et al. 2016). Restrictive deterrence also expands insights about offender behaviour beyond a simple cost/benefit calculation and acknowledges that learning is key to successful criminal activity (Gallupe et al. 2011).

Restrictive deterrence was conceptualized as having two dimensions, 1) probabilistic, and 2) particularistic (Jacobs 1996a). Probabilistic restrictive deterrence suggests offenders will reduce their frequency of offending out of a concern that there is a greater likelihood of apprehension when one is involved in more criminal activities (i.e., they reduce offending frequency in response to the perceived eventuality of getting caught) (Gallupe et al. 2011; Jacobs 1996a). For example, a trafficker may transit fewer goods at a time to reduce the likelihood of detection (e.g., KAZA 2019). In summary, the offender assumes that there is a chance of being caught and wishing to decrease those chances reduces the frequency or volume of illegal activity, behaving as if governed by the law of averages (Gallupe et al. 2011).

In contrast to probabilistic restrictive deterrence, Jacobs' (1996a) particularistic restrictive deterrence focuses on changes in tactical strategies used to reduce the likelihood of being noticed and apprehended. By changing tactics, an offender can evade detection or mitigate punishment severity upon detection. Here, an offender may not view apprehension as inevitable, maintaining the rate of offending but avoiding situations perceived to be dangerous and actively taking precautions to avoid arrest (Gallupe et al. 2011). Jacobs (1996a) conceptualized particularistic restrictive deterrence as having two strategic types: pre-emptive and reactive. The first strategy is anticipatory, where an offender takes defensive action to reduce apprehension (Jacobs 1996a). The second strategy is reactive, where an offender has been detected and made contact with enforcement (Jacobs 1996a). Moeller et al. (2016) conceptualized these into three strategies, collectively referred to as 'sanction avoidance': 1) avoidance (escape detection through strategic selection of spatial/temporal condition, such as choosing an alternative route); 2) management (reactive response to interactions with authorities, such as bribing to avoid a sanction) (see Jacobs 1996b); and 3) mitigation (strategies used to reduce the likelihood or severity of sanctions, such as negotiating to reduce a fine).

Research on restrictive deterrence and sanction avoidance strategies provides nuanced understanding regarding street crime offender' response to law enforcement, covering issues of street-level drug dealers, carjacking, auto theft, prostitution, and suburban drug sales (Jacobs 1996a; Jacobs & Cherbonneau 2012; Jacobs & Cherbonneau 2017; Jacques & Allen 2014; Moeller et al. 2016). Other research explores restrictive deterrence in the context of cybercrime, including 'internal computer abuse' (Willison et al. 2018), computer hacker behaviour (Maimon et al. 2014), and online criminal markets (Holt et al. 2015). Based on our review of the literature, restrictive deterrence has not been applied to IWT.

Illegal Wildlife Trade

Bennett (2011) stated that 'In the short-term the only practical way to reduce demand [for illegally traded wildlife] is through enforcement, both acting as a deterrent and also demonstrating that this is not a socially acceptable norm' (477). Yet, similar to other forms of illicit trade, there is insufficient evidence demonstrating deterrent effects of law enforcement interventions and there remain questions about the overall effectiveness of enforcement as a deterrent in IWT (Moreto & Gau 2017; Wellsmith 2011).

Evaluations of deterrence theory's component parts (i.e., certainty, severity, celerity) are rare in conservation research (e.g., Moreto & Gau 2017), with most inquiry focused on protected areas, anti-poaching patrols by rangers on foot, horseback, using dogs or air assets (e.g., Mulero-Pázmány et al. 2014). Increased numbers of patrols have at times resulted in increased detection of non-compliance (e.g., Linkie et al. 2015) and decreased poaching rates (e.g., Hilborn et al. 2006), but do not always result in lower poaching rates (e.g., Barichievy et al. 2017). Beyond the protected area level, evaluations of enforcement (e.g., during wildlife transport, trade, sale) are often limited and constrained by data availability. The need to address this gap is highlighted by concerns that implementing more regulations could drive some illicit trade underground where it is harder to detect (e.g., Wilkie et al. 2016).

Deterring IWT is complicated by issues of poor governance, corruption, and fraud (Mulualem et al. 2017; South & Wyatt 2011; van Uhm & Moreto 2017). Systemic reports of such forms of criminality across source, transit, and destination locations demonstrate responses to sanction threats that may not always result in absolute deterrence, with traffickers instead finding alternative strategies to mitigate the risk of being caught or punished. Previous research has identified and described hiding goods as a strategy in IWT (e.g., South & Wyatt 2011). For example, wildlife and wildlife products can be obfuscated with tin foil or agricultural products, mislabelled or incompletely labelled, and sometimes abandoned (Utermohlen & Bain 2018). Other sanction avoidance tactics include bribe payments to, and extortion of, border officials (Mulualem et al. 2017), or the use of fraudulent paperwork (South & Wyatt 2011).

If law enforcement does not deter all illegal wildlife traders, does that mean it has no impact on the scope and scale of IWT? Is it possible that although some individuals may be absolutely deterred, others are restrictively deterred? Developing a better understanding of sanction avoidance strategies in the context of IWT may help answer these questions and inform evaluation research on the impact of enforcement strategies. Thus, we consider sanction avoidance strategies used in IWT and how articulating these strategies could lead to more in-depth theoretical exploration. Although we do not test deterrence theory or restrictive deterrence, this work is designed to be a starting point from which future research can dig deeper into the causal mechanisms underlying responses to enforcement efforts.

We draw on an exploratory case study of the illegal wild meat trade in Pointe Noire, Republic of the Congo (ROC) to illustrate the use of sanction avoidance strategies. ROC, on the South Atlantic Ocean, is one of the largest oil producers in Africa, yet more than half of the country remains forested (CIA 2020). These forests are home to many endangered species but their vulnerability to IWT is an ongoing problem of conservation concern in ROC (e.g., Cox et al. 2020). Research presented here was part of a larger collaborative project designed to understand both the wild meat supply networks and end consumers (e.g., Gluszek et al. 2021, Gore et al. 2021). Research in this article contributes to this knowledge base of IWT in ROC.

Illegal Urban Wild Meat Trade

Wild meat trade is widespread in Africa's Congo Basin and has deep historical roots connected to culture, religion, medicine, identity, gender, social relationships, and power (Abernethy et al. 2013). In rural settings, wild meat often remains a primary source of protein and provides a foundation for subsistence living (Bennett et al. 2007; Mbete et al. 2011). Although there may be sustainable wild meat consumption at the local household level, there is concern among experts that commercial trade to cities is unsustainable, threatening wildlife populations (Mbete et al. 2011; Nasi, Taber & van Vliet 2011; Wilkie & Carpenter 1999) and subsistence-level/local human consumption (Bennett et al. 2007). In urban areas, alternative sources of affordable domestic protein are available but there is still a high demand for wild meat as a luxury item (e.g., LaCerva 2016) or reminder of 'home' (Chausson et al. 2019; Wilkie et al. 2016). Current wildlife enforcement capacity remains limited, with many urban markets continuing unenforced (Wilkie et al. 2016). This restricts the ability to target networks underlying the urbanization of the wild meat trade effectively.

One precursor for managing risks associated with the wild meat trade is to assess the nature and scope of the illicit economy. The literature provides insight about hunters (e.g., Pailler et al. 2009), village-level consumption (e.g., Kümpel et al. 2010; Poulsen et al. 2009) and estimating species diversity at wild meat markets (e.g., Fa, Currie & Meeuwig 2003). There has been sustained research on rural aspects of the trade within West and Central Africa (e.g., Taylor et al. 2015), and some studies have mapped the types of actors involved in the trade and the flow of wild meat through the supply chain (Boakye et al. 2016; Cowlishaw, Mendelson & Rowcliffe 2005; Mendelson, Cowlishaw & Rowcliffe 2006). Cities are only recently coming into focus, particularly with respect to the unique aspects of urban supply chains (e.g., Chausson et al. 2019; Gluszek, Viollaz, & Gore 2018; Kahler et al. 2019). Beyond a general lack of inquiry on the illegal wild meat trade's urban dimensions, scant attention has been paid to the deterrent effects of both formal and informal sanction threats.[1] Formal sanction threats are those posed by official organizations tasked with enforcement, such as police giving fines or border officials confiscating goods. Informal sanctions stem from non-state actors and can emerge from the community, peers or family (see Apel & DeWitt [2018] for further discussion). For example, a wildlife market with regulations that sanction members that do not comply or someone experiencing disapproval from their peers for their actions.

Methods

Case Study

Case studies are appropriate in field-based research contexts where baseline information can be sparse, social conditions complex and time is limited (Yin 2018). Such an approach can help advance theoretical understanding, in this case, about sanction avoidance strategies for an IWT context. The method was ideal for the exploratory nature of our inquiry on the urban wild meat trade. Our study focused on the source, transit, and demand segments of the illegal trade identified by donors, including the European Union Action Plan Against Wildlife Trafficking (2016), the United States National Strategy to Combat Wildlife Trafficking (2015), and African Union Strategy to Combat Illegal Trade in Wild Flora and Fauna in Africa (2015).

[1] We do not advocate for criminalizing individuals involved in the wild meat supply chain, or for increased law enforcement activities, as this may be detrimental to rural populations who are dependent on wild meat (Bowen-Jones et al. 2003).

Study Site Description

The majority of ROC's population resides in the capital city of Brazzaville, Pointe Noire on the coast, and along the rail corridor connecting these two urban centres. ROC's natural resource industries include oil, fishing, mining, and timber (CIA 2020). Rich in biodiversity, the country is part world's second-largest tropical forest that acts as an important transboundary corridor for thousands of mammal, bird, and plant species, including 3,000 endemic species (USFWS 2014). Pointe Noire, a city of over 1 million people[2] was selected as a case study site based on the known flow of wild meat into the urban centre from rural regions and protected areas.

Legal Context of Wild Meat Trade and Rule of Law

There are no restrictions on wild meat consumption stated clearly in the ROC's legal framework. Hunting is regulated by a series of laws protecting wildlife and wild habitats. Wildlife in the ROC is listed under three Annexes: I—fully protected species, hunting is prohibited; II—partially protected species, a game license is required; and III—species without special status which can be hunted for subsistence, but not traded (Government of Republic of Congo 2015). Law n° 37-2008 states that hunting is prohibited in all protected areas unless there are special derogations. Night hunting is prohibited. Hunters must register their hunting weapons and pay for a small-game or big-game permit each year. Annex I protected species are forbidden to circulate on national territories, and non-protected species should be given a health certificate and certificate of origin. All wild meat arriving in Pointe Noire (and other cities such as the capital Brazzaville) is illegal according to the rule of law; however, the laws are not necessarily known, understood, or enforced.

Data Collection

We collected data using multiple procedures to triangulate data June 2016–January 2017 (Singleton et al. 1993) and across different geographies of the supply chain (e.g., broad metro area of Pointe Noire, Conkouati-Douli National Park, Tchimpunga Nature Reserve, the district of Kakamoeka (**Figure 1**) and border region with Angola) (**Table 1**). Sites were identified through consultation with researchers working in the

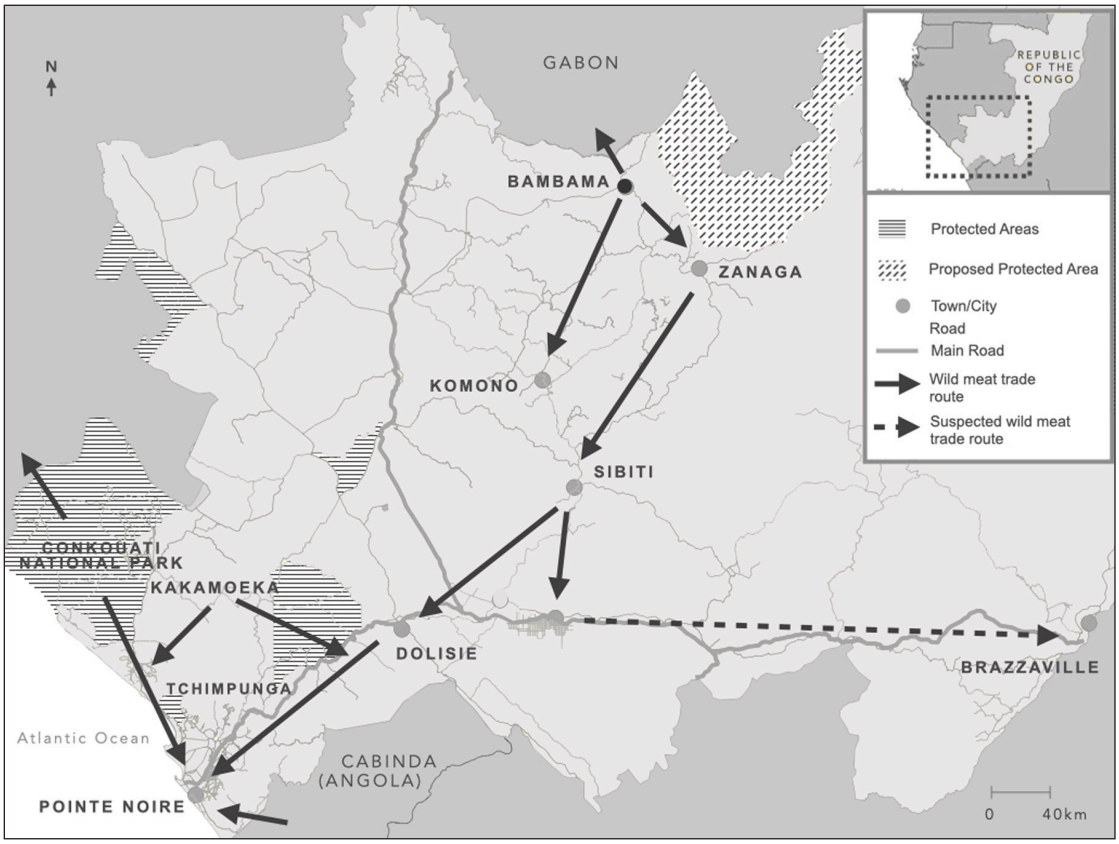

Figure 1: Regional flow of wild meat from rural areas to the city of Pointe Noire, Republic of the Congo (adapted from Boratto & Gore 2017, 2018; Kahler et al. 2019).

[2] http://www.worldbank.org/en/country/congo/overview (update 11 January 2019).

Table 1: A variety of data collection procedures were used for this research in order to capture different stages of the supply chain.

Supply Chain Stage	Stakeholders or Points of Interest	Data Collection Procedure		
		Face-to-face surveys	Participant observations	Focus group discussions
Source	Hunters adjacent to protected areas or forests	n = 38		n = 1
Transit	Transportation hubs		n = 86	
Destination	Markets		n = 196	
	Vendors	n = 8		n = 1
	Restauranteurs	n = 6		
	Restaurants		n = 374	
Entire Supply Chain	Law enforcement authorities and key informants	n = 4		

region, employees from the National Park, nongovernmental organization personnel and local field assistants. Research methods were IRB approved and all surveys, focus groups and interviews were conducted with participant consent. Participants were given the opportunity to decline participation and reminded that they could choose not to answer questions or end participation at any point. All interviews and focus groups were conducted by or in collaboration with local field assistants speaking in either French or a local language. For a detailed description of data collection protocol and a summary of the supply chain structure, see Boratto and Gore 2017, 2018.

Analysis

For qualitative data, we used provisional coding with a start-list (Miles et al. 2020) to code for sanction threats and sanction avoidance strategies outlined by Moeller et al. (2016) as avoidance, management, and mitigation and their links in illegal trade (e.g., source, transit, demand). Coding the differences between Moeller et al.'s (2016) management and mitigation strategies proved challenging as it was difficult to distinguish when a described interaction was a response to interactions with authorities or a response to given sanction (e.g., attempting to pay bribes to avoid or reduce fines). For this reason, these strategies are presented together. Other coding challenges included the interpretation of incidents where a courier was paid to transport goods. Those paying someone to transport goods could be classified as being proactive (i.e., using avoidance strategies), while the courier themselves may be reactively responding to sanction threats (i.e., management/mitigation) as they pass through checkpoints (e.g., attempting to pay a bribe). We also generated summary statistics from survey data and produced trade maps with georeferenced links using Q-GIS to help interpret interview and focus group data.

Study Limitations

Case study results are not generalizable; however, results do provide one lens for considering dimensions of sanction avoidance within the context of urban wild meat trade and identifies future areas for confirmatory or quantitative inquiry. We were unable to access those who acted as intermediaries or couriers in the wild meat trade for surveys or interviews, therefore results are limited to the perspectives and experiences of those who interact with them (e.g., hunters, vendors, restaurateurs, key informants) and observation. This study is further limited in its ability to gauge the influence of factors influencing supply and demand, such as wildlife population status and market price fluctuations, which could influence willingness to take risks at various points along the supply chain. Our results are presented as one step towards building an enhanced understanding of responses to sanction threats.

Results

Our goal was to characterize sanction avoidance and key components of the illegal urban wild meat trade. We first present results on perceived sanction threats and deterrence, followed by sanction avoidance strategies.

Perceived Sanction Threats

Wild meat was transited into the city by a several different types of people, including individuals visiting rural areas, hunters selling at markets or to restaurants, buyers that go into rural areas to purchase meat in bulk to bring to the city, and other intermediaries hired to transport wild meat (e.g., people hired specifically to transport wild meat or those working in the transportation of other goods). Some meat is taken directly from rural regions to households or restaurants, while other meats are first transited through urban ground transportation hubs and/or markets before being sold to the final buyer. Participants described barriers to selling wild meat to urban markets, including enforcement obstacles. They identified five departments (Congolese administrative units) as source locations for wild meat. These regions are connected to Pointe Noire by four main transportation routes, along which there are numerous checkpoints administered by military, police, forestry ministry agents (Ministere d'Economie Forestiere), and ecoguards (officers under ROC's park agency). Some individuals working across the supply chain recognized these checkpoints as possible barriers to the trade. Participants described different sanction threats in the wild meat supply chain, including confiscations, taxes, fines, or arrest, depending on the species of wildlife and the volume.

At the source stage, hunters near the National Park described encounters with ecoguards and awareness that wild meat could be confiscated and perhaps burned if detected. The two obstacles to the wild meat trade most cited by participating hunters were ecoguards (26%) and enforcement confiscations (24%); others referred to roadblocks (8%).[3] Some participating hunters provided examples of ecoguards seizing wild meat while transporting meat out of the park.

During the transit stage, those attempting to transport wild meat into the city via major road routes must pass through a series of checkpoints, including forestry ministry agents, police and military. Some checkpoints are formal and permanent posts, while others are temporary structures or random checks. At each of these stops, it is possible to encounter a sanction threat or have wild meat confiscated. This occurs formally by those mandated to monitor wildlife trade (e.g., forestry ministry agents, ecoguards) or opportunistically by those in a law enforcement position and therefore position of power (e.g., military). Depending on the source location and route that wild meat takes, transporters may travel through numerous checkpoints before arriving in the city, including posts monitored by police, military, or forestry ministry authorities. Individuals or groups transporting wild meat through these posts risk being detected, which could result in the seizure of their goods or sanctioning (e.g., fines or charges).

In Pointe Noire, wild meat, except for gorilla and elephant species, was openly traded at public ground transportation hubs and markets and sold openly in urban restaurants. Observations of wild meat unloaded from vehicles at five transportation hubs revealed the open trade of 217 animal carcasses, whole and in pieces, in 88 incidents. No active enforcement of wildlife laws was visible by line of sight at the transportation hubs or markets during observation periods. In general, urban enforcement efforts were focused on strictly prohibited species such as gorilla, chimpanzee, and elephant species, which were not (with one exception) observed in the market surveys.

Deterrence

Some participants acknowledged historical changes in the wild meat supply chain. One police officer described how the volume of wild meat traveling by road decreased after the civil war.[4] He credited laws in place with reducing the flow, citing knowledge of checkpoints and hunting season closures. Focus group participants also stated that the volume of wild meat coming out of Conkouati-Douli National Park (Conkouati) had decreased over time, positing that the presence of the ecoguards was deterring flow.[5] Similarly, some hunters in Conkouati said they did not want to risk getting caught, so they only sold locally in the village. One hunter stated, 'why bother to hunt? It is not possible to sell in the city,' describing transportation challenges due to ecoguard operations [Hunter 4298]. Almost one-quarter of hunters surveyed from the Conkouati region and 63% of hunters surveyed said Pointe Noire was the final destination for traded wild meat. Buyers go to the villages specifically to purchase or order wild meat in bulk for transport to the city. In Kakamoeka, 76% of hunters said wild meat was sold directly to buyers. The majority of the observed wild

[3] Percentage of hunters who responded that this would be an obstacle. Other non-enforcement obstacles were also cited, including lack of transportation (10%), meat rotting during transportation (18%), and lack of customers (21%).

[4] Congo went through several consecutive periods of civil war and unrests (1993–2002). Congolese commonly use these dates as a temporal reference of their lives 'before' and 'after' the war.

[5] Scarcity of prey was also cited as an issue by some of the hunters surveyed.

meat traded through ground transportation hubs in Pointe Noire travelled from these regions, so some but not all trade was deterred.

Sanction Avoidance in the Urban Wild Meat Trade

This case study inquiry indicated that some involved in the illegal urban wild meat trade took efforts to avoid sanction threats using multiple strategies. Survey and interview respondents described four specific methods used to evade checkpoints. These include two *avoidance* strategies: 1) hiding wild meat and 2) unloading wild meat from vehicles and hiking around enforcement checkpoints; a *management/mitigation* strategy: 3) attempting bribery; and 4) attempting to pay a courier to navigate their wild meat through checkpoints (e.g., negotiate with law enforcement to pass checkpoints), which could involve the use of *avoidance*, *management*, or *mitigation* strategies. Interviews with key informants reiterated that those involved in the supply chain used these methods.

Avoidance

Jacobs (1996b) described avoidance strategies as responses that shift spatial and temporal patterns, such as going around checkpoints, changing the time of day to offend, and hiding products. Hunters were asked to identify obstacles one might encounter if they attempted to sell wild meat in Pointe Noire. Most of the participating hunters willingly and openly disclosed details about how wild meat was transited into the city because the activity is not widely perceived as being a serious crime, the interviewers communicated that they had no law enforcement authority, and projective questioning was used. Approximately half of the hunters surveyed in this research (53%) described wild meat being sold to a third party to reduce risk by avoiding the need to transport wild meat through checkpoints for urban sales. Other hunters described paying for a truck driver or a courier to take the meat to the city. Some of those transporting the wild meat themselves reported techniques to avoid checkpoints. One hunter [9988] described hiking with wild meat at night for nine hours to circumnavigate ecoguard posts to catch a truck into the city. Others described how some riding on trucks get off before a checkpoint, hike with their wild meat through the forest and catch a ride on the other side to avoid detection. Ecoguards countered these efforts by hiding in trees to monitor activity and radio other ecoguards to intercept.

It was also common practice, according to study participants, for those transporting wild meat to evade detection by hiding it underneath other goods. Observations along the supply chain noted wildlife (e.g., a live soft-shelled turtle) hidden in sacs beneath other durable and sometimes perishable goods being sent to the city by public transport. One police officer described how wild meat could be hidden in vehicles under bananas. Similarly, at the urban transportation hubs, 17 incidents were observed in which wild meat that had been concealed during transport was openly unloaded and overtly traded upon arrival into the city.

Management and Mitigation

Management and mitigation strategies involve reactive responses to interactions with authorities (Moeller et al. 2016), such as attempting to pay a bribe, arranging passage, or trying to lessen the impact of a sanction. Study participants, particularly vendors, confirmed using these strategies to continue moving products along their supply chain. This implies traders may be budgeting for costs related to management strategies (e.g., attempting to pay someone to look the other way) as part of their business models. Study participants noted some traders would call on their 'connections' or pay a third party or courier to arrange for safe passage of their goods. Phone calls and other electronic communications were cited as being used to facilitate and coordinate passage. According to participants, these management strategies were widely deployed across the supply chain, with both wealthy and non-wealthy traders participating.

Discussion

Restrictive deterrence is a relatively under-discussed theoretical perspective under a broader rational choice framework that could advance knowledge of law enforcement effects on illicit networks (Willison et al. 2018), such as IWT supply chains. Our mixed-methods approach produced foundational insight about the characteristics underlying the basic structure of one illegal wild meat supply chain and enabled conceptual exploration of sanction avoidance in the context of wildlife trade, specifically the illegal wild meat trade into urban markets. Because restrictive deterrence may occur even in the absence of absolute deterrence, focusing evaluations of illicit trade interventions on absolute deterrence may artificially oversimplify and restrict one's ability to consider other processes that influence offender response to a perceived sanction threat. In this case study, some study participants perceived a sanction threat (e.g., police checkpoint) and adaptively

responded to the threat by hiding goods or attempting to negotiate with authorities. Enforcement may not deter all offenders under all conditions, but sanction threats may instigate the use of sanction avoidance strategies, subsequently altering trade patterns in meaningful ways.

Future research on IWT could segment the trade into discrete spatial stages to test for specific causal mechanisms that result in the adoption of particular sanction avoidance strategies at each link in the supply chain. Here, we consider three key domains of restrictive deterrence that may be relevant to future research, using categories outlined by Moeller et al. (2016) as a baseline: 1) sanction avoidance strategies, 2) characteristics of crime, and 3) offender learning mechanisms.[6]

Sanction Avoidance Strategies

The most notable strategies employed by participants in our case study included avoidance (e.g., hiding goods) and management (e.g., negotiation, attempted bribery, corruption). Articulating these behaviours raises new questions about why sanction avoidance strategies are used and why certain types occur in some situations and not in others. Some participating hunters described hiking around checkpoints to evade detection. The presence of these strategies raises questions about the effectiveness of enforcement and what we can expect from such efforts depending on who is involved and the stage of the trade. For example, how are different sanction avoidance strategies employed by different people? Can they vary based on their location in the supply chain and their position of power?

Although the majority of this paper has centred around sanction threats from law enforcement authorities, there is some indication that informal sanctions were also present (i.e., sanctions stemming from peers and non-law enforcement authorities). In our case study, there were indications in vendor focus groups that informal sanctions may have emerged from vendor regulations in urban markets. For example, vendors selling illicit goods may be excluded or condemned by peers. Future research could explore the differences between sanction avoidance strategies used in response to formal and informal sanction threats.

Characteristics of the Crime

Moeller et al. (2016) described the characteristics of restrictive deterrence as crime discreetness (e.g., enforcement ability to recognize and identify a criminal event), frequency of offending (e.g., volume sold, number of customers willing to sell to), and market-based crime and frictions (e.g., changes in availability, demand, and price associated with sanction risk). These characteristics may influence the selection of sanction avoidance strategies at different points along the supply chain. For example, Basu (2013) noted in drug trafficking that the greater the legitimacy of transportation (i.e., more legal), the greater the effort required to conceal illicit goods among legitimate cargo. The transportation mode selected could dictate the level of concealment needed to evade detection. Some methods may require less discreetness (e.g., goods may be hidden on public transportation but not in a private vehicle). In this regard, the transportation method's characteristics dictate the ability to select a particular sanction avoidance technique. In this study, some wild meat to was hidden under legitimate goods (e.g., agricultural products) on public transit, but the frequency of personal vehicle use and the relative need to hide goods in those vehicles is not clear. Future research could explore the use of sanction avoidance strategies between different transportation methods and the legitimacy of the good traded (e.g., the laundering of illicit goods as licit, see Basu 2013; Warner et al. 1990). The disguising of illicit goods in licit products is a standard procedure in the field of drug trafficking, for example. This pattern may offer fruitful comparisons of risk management strategies across illicit supply chains.

Although this study did not directly measure changes in discreetness, frequency, or volume of trade, there were indications that sanctions for smaller quantities of trafficked wild meat would be less severe than they would be for larger volumes. One hunter indicated he would carry his wild meat out of the protected area at night, thus putting a temporal restriction on his trade. In other areas of the literature, there are indications that IWT smugglers will choose to traffic on particular days or times of the year, knowing that there is less enforcement during those times (Utermohlen & Bain 2018). Future research could unpack possible adaptive responses by looking at the volume, frequency, and temporal spacing of trade in response to the characteristics of trade routes, while controlling for trends associated with supply (e.g., seasonal variations in hunting due to ecological factors and habitat accessibility) and demand (e.g., market price).

[6] Moeller et al. (2016) also explored the concept of offender deterrability. We do not discuss deterrability in this paper, but it is worthy of future investigation in the IWT context.

Moeller et al. (2016) also described 'market-based crime and frictions' as conditions that influence sanction avoidance strategy selection, recognizing that market prices may go up and down and therefore influence willingness to take risks. For example, prices in the drug market can go up in response to enforcement (Caulkins & Reuter 2010). Similarly, increased enforcement measures in China showed a temporary reduction in the illegal elephant ivory trade, but this was followed by a subsequent rise in market price (Zhou et al. 2018). Considering the benefits of wildlife trade, such as increases in market price or a shift in markets (e.g., to an international market), may produce a more nuanced understanding of the underlying drivers behind the strategic responses to sanction threats. A comparative analysis of illicit value chains, including IWT, could also consider how borders pose barriers for different illicit economies and the relationship between increases in detection risk and price inflation.

Offender Learning

Learning is an important process in restrictive deterrence, given the reciprocal effect of past offending on future offending (Akers 1990; Mungan 2010). For every success, the offender learns new techniques to facilitate future criminal activity (see e.g., Gallupe et al. 2011). Learning can be facilitated by 'technical criminal capital' (i.e., gaining the skills and tools needed for crime) and 'criminal social capital' (i.e., developing the social network to learn skills and gain criminal opportunities) (Moeller et al. 2016) and also through the exchange of information on sanction threats (Dickinson & Wright 2015). In the wild meat trade in the area surrounding Pointe Noire, hunters took orders, were provided hunting equipment, and traded with those in their social network (Boratto & Gore 2017). These social links may be providing opportunities to engage in illicit trade through access to buyers, networks for bribes, and knowledge on how to evade detection or manage interactions with authorities. Future research could characterize the relationship between access to criminal and social capital (e.g., cultural and familial ties, level of organization among offenders) and the learning process to examine offender (or groups of offenders) responses to sanction threats.

Conclusion

Globally, there is agreement about the importance of enforcement responses that anticipate and respond to shifting trafficking methods for dismantling illegal trade networks (Utermohlen & Bain 2018). Improved scientific understanding about the basic elements in the urban market, trade mechanisms, and responses to enforcement provides new perspectives that practitioners may consider in their efforts to combat illicit trade, such as for wild meat. Our research suggests that scientifically advancing conceptualization of IWT to consider circumstances that move beyond expectations of absolute deterrence and include principles of restrictive deterrence may help provide a stronger scaffold from which we can explore and build a broader understanding of the impact of formal and informal sanction threats. In practice, including the concept of restrictive deterrence in strategic planning efforts may help practitioners identify underlying causal mechanisms that influence responses to crime prevention efforts and inform design, implementation, and evaluation efforts that target illicit supply chains.

Competing Interests

The authors have no competing interests to declare.

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