

Poverty, Pandemics, and Wildlife Crime

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Abstract

The COVID-19 pandemic has caused a global recession and mass unemployment. Through reductions in trade and international tourism, the pandemic has particularly affected rural economies of tropical low- and middle-income countries where biodiversity is concentrated. As this adversity is exacerbating poverty in these regions, it is important to examine the relationship between poverty and wildlife crime in order to better anticipate and respond to the impact of the pandemic on biodiversity. To that end, we explore the relationship between poverty and wildlife crime, and its relevance in the context of a global pandemic. We examine literature from conservation, criminology, criminal justice, and social psychology to piece together how the various dimensions of poverty relate directly and indirectly to general criminal offending and the challenges this poses to conservation. We provide a theoretical framework and a road map for understanding how poverty alleviation relates to reduced wildlife crime through improved economic, human, socio-cultural, political, and protective capabilities. We also discuss the implications of this research for policy in the aftermath of the COVID-19 pandemic. We conclude that multidimensional poverty and wildlife crime are intricately linked, and that initiatives to enhance each of the five dimensions can reduce the poverty-related risks of wildlife crime.

Keywords: conservation, COVID-19, environmental crime, criminology, poaching, rural development

INTRODUCTION

The relationship between poverty and environmental degradation has received a lot of attention in recent years from researchers and conservation practitioners alike (Duffy and St John 2013; Twinamatsiko et al. 2014; Duffy et al. 2016; Lunstrum and Givá 2020). Integrating economic, social, and environmental development and poverty-sensitive approaches to biodiversity conservation have become priorities under the 2030 Agenda for Sustainable

Development (United Nations 2015). Many studies have focused on the various impacts that protected areas and conservation efforts have on local livelihoods (Cooper 2020). However, understanding how poverty alleviation may impact conservation is similarly important as the majority of people who live in poverty are concentrated in rural areas of the tropics and subtropics with rich natural resources (Fisher and Christopher 2007; Redford et al. 2008). The COVID-19 pandemic presents new challenges to poverty reduction in these areas, but the implications of this for biodiversity and wildlife crime have not been explored.

Often considered from a strictly economic perspective, poverty encompasses all aspects of human well-being (OECD 2001; Bourguignon and Chakravarty 2019). Impoverished households often lack food security, and access to basic education, healthcare, clean water, and energy (Sen 2000, 2001). The Organization for Economic Cooperation and Development (OECD 2001) defines poverty as having five core inter-linking dimensions which include

Access this article online	
Quick Response Code:	Website: www.conservationandsociety.org.in
	DOI: 10.4103/cs.cs_193_20

the lack of economic, human, socio-cultural, political, and/or protective capabilities. Ineffective and inequitable natural resource revenue sharing, vulnerability to climate change, and the lack of basic capabilities results in people being forced to spend most of their time working in low-level jobs and/or gathering resources (Bradshaw 2007; Barbier 2010; Bauer et al. 2016). The world's most impoverished rural people are often forced into resource exploitation, which can degrade the very natural resources that their survival depends on (Barbier and Hochard 2018) and lower their ability to access capacity-building opportunities to break out of the poverty trap. Hence, studies on the relationship between poverty and conservation have referred to a 'downward spiral' of poverty and ecosystem degradation (Scherr 2000; Barbier and Hochard 2018). The downward spiral concept encompasses the idea that people living in poverty place increasing pressure on their local environment, creating a feedback loop which increases human populations, further limits access to natural resources, and limits the capacity for sustainable resource management (Scherr 2000). The resulting environmental degradation leads, in turn, to declining wages, consumption, human health, and food security (Cleaver and Schreiber 1994; Animashaun 2019). This ultimately leaves people living in poverty entrapped in a vicious cycle (Kassa et al. 2018a; Barbier and Hochard 2018; Animashaun 2019).

The poverty-conservation nexus is an important consideration in the context of COVID-19, which threatens rural livelihoods, especially in low- and middle-income countries (LMICs). For the first time in two decades of global poverty reduction, poverty rates will increase (World Bank 2021a). As the global economy continues to fall into a recession, unemployment rates will increase, wage rates will decrease, and a large number of remaining jobs will be part-time, low quality, and have little or no security. Widespread border closings, and restrictions on travel and public gatherings, have also led global tourism to a near halt (Gössling et al. 2020). Even informal employment and earnings are threatened by decline of urban markets for rural goods and services, social distancing rules, and a lack of childcare options—a threat which is most impactful on women-owned businesses (Fox and Signé 2020). The pandemic will continue to cause severe disruptions to essential well-being services, education, and healthcare systems (World Bank 2021a). Based solely on a unidimensional definition of income poverty, the World Bank (2021a) is estimating that between 119 and 124 million people either fell below or were prevented from escaping the extreme poverty line in 2020 as a result of COVID-19.

Generally speaking, poverty in all of its dimensions leaves people marginalised and under pressure to engage in innovative forms of deviance and criminality (Goode 2016), including environmental and wildlife crime. Here, we consider wildlife crime to be any act committed contrary to national laws and regulations intended to protect fauna and flora (CITES 2012). Many people living in LMICs lack easy access to legitimate, stable market opportunities, and therefore may engage in the

production side of wildlife crime as an economic survival strategy. This also includes people in locations with ineffective or corrupt institutional support for mainstream business (Venkatesh 2006; Gilman et al. 2011). Similarly, poverty can directly impact the rates of illegal use of natural resources. Continuous engagement in environmental crime can provide economic support to individuals and communities as a source of regular income, a safety net, or even as capital reserves and assets to start a more legitimate business (Duffy and St John 2013; Gilman et al. 2011).

To date, limited evidence exists on the consequences of poverty alleviation on wildlife crime. We provide a theoretical framework to illustrate how being deprived of basic 'capabilities' interferes with conservation objectives and strengthens the illegal system under which wildlife crime operates. We first outline deficiencies in five distinct capabilities that contribute to, and sustain, impoverished circumstances, which in turn can result in engagement in wildlife crime. It is important to note that our emphasis here focuses on the supply stage of wildlife crime as it relates to illicit trade, wildlife crimes for personal use (i.e., subsistence, cultural and traditional practices, religious practices, etc.), and on illegal killings due to negative human-wildlife interactions (HWI). Furthermore, we situate this discussion within the context of the COVID-19 pandemic and outline a road map on how conservation and development efforts can better address these capabilities.

ARGUMENT

Economic capabilities

A common aspect of virtually all definitions of poverty is the lack of opportunities to earn an adequate income, and to have assets. This links with a large body of literature that has identified a relationship between increasing crime levels and poor labour-market conditions, indicated by decreasing wage rates or increasing unemployment rates (e.g., Fadaei-Tehrani 1989; Raphael and Winter-Ebmer 2001; Machin and Meghir 2004; Tang 2011). Poor economic and labour-market factors are also believed to be a key driver of illicit hunting and resource extraction (e.g., Nurse 2015; Harrison et al. 2015; Hauenstein et al. 2019; Figure 1). Natural resources such as timber or bushmeat are extracted illegally and sold locally to make money to meet individuals' basic needs (Brashares et al. 2004; Kassa et al. 2018b). This was observed following the 2008 financial crisis, when increased unemployment rates led many people to turn to illegal hunting and destructive agricultural practices (Sayer et al. 2012). Illegal charcoal production can also be used to generate income for households suffering from declining agricultural yields (Gardner et al. 2015).

The inability to secure steady or sufficient financial resources can lead individuals to turn to illicit activity to generate income, to stabilise household consumption, or as an outlet for poverty-related psychological stress (Chalfin and Raphael 2011). Indeed,

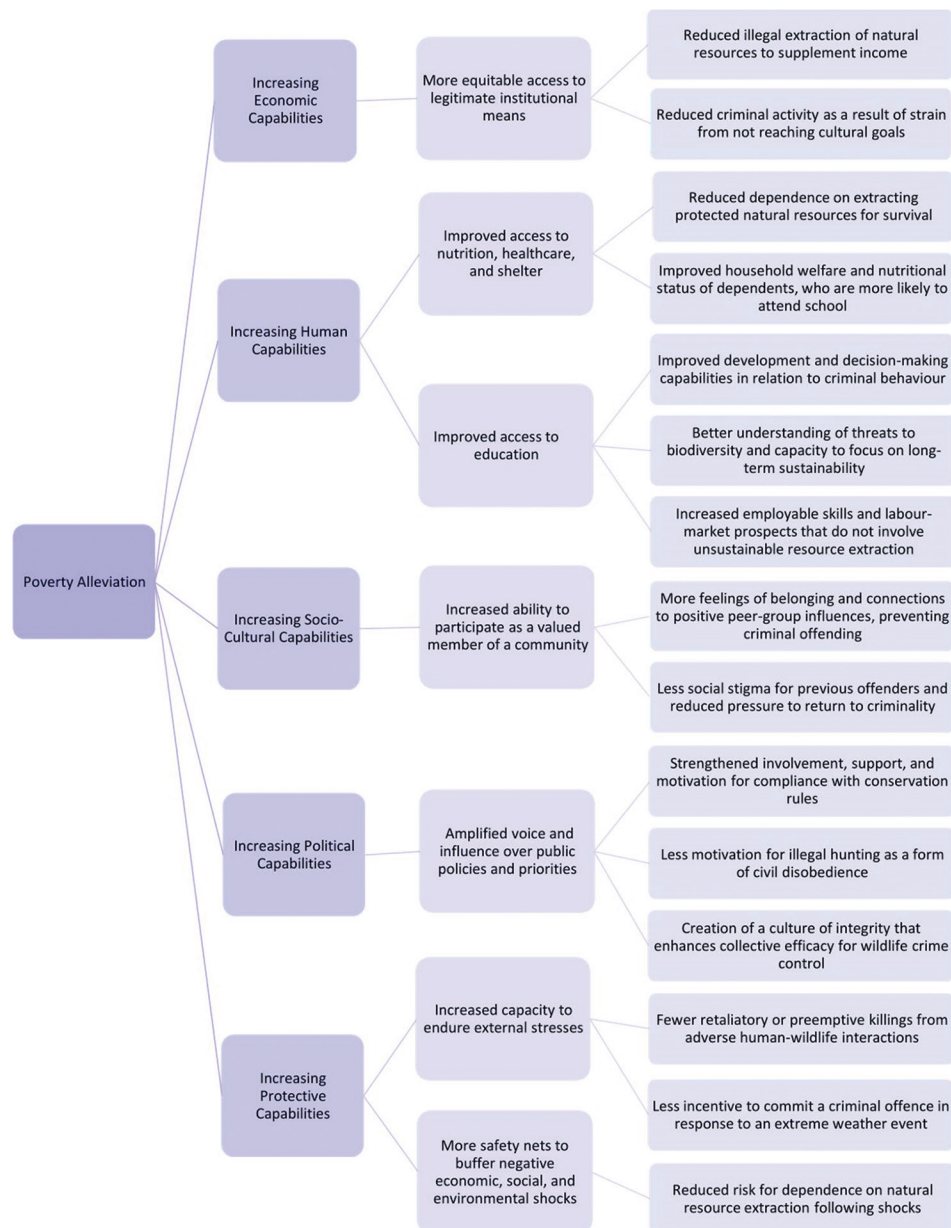


Figure 1

A simplified theoretical framework outlining the various pathways linking poverty alleviation and reduced wildlife crime

economic strain has long been recognised as an important correlate of criminal behaviour with prior scholars highlighting the role of structural inequality, and the disconnect between cultural goals and the means to achieve said goals. In his seminal article, Merton (1938) outlined how cultural goals, including those centered on economic activity and success, are influenced by the availability of legitimate institutionalised means (e.g., employment). In short, individual psychological strain develops when people are unable to achieve culturally-defined goals (e.g., home ownership). The interaction between culture goals, the (un)availability of institutional means, and strain leads to five distinct adaptations: conformity, innovation, ritualism, retreatism, and, perhaps most relevant for wildlife crime, rebellion. Innovation is also relevant to our discussion here since

individuals within this group subscribe to culturally-defined goals, but use illegitimate means (e.g., wildlife crime) to attain them (Merton 1938). Agnew's (1992) general strain theory can also be applied to explain the link between economic and labour-market factors, and wildlife crime. Agnew (1992) proposed that people experience strain when a positively viewed component of their lives (e.g., steady employment) is removed or when a negative element is added (e.g., pandemic). This is particularly relevant given the impact of COVID-19 on conservation revenue, employment opportunities, and associated reduced availability of protection services to mediate negative HWI (see Section 'Political capabilities').

The ability to achieve cultural goals have also been shaped by powerful processes of exploitation, discrimination, exclusion,

and oppression that have led to immense inequalities within and between countries. Many LMIC and high-income countries alike are recovering from historical legacies that have defined social classes, including structural divides based on race, ethnicity, gender, religion, nationality, and caste systems. As such, overall gains in global poverty reduction have not always corresponded to a reduction in inter- and intra-country inequalities. This is important as economic inequality may be the main driver of illegal hunting in some contexts (Lunstrum and Givá 2020). Furthermore, recent research has found that many proposed COVID-19 recovery policies, programmes, and initiatives do not take an equity approach, and therefore will exacerbate existing inequities (Mawani et al. 2021). As will be discussed, post-COVID-19 economic interventions should prioritize equity and social justice, and should be well-targeted so that support for economic capabilities reaches the most affected.

Human capabilities

Human capabilities include access to food, healthcare, education, clean water, and shelter (OECD 2001), and there are clear and direct links to how related deprivations lead to illegal resource use (Figure 1). For instance, fish and bushmeat are frequently harvested illegally to directly meet subsistence needs as a source of protein (Brashares et al. 2004; Knapp 2012; Knapp et al. 2017). Protected areas are frequently exploited for building materials, firewood for cooking, and medicinal plants (Chamberlain et al. 2004; Harrison et al. 2015). Other resources are collected to make goods when they are preferred, more accessible, or cheaper than manufactured alternatives (Twinamatsiko et al. 2014; Harrison et al. 2015). Illegal resource use is often not a livelihood of choice, but can provide a “safety net” or “gap-filler” function for people when their preferred sources of income fall through (Sunderlin et al. 2005), and where wider society does not have effective safety nets. Examples of safety net functions include gap-filling employment and sources of food in the agricultural off-season, savings for old age, and emergency income following shocks and tragedies (Sunderlin et al. 2005; Gardner et al. 2015).

These human capabilities also interact among themselves. For example, a lack of access to clean water, sanitation, and healthcare facilities means children are more likely to miss school due to illnesses. Conversely, education increases labour-market prospects and therefore increases the opportunity cost of crime and reduces post-school criminal activity (Lochner and Moretti 2004). Parental education is also correlated with nutritional status of children (Iftikhar et al. 2017), and household welfare (Orbeta 2005). The relationship between poverty, vulnerability and family size is strong and long-lasting (Orbeta 2005). Households with a large number of dependents, tend to be most directly reliant on natural resources to meet basic needs, and to have a greater likelihood of engaging in illegal forest activities (e.g., Atuo et al. 2020).

Immediate efforts to improve human capabilities as part of COVID-19 recovery can include conditional or unconditional

cash transfers to help stabilise livelihoods for people who have struggled to retain employment (Mawani et al. 2021). In-kind transfers may also include distribution of food, school feeding programmes, vouchers, and other basic items such as soaps (Mawani et al. 2021). While state-sponsored provision of food or medicine may be the most appropriate response in some cases, such as following disaster events, in the long-term this approach is disempowering and does little to build capacity, or relieve food insecurity (Booth and Pollard 2020). Poverty alleviation requires improving the social structures in place (Booth and Pollard 2020). An example of this may be expanding workplace development programmes, and providing skill development training to create avenues for low-income people to transition to secure employment (Mawani et al. 2021), so that they can enhance their human capabilities in a sustainable manner.

Socio-cultural capabilities

Socio-cultural capabilities refer to one’s ability to participate as a valued member of a community (OECD 2001). Criminological findings have determined a myriad of poverty-related social factors associated with participation in crime and theories of criminal behaviour (Sharkey et al. 2017). Though a structural problem, at the individual level, poverty can relate to impaired decision-making and self-regulation of youth (Spears 2011; Sheehy-Skeffington and Rea 2017); physical and psychosocial stress (Evans and Kim 2012); reduced social attachment to everyday activities and intrinsic career motivation (Hirschi 1969; Matsueda and Heimer 1987; Sampson 1987; Sheehy-Skeffington and Rea 2017); lack of commitment to a future based on conventional behaviour (Hale et al. 2013); as well as lack of connection to school and children’s social networks and peer-group influences (Haynie 2001; Haynie et al. 2006). These factors are also often interconnected to parental mental health problems, parental criminality, a history of abuse, and lack of academic achievement (e.g., Farrington et al. 2001; Murray et al. 2012; Wang et al. 2014; Taşkıran et al. 2017; Sharkey et al. 2017). Since variations of these pathways can contribute to an association between poverty and criminal behaviour, investing in modest mental health and social initiatives is thought to benefit society through reduced offending (Knapp et al. 2011; Peay 2011). The role of social norms and peer influences has been evidenced in the context of conservation, where non-compliance with wildlife regulations is greater for people with family members or friends who approve of the offence (Atuo et al. 2020; Figure 1).

The ability to achieve socio-cultural capabilities is often defined by legacies of historical injustices and enduring structural issues. Poverty reduction efforts to mitigate the impacts of COVID-19 should take an equity approach by focusing on high-risk groups. Depending on the context, this may include informal workers; women; racialised groups; youth; older workers; low-educated and less-educated people; people with disabilities; refugees and internally displaced people; ethnic minorities; Indigenous people; and precarious

workers (Mawani et al. 2021). Legal and policy frameworks can promote community-based approaches to facilitating social cohesion. Engaging local leaders in these efforts may be a productive approach, as their influence can overturn social norms in their communities for upstream change.

The ability to participate as a valued member of a community also relates to desistance pathways away from ‘criminal careers’ after offences have been committed. These paths are inhibited by social stigmas associated with the ‘offender’ label attached to ex-offenders (Bain 2019). These stigmas inhibit reintegration and can cause a cycle or feedback loop that perpetuates further offending and criminal behaviour (Lemert 1951). This highlights the importance of preventative measures, destigmatising past offences, and breaking the system of crime through poverty alleviation, rather than inflicting harsh sanctions on poverty-stricken offenders. Desistance from a ‘criminal career’ only becomes attainable through tackling social exclusion and equipping past offenders with relevant skills required by local employers, and life skills more generally (“soft skills”; Bain 2019). Providing positive transition points (see Warr 1998) can disrupt an individual’s offending trajectory and encourage desistance. It further facilitates feelings of belonging and achievement, and reduced pressure to return to criminality (Bain 2019). In the absence, the offender is left feeling isolated and further marginalised (Nugent and Schinkel 2016), which can strengthen the propensity for criminal behaviour (Bain 2019). Additionally, the lack of connectedness with conventional norms could result in the association with deviant individuals (Sutherland and Cressey 1970) and perpetuation of deviant sub-cultures (Miller 1958).

Political capabilities

Poverty alleviation includes politically-based human rights components, such as having a voice in policy creation and establishing political priorities (OECD 2001; Figure 1). Illegal hunting is thought to be driven in some cases by prestige, identity and custom (MacDonald 2004), as an expression of hegemonic masculinity (Sollund 2020), or as a politicised practice of civil disobedience or resistance when there is a lack of democratic safeguards for traditional hunting lifestyles against prevailing environmentalist ideologies (Nurse 2015; von Essen and Allen 2017). Wildlife crime as a form of civil disobedience can arise when relevant citizens are excluded from the democratic process, or biases and predetermined agendas set by powerful interests override local concerns (von Essen and Allen 2017; Fernández-Llamazares et al. 2020). These political motivations for wildlife crime may be especially pronounced where there is a historical legacy of colonialism that has left communities without legal rights to harvest their own local resources (Duffy and St John 2013). This means that an equitable COVID-19 recovery will require inclusion of marginalised voices in the design of conservation and social protection policies to improve political capabilities.

Protective capabilities

Protective capabilities refer to people’s capacity to endure times of economic, social, or environmental stresses (OECD 2001). Protective capabilities enable people to withstand natural disasters, threats to person and property, and financial crises, such as through the provisioning of insurance (OECD 2001). Climate change can increase the frequency and severity of stressors, which decreases protective capabilities and can, for example, force herders to graze livestock inside protected areas, or participate in illegal hunting (White 2018). A growing body of literature shows that crime can be a function of climatic factors and weather shocks which decrease protective capabilities (Agnew 2012; White 2018). For instance, both drought and excessive rainfall cause an increase in thefts, cattle raiding, and property crimes in agriculture dependent communities in Southeast Asia (Papaioannou 2017; Papaioannou and de Haas 2017). Farmers that have lost their protective capabilities may also turn to charcoal production, shifting cultivation, or destructive fishing practices (Gardner et al. 2015; Cripps and Gardner 2016).

In addition, environmental shocks can increase risks of local and regional conflicts (Hendrix and Salehyan 2012). Shocks and conflicts further decrease protective capabilities and add strain to people living in poverty, increasing their likelihood of committing wildlife offences (Mbiba et al. 2019). Similarly, shocks can force vulnerable populations to migrate, become displaced, or to become ‘trapped’, depending on their mobility potential (Black et al. 2013). In either of these three cases, people may lose their social capital, and consequently become more dependent on extracting natural resources (Mbiba et al. 2019).

Negative HWI and the spread of diseases can also rapidly diminish protective capabilities and household productivity, making households more reliant on exploiting local natural resources for survival and providing for children (Harrison et al. 2015; Figure 1). Negative interactions including crop raiding, livestock depredation, and harm to people can provoke retaliatory killings and illegal hunting (Moreto 2019). The mere presence of wildlife in communities that have experienced negative HWI in the past can contribute to individual- and community-levels of strain (Agnew 1992) and decrease protective capabilities, which, in turn, can result in pre-emptive illegal retaliatory killings (Moreto 2019).

Wildlife crime prevention strategies could proactively identify and address drivers of risks and exposure to stressors. Targeted interventions to buffer shocks could focus on protecting high-risk communities in hotspots for adverse HWI, and in climate sensitive sectors. No single social protection programme will completely alleviate the burden of shocks related to COVID-19 and compounding stresses (such as climatic stresses) that significantly affect vulnerable people. Rather, a carefully devised set of policies and programmes can reinforce each other and “weave a safety net” that can alleviate shocks to households (Grosh et al. 2014). For example, interventions may include a combination of cash transfers,

social pensions, food programmes, emergency benefits, and/or public works programmes (Grosh et al. 2014), along with supports to prevent and compensate for damages from HWI. This requires careful planning to provide comprehensive coverage for enhancing protective capabilities, and addressing chronic poverty and inequality (Grosh et al. 2014).

Complexities in the relationship between poverty and conservation

On the other side of the poverty and conservation relationship are rising income levels leading to increased consumption, consumerism, waste, and pollution (Reardon and Vosti 1995; Farias and Farias 2010). Indeed, the growth of affluence and the emergence of new consumers is a driver of global environmental destruction (Wiedmann et al. 2020). There is a known positive relationship between wealth and consumption for personal gains (Myers and Kent 2004), occupying larger land areas (Scherr 2000), and purchasing forest and high-value wildlife products to signify status (e.g., Drury 2011; Scales et al. 2017).

Furthermore, some development approaches, such as clear-cutting of forests for cattle grazing, contribute to economic growth since the associated infrastructure provides important access to markets and services, and creates new jobs (Minten 1999; Wilkie et al. 2000). However, this growth is not always distributed equally, can impose added stresses on marginalised people (Zepharovich et al. 2020), and can intensify gender inequality (UNDP 2020). It also comes at the expense of biodiversity by fragmenting habitats and paving the way for new landscape conversions and resource exploitation.

In light of this, it is important to keep in mind that the global distribution of wealth has led to highly disproportionate levels of consumption. The wealthiest 1% of income earners account for 100 times more carbon emissions each year than the poorest 50%, due to unsustainable and unjust patterns of consumption, production, and investment (UNDP 2020). Per capita use of resources is far higher in high-income countries than it is near tropical/sub-tropical biodiversity hotspots. It is this consumption that is boosting demand for soy, beef/leather, timber, and palm oil, and promoting the continued conversion of tropical forests (Walker et al. 2013). So, while increased income levels may lead to increased consumption and deforestation, the activities of people alleviated from poverty still only account for a tiny proportion of resource use at an international scale.

Overall, the relationship between poverty alleviation and conservation is complex (Barbier and Hochard 2018; UNDP 2020). Whether poverty alleviation contributes to biodiversity loss depends on the choices made in policy and planning when people have higher capabilities (Roe et al. 2011). Research findings indicate that poverty may favour behaviours that make it more difficult to escape poverty and to invest in long-term improvements (Haushofer and Fehr 2014). Alleviating people from poverty does not necessarily mean they will become unsustainable consumptive users of natural resources.

Rather, poverty alleviation should be seen as the process of empowering individuals by expanding their capabilities and freedoms (including political freedoms), economic facilities, social opportunities, transparency guarantees, and protective security (Sen 2000, 2001). With reduced poverty comes reduced hunger, mortality, and increased global health, access to basic social services, and participation in public and political life. Therefore, people are more empowered to make decisions that align with long-term sustainability (Barbier 2000), rather than focusing on immediate benefits to ensure day-to-day survival.

Poverty alleviation is also an important consideration when it comes to crime deterrence, which typically relies on a blend of 'carrots' and 'sticks'. Although criminal sanctions (sticks) have been shown to successfully deter wildlife crimes (Aimer and Goeschl 2010), research suggests that individuals are more responsive to incentives (carrots) that are the most immediate, which is especially true for people living in poverty (Chalfin and McCrary 2017). Improving policing, either through increased personnel or monitoring and policing productivity, and improving local labour-market conditions have an immediate effect on the relative benefits and costs of engaging in criminal activities. On the other hand, changes to incarceration policies (e.g., increasing sentences) may be a smaller deterrent because these policy changes are often unknown to potential offenders, and the cost of a prison sentence is perceived to be something that may be avoided or only experienced in the future (Chalfin and McCrary 2017).

Poverty and wildlife crime in the shadow of COVID-19

Assessing the intersection of poverty and crime has a considerable history within criminological literature. For example, prior research has examined citizen perceptions of safety and vulnerability, and their relationship with poverty (Pantazis 2000), while a meta-analysis examining research during the 1970s and the 1980s found strong support linking poverty and income inequality with violent crime (Hsieh and Pugh 1993). To date, however, the impact of poverty on crime during and after a pandemic is not well-known, and the current pandemic provides a unique (albeit unfortunate) opportunity to probe these links (Stickle and Felson 2020). There have been reports that the COVID-19 pandemic has led to certain decreased organised crime activities as a result of macro-economic swings, increased law enforcement presence in public areas, and increased trade and travel restrictions at borders (GIATOC 2020a). This may be part of the reason that Kruger National Park has seen a decline in illegal rhino hunting (BBC 2021), in addition to the provision of social grants provided by the government. It is also believed that potential offenders may be suspending activities due to personal concerns about contracting COVID-19, although further research on this is needed (GIATOC 2020a). That said, there is evidence to suggest that traffickers are simply biding their time and stockpiling wildlife products, such as ivory and pangolin scales (WJC 2020).

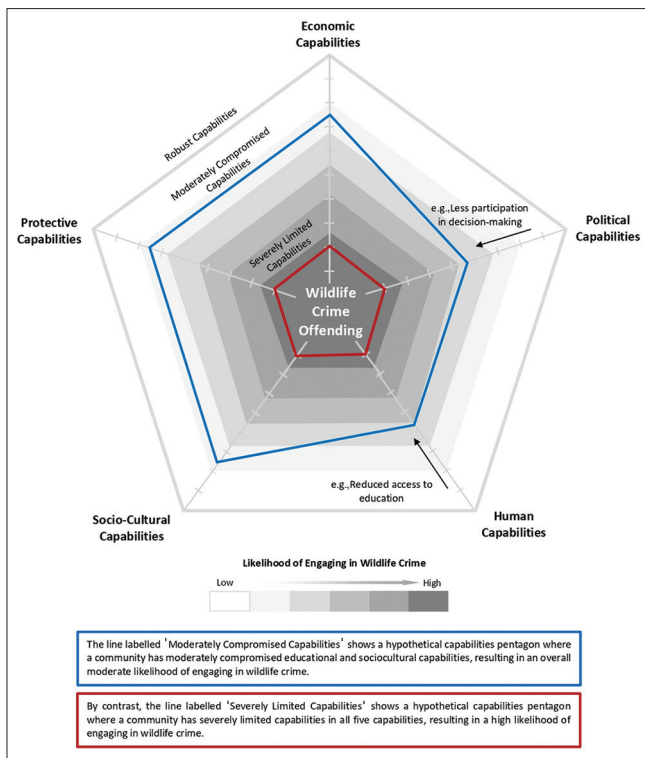


Figure 2

Pentagon framework of the capabilities/dimensions of poverty that relate to wildlife crime offending

COVID-19 will likely affect wildlife crime by negatively impacting each of the five capability dimensions of poverty (Figure 2). For instance, marginalised children and youth living in remote villages are at a severe disadvantage due to widespread school closures (Parsitau and Jepkemei 2020) and a downturn in nature-based and rural tourism. Education that is mediated through technology and smartphones will be out of reach to many rural children and their parents due to the cost of internet, limited connectivity, and barriers to technology purchase (Parsitau and Jepkemei 2020). School closures also present an obstacle to providing children with adequate nutrition for learners who depend on school feeding programmes (UNESCO 2020).

These COVID-19 changes can force marginalised people into illicit extraction of natural resources for nutrition, and as a result of being less occupied with work or school (Anagnostou et al. 2020). Parents who are still able to work may have to leave their children and youth unattended and socially isolated (UNESCO 2020). This leaves young people more prone to risky behaviours and substance abuse, and causes children to miss out on social attachments that are essential for learning, development, cognitive control (UNESCO 2020), and for preventing associated criminal behaviour. The deprivation of education, food, healthcare, and social networks can all indirectly decrease children's capabilities, which may then increase incentives to engage in wildlife crime. COVID-19 has likely had (and will continue to have) a direct impact on the routine activities of individuals

(and potential offenders) resulting in the convergence in time and space between offenders and target resources, and the lack of capable and invested resource guardians (Cohen and Felson 1979; Moreto and Pires 2018).

COVID-19 will also likely have more direct impacts on wildlife crime. Demand and distribution channels for many preferred local products (e.g., legal meat and other food products) and services will dwindle or become blocked or eliminated entirely. As economic returns from legitimate employment deteriorate or disappear altogether, crime rates will likely increase. Research has found this same trend in previous times of economic hardship (e.g., Hale 1998; Hale et al. 2013). The pandemic crisis has also caused internal mass migrations as many people who have lost their jobs in urban areas are returning to family villages in rural areas (World Bank 2020b). This increases the interface for negative HWI and opportunistic wildlife harvesting, and consequently this migration may contribute to a rise in wildlife crime.

Surveillance and policing capacity of protected areas are in dramatic decline as law enforcement efforts are being redirected to support pandemic responses (Wittig 2020). Decreased law enforcement and park management resources has previously led to decreased wildlife populations due to illegal hunting (Leader-Williams et al. 1990; Hilborn et al. 2006). An added challenge for communities near protected areas is that international tourism has declined dramatically, and many countries have closed their parks and reserves to minimise spread of the pathogen. This is important as eco-tourism revenue is often the main source of funding for conservation, community livelihood initiatives, and anti-poaching patrols. Furthermore, conservation funding, including from public spending, may become more limited as a result of society realigning its spending priorities (Kavousi et al. 2020). Thus, the impact of COVID-19 on law enforcement and management in protected areas may be three-fold: 1) decreased formal forms of guardianship due to reduced patrol activities; 2) decreased revenue and associated community-based initiatives, including services to reduce negative HWI; and 3) decreased informal guardianship from tourists. This reduced law enforcement presence in protected areas, the potential increase in negative HWI, and lack of informal guardianship may decrease the opportunity costs of illegally harvesting natural resources (Kurland et al. 2017; Moreto and Pires 2018). At the same time, people involved in trafficking wildlife products are marketing their products in consumer states as cures to COVID-19, which will further drive illegal hunting (EIA 2020a, 2020b; Save the Rhino 2020). Likely as a result of a combination of these factors, authorities around the world have reported increases in illegal hunting since the start of the pandemic. This includes, for instance, in South America (e.g., Colombia; Georgiou 2020), in Sub-Saharan Africa (e.g., Zambia, Malawi, Zimbabwe; Box 1; GIATOC 2020b), and in South Asia (e.g., India, Nepal and Pakistan; Godbole 2020).

Importantly, the economic impact of COVID-19 is not restricted to local communities or potential offenders. Rangers themselves are often from marginalised communities, have low

Box 1***Example of how COVID-19 is affecting illegal wildlife use in Sub-Saharan African countries****

Several Sub-Saharan African countries, including Zambia, Malawi and Zimbabwe, among others, have reported a spike in low-level bushmeat hunting (e.g., Figure 3) since the COVID-19 pandemic has unfolded. Bushmeat hunting is thought to be driven by a number of capabilities-related factors linked to the pandemic:

1. With borders closed and even local movement restricted in some areas, rural people have been prevented from selling their seasonal crops (e.g., tobacco and cotton), creating financial pressures that have driven some to turn to harvesting bushmeat.⁺
2. As unemployment has spread in urban areas, family remittances to rural areas have dried up, driving some rural families to illegally hunt wildlife to mitigate food insecurity.⁺
3. Rural communities that were previously dependent on nature-based tourism for employment and community development have seen tourism dollars evaporate, creating broad financial pressures on rural communities.⁺
4. Parks and protected area authorities across Africa are challenged to pay the salaries of their rangers and wardens, resulting in layoffs, non-payment of salaries, corruption and post abandonment. The resulting 'oversight vacuum' has led to increased illegal hunting inside protected areas, and some parks are reporting thefts of critical parks infrastructure such as solar panels designed to pump water for park wildlife.⁺

Although these negative impacts have been documented in certain countries, more empirical research is needed to understand how COVID-19 is impacting illegal wildlife harvest and trade.



Figure 3

African palm civet sold as bushmeat in the Republic of the Congo*

****Source: GIATOC 2020b***

****Photo source: Jean-Baptiste Dodane © jbdodane.com***

salaries, are underpaid, paid late, have no insurance, and lack the necessary equipment to perform their jobs (Moreto 2016; Belecky et al. 2019; Spira et al. 2019). A reduction in tourism revenue may negatively affect the well-being and job security of rangers tasked with anti-poaching efforts. This could result in deleterious impact on rangers' salary, facilities, and other related occupational provisions. Furthermore, COVID-19 may have a considerable impact on the health and finances of rangers and their families as well. This in itself could result in increased job stress (Moreto 2016), which may also contribute to establishing an environment for ranger corruption (Moreto et al. 2015). Corruption, however, is not limited to micro-level interactions. Political capabilities of communities in illegal wildlife source, transit, and destination states may be at risk from decreased governance as public officials become more susceptible to corruption and bribery (van Uhm and Moreto 2018; Wittig 2020).

IMPLICATIONS FOR POLICYMAKERS

Even before the COVID-19 pandemic, wildlife crimes were often under-detected or undetected due to a variety of reasons,

including, lack of surveillance in remote areas; crimes falling between the responsibilities of different authorities, such as criminal justice and environmental authorities; and cases being dismissed due to a lack of evidence (Ceccato and Uittenbogaard 2013). Despite a myriad of interventions to stop wildlife crime, there is a general lack of outcome evaluations to determine which initiatives are, in fact, successful (Kurland et al. 2017). Furthermore, such interventions may be largely based on available resources, that are likely to have been disrupted due to COVID-19. As such, it would be apt for policymakers to identify and address structural and social determinants of wildlife crime. We suggest that there is a critical need for more accurate framing of wildlife crime offenders in terms of systemic causes of poverty and inequalities. Here, we have collated evidence that improving people's well-being through poverty alleviation is essential for preventing wildlife crime. Government and wildlife authority responses should involve cooperation, inclusive multilateralism, and innovative partnerships so that citizens see a culture of integrity and transparency, which paves the way towards collective efficacy and responsibility for wildlife crime control (Ventura 2020; Anagnostou et al. 2020).

Policymakers have persisted for decades with policies that are failing to adequately address wildlife crime, and we argue that it is time to bring in a poverty alleviation approach that builds rural community capabilities to reduce the likelihood of residents engaging in wildlife crime. Under our poverty-wildlife crime framework, enhancing the capacity of communities to achieve well-being has the potential to achieve this. Furthermore, governments that take an aggressively prohibitionist approach (while poverty conditions remain the same) can contribute to a feedback loop that inadvertently exacerbates poverty for people whose livelihoods are directly dependent on local natural resources. These approaches may also simply remove the weakest actors, and present an opportunity for more clever and adaptable groups and individuals to flourish in wildlife crime networks (Gilman et al. 2011). Regulated use should be considered until these communities have achieved at least enough well-being to have the capacity to democratically

adopt a sustainable, alternate source of income, with training to manage it. This is especially true as studies have shown that harvesting natural resources illegally is often only selected when external shocks are particularly severe, and where other safety-net functions remain unavailable or underdeveloped (Wunder et al. 2014).

In applying our model to this context, poverty alleviation should be seen as an overall positive strategy for global sustainability and the decline of wildlife crime. That said, development policies must still account for possibly irreplaceable losses of biodiversity and ecosystem integrity. Governments and transnational corporations should continue to invest critical technologies, expertise, and funds into LMICs, and specifically high-risk populations, to improve the capacity to employ the highest environmental standards. This is particularly vital for Africa, where over half the population is suffering from multidimensional poverty, and poverty reduction has been slow (Alkire et al. 2016).

The first step could be developing context-specific evidence through socio-economic assessments, perception surveys, community input, and establishing baselines (ILO 2020). This information can then be used to develop integrated approaches for socio-economic recovery such as designing and supporting the implementation of health, water, sanitation, hygiene, and public employment programmes (ILO 2020). Additional actions can include initiating social insurance for workers in the informal sector; social assistance such as conditional cash transfers; a growth strategy that protects the agriculture sector; and wage subsidies, among others (Mawani et al. 2021).

While these are all important services for promoting equitable access to livelihoods, these programmes are often out of reach for people living in extreme and chronic poverty conditions. Holistic ‘graduation approaches’ are examples of how to address this challenge, and the associated overrepresentation of women in poverty (Sulaiman et al. 2016; BRAC 2017). Closing the gender poverty gap not only promotes gender equity, but also improves access to education, health, and nutrition for the next generation, and increases broader economic security (Christensen 2019). Graduation initiatives involve supporting women and other high-risk groups to meet basic needs by first provisioning food or cash to stabilise households (BRAC 2017). Participants are then provided with a productive asset for a decent livelihood, such as livestock, a sewing machine, a food cart, or access to formal employment. Support staff then frequently visit for technical training on how to manage the asset and savings, and coaching to reinforce skills, build confidence, and support social inclusion in the long-term. Health education and access to health care are also integral steps (BRAC 2017).

As discussed earlier in this essay, poorly planned economic growth strategies can have detrimental costs to biodiversity, and can exacerbate inequalities. While many are calling for a Green Recovery to COVID-19 (OECD 2020), it is imperative that the most vulnerable people are able to benefit from new opportunities through targeted training, skill development,

and access to markets. Conservation organisations, civil society, international development organisations, and the private sector should collaborate to deliver multidimensional supports for sustainable livelihoods. Multidimensional initiatives that also use an equity approach will help high-risk communities build resilience in the aftermath of the pandemic, and in doing so, reduce the poverty-related risks of wildlife crime.

CONCLUSION

It is clear that both poverty and poverty alleviation can impact conservation to varying degrees depending on the context. Not all environmental degradation in LMICs is linked to poverty. However, evidence suggests that conservationists need to recognise that deficiencies in any of the five main capabilities can counter biodiversity protection. We have outlined various risk factors for wildlife crime including increased levels of acute shocks such as unemployment, decreased wage rates, poor access to education and healthy social networks, decreased community participation and political capabilities, emotional distress, and a lack of access to essential services such as healthcare, all of which may be worsened by COVID-19 and future pandemics (McMahon et al. 2013; Chen et al. 2016). While it is no easy task, poverty reduction should be considered from all of these dimensions to deliver win-win situations for both development and conservation purposes (Chaigneau et al. 2019).

COVID-19 has highlighted the vital need for improvements in how conservation efforts are executed in LMICs. The challenge going forward will be to find new ways to ensure that people living in poverty have a stronger voice in how capability enhancement and conservation strategies are created and implemented. In this way, people alleviated from poverty will be more likely to exercise their freedoms and continue to align their decisions with conservation objectives (Sanderson and Redford 2003; Roe 2015). This essay suggests that the interactions between poverty alleviation and wildlife crime are extensive, and that improving the lives of communities living with and near wildlife is crucial for reduced criminal offending, and ensuring human and ecosystem wellbeing.

Author Contributions Statement

Michelle Anagnostou conceived and designed the research, and led the drafting of the manuscript; William D. Moreto, Charlie J. Gardner, and Brent Doberstein all contributed critical, intellectual content to the drafts and gave final approval of the version to be published.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Received: 21-Sep-2020; Revised: 16-Jul-2021; Accepted: 16-Jul-2021; Published: 22-Sep-2021