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Research Article

Why poaching pays: a summary of risks and benefits illegal hunters face in Western Serengeti, Tanzania

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Abstract

Illegal hunting poses a considerable threat to the wildlife of Serengeti National Park and its affiliated protected areas. Techniques for successful mitigation of this threat are heavily debated. Bottom-up community-based initiatives aim to curb poaching by linking local communities with wildlife conservation. Top-down anti-poaching enforcement of protected areas seeks to maintain wildlife populations through fines and prison sentences given to arrested poachers. Poverty stands as the major driver of illegal hunting as households vie for income and sustenance. Livelihoods of illegal hunters have been augmented considerably through revenue generated from bushmeat sales. Illegal hunters use bushmeat both for supplementing household protein and for economic gain. Obtaining bushmeat carries risks in the form of personal injury, fines, and/or prison sentences, if arrested. This paper compares these costs and benefits through a summary of the monetary benefits, bodily injuries, fines, and prison sentences that individuals endured over their poaching careers. Data were collected from 104 individuals, all of whom voluntarily admitted active or recent involvement in illegal hunting activities.

Key Words: Bushmeat, Poaching, Conservation, Wildlife, Serengeti National Park

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Introduction

Illegal hunting is a widely recognized threat to the wildlife populations of the Greater Serengeti Ecosystem (GSE), in Tanzania. While the entire GSE is threatened [1, 2], the greatest threat occurs on the western edge where human population densities are higher [3-6]. Increasing human densities affect western Serengeti by increasing resource use intensity and threatening wildlife populations [6]. Estimates of the actual number of illegal hunters that live within 45 km west of the Park have ranged from 52,000 to 60,000 and continue to increase with ongoing human population growth [7, 8]. Approximately one million people live along the western edge of the Park, with a 2.9% increase per annum [7, 9]. If 56,000 people are assumed to poach, this means that 5.6% of all people actively poach. Since poachers tend to be men who begin poaching in their teenage years, the percentage of individuals within this more specified demographic unit who hunt illegally is likely to be much higher.

Illegal hunters are thought to consist largely of poor, uneducated farmers [7] who have few other livelihood alternatives open to them [10]. This is a simplification of a complex historical and cultural milieu [11, 12], as motives for illegal hunting may include many human desires such as skill development, identity formation, opposition to authorities, boredom, and thrill seeking [10,12,13]. Among the many possible motivations for poaching, the driving force of poverty is well established [14, 1]. The rewards for successful hunters may be either protein-based or pecuniary [15, 2, 14, 16], or a combination of both. Hunters may keep the meat largely within their households to meet basic caloric and protein needs, trade it for goods, or sell it to obtain cash [10]. The contributions that bushmeat sales make to an individual, or an individual's household, are difficult to tease apart. For some households, poaching is done instead of—or replaces—other revenue-generating activities, while for others it is done as a means of livelihood diversification.

To earn such substantial rewards, however, illegal hunters face significant risks in their daily activities. Due to the possibility of detection by anti-poaching patrols, poachers carry out some, or all, of their activities at night when the possibility of injury by wildlife or travel increases [10]. Injuries sustained by poachers included sprains, puncture wounds, infection, and broken bones. Malaria was also reported as a common ailment contracted while poaching, although it is routinely contracted by hunters and non-hunters alike. If poachers elect to operate in the day, their likelihood of detection and arrest may increase [10]. Other risks may come in the form of meeting hostility from members of other ethnic groups, such as the Maasai, when poaching. The Maasai have historically shown hostility toward the Bantu ethnic groups that comprise western Serengeti [11]. Traditionally, this took the form of cattle raiding, where Maasai raiders, coming from settlements east of Serengeti National Park, would raid cattle in the west and cross back through the park with stolen cattle [18]. Depending on the situation, western Serengeti groups occasionally pursued the Maasai in efforts to retrieve stolen cattle. Such episodes resulted in general antipathy between the more pastoral and nomadic Maasai and the largely settled, agricultural western Serengeti people. Despite little documentation of such altercations between the two factions, the possibility of encountering the Maasai while poaching was a considerable source of fear among respondents. Understanding the magnitude of these risks, and the poachers' own perceptions of these risks, is essential knowledge for governmental and nongovernmental agencies that wish to mitigate poaching activities.

It is also essential to understand what long- or short-term factors motivate an individual to hunt. What may push one individual into poaching may be entirely different from a factor—or suite of factors—that may lead a neighbor to poach. While a shortfall of income may be the ultimate driver, proximate, more stochastic drivers may include excessive drought conditions [5], the value of resources acquired [19],

mean monthly densities of wild herbivores [19], livestock or crop losses due to wildlife [10], the costs of bridewealth for marriage, or the desire to earn money to use for education purposes [10]. Present-day poachers may turn to illegal hunting as a way to earn money needed for marriage bridewealth [11]. Historically, bridewealth in this region was obtained primarily by cattle raiding, stealing cattle from other ethnic groups [18]. In recent decades, the frequency and magnitude of cattle raiding has decreased significantly following years of government enforcement [18]. Current poaching may serve as a substitute, allowing men a relatively quick means of accruing cash for bridewealth.

Other motivations driving poaching may be cultural, leading one to hunt for the sake of prestige, tradition, or camaraderie [16]. Moreover, what may lead an individual to poach one year may change entirely the next year. Since it is difficult to ascertain what primary motivation—or combination of motivations—might lead an individual to hunt, this paper examines poaching through reported costs and benefits. Using the theoretical framework of rational decision making, it is assumed that individuals exhibit rational behavior and have transitive preferences, choosing among alternatives to maximize utility or expected utility [20]. Within this framework, it is suggested that western Serengeti individuals might hunt illegally solely because the possible pecuniary rewards outweigh potential economic costs. While undeniably important to the decision-making process, psychological and physical costs were outside the scope of this study. An examination of financial costs and benefits of the activity suggests why poaching is widespread in the region.

The primary means of poaching in the GSE is through the use of wire snares [10, 21, 22]. Snares are relatively inexpensive, readily obtainable in most markets, and may be set up under cover of darkness, which reduces the chances of detection. The prevalent use of snares means that poaching, unlike licensed hunting, is indiscriminate with regard to the wildlife killed [9]. Off-take is determined more by the relative abundance of species in a given region than by the intrinsic preferences, tastes, or monetary values of each species [9]. Even though snares often target large herbivores, unselective harvesting occurs and many carnivores such as lions and leopards are unintentionally killed in the process [10]. Although snaring predominates among active poachers, it is by no means the exclusive method used. To a lesser degree, poachers used dogs, pit traps, spotlighting, and bow-and-arrow [10]. Research shows that although poaching occurs year-round, it is concentrated during the dry season months (January – March) [1, 10]. Despite the probability of harvesting more animals during the dry season, it can still be profitable to hunt during the wet season due to stochastic market forces and pricing fluctuations among common protein sources [1]. The most frequently harvested species were wildebeest (*Connochaetes taurinus*), zebra (*Equus burchelli*), and impala (*Aepyceros melampus*), which together accounted for 79% of all wildlife species taken [7, 10].

National parks like Serengeti are the most restrictive for would-be users among Tanzania's protected areas. Legal uses in the park are limited to non-consumptive utilization [23]. Although enforcement effort has been inconsistent since the creation of the protected areas, access and resource use by local peoples are prohibited by anti-poaching units [21]. Serengeti National Park's adjoining game reserves to the west, Ikorongo, Maswa, and Grumeti, allow for licensed hunting but disallow all other forms of access including cultivation and livestock grazing. The Tanzanian government owns these reserves and the wildlife therein and is ultimately responsible for issuing permits for hunting. Hunting blocks are allocated by the Wildlife Division every five years and awarded to hunting companies. The availability of resident and tourist hunting permits is based on quotas for game reserves, game-controlled areas, and open areas. Although such permits are theoretically obtainable, they are often prohibitively expensive for local would-be hunters. Access to a firearm and a vehicle are also necessary and rarely attainable for local western Serengeti people. As a result, many circumvent these legal obstacles and hunt illegally.

The Tanzanian government has instituted anti-poaching enforcement measures to curtail the scope and intensity of poaching activities, with debated amounts of effectiveness [23]. Such measures have involved patrolling routes both inside and outside Serengeti National Park with the aim of arresting poachers and levying fines and/or prison sentences, depending on the extent of the offense. The long-term effectiveness of these measures depends heavily upon the interplay of three factors: the likelihood of detecting and arresting poachers, the severity of the punishment doled out, and the pecuniary and/or protein reward that the poachers may reap. If the rewards poachers face are significantly greater than the financial, physical, and psychological risks involved, it is unlikely that the level of poaching in western Serengeti will decrease appreciably [24]. Understanding the magnitude of these factors is therefore critical to understanding and predicting future success of conservation initiatives.

A lack of this information has resulted in an ongoing problem for wildlife officials attempting to better conserve the GSE's world-renowned wildlife [3, 16]. This study assesses these factors through an examination of their illegal hunting "careers-to-date". By comparing individual poacher arrests, punishments, and injuries sustained with the income generated through the activity, it becomes clear why poaching has continued unabated in western Serengeti for the last several decades.

Methods

Data were collected through semi-structured interviews in Swahili with 104 individuals who self-identified as having participated in illegal hunting in Serengeti National Park (Fig. 1). The questionnaire was completed by the author of this study in Swahili and a trained local Tanzanian assistant. Closed- and open-ended questions included topics relating to household income and finances, livelihood strategies, arrests, penalties, injuries, and perception-based attitudes related to anti-poaching units and Serengeti National Park. Responses were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 18.0 (SPSS Inc., Chicago).

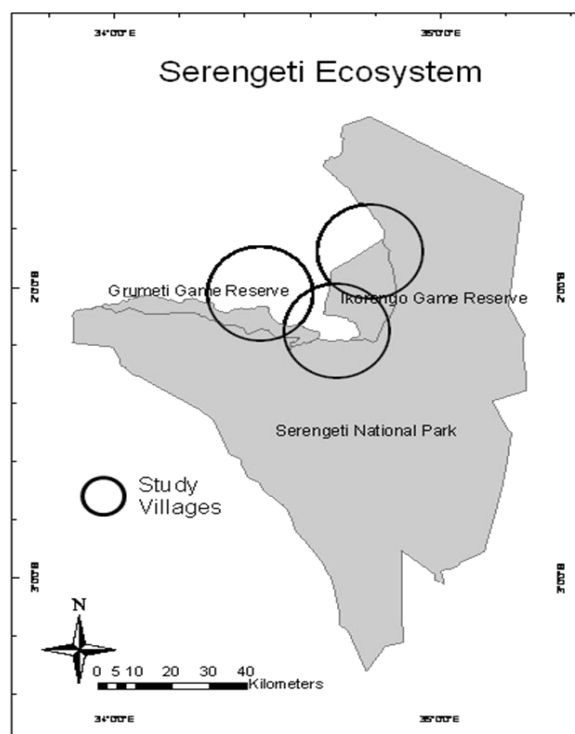


Fig. 1: Map of the Greater Serengeti Ecosystem. Circles indicate general undisclosed locations where interviews were conducted with illegal hunters.

Since poaching is a sensitive issue that may carry significant penalties upon arrest, respondents were selected with a snowball sampling technique that is regularly used in studies of difficult-to-find populations [25]. In snowball sampling, one or more key individuals are identified and asked to name others who might be candidates for this specified research. Interviews were organized after trust-based relationships were built with key informants representing villages in Serengeti and Bunda Districts on the western side of the park. Key informants were identified informally while the study's author simultaneously conducted less sensitive household economic surveys in several villages surrounding Serengeti National Park. Respondents were assured anonymity, and interviews were conducted in remote areas to ensure full confidentiality. For these reasons, birth place and residence were not recorded. Undisclosed interview locations occurred within 20km of one of Serengeti National Park's boundaries. Unlike other sampling techniques, distance of villages and households to park boundaries were unable to be completed to assure anonymity. Respondents came forth voluntarily and were not given payment or gifts of any kind for their participation. Illegal hunters who had less trust in outside researchers—and who may have exhibited an alternative poaching behavior—may be underrepresented in this study.

While a variety of methods have been utilized in collecting sensitive data [26], self-reporting based on trust-developed relationships remains the only way to collect longitudinal career-to-date data of poachers and the households they represent. This technique complements random samples like the randomized response technique because it more effectively dispels fear in the respondent, ensuring greater validity in responses. It is assumed that poachers who lacked adequate trust in the interview team did not appear for an interview.

The number of days spent hunting over a career-to-date was calculated in a three-step process. First, respondents were asked to list each month they had hunted in the last 12 months, beginning with the previous month. Second, respondents were asked to report the number of trips they typically took in an average wet- and dry-season month. For many highly involved poachers, the number of trips they took each month varied little and recollection did not prove difficult. Third, respondents were asked to estimate the number of days they typically hunted on each trip. This was done with the understanding that respondent estimates were affected by respondent age. Coupled with the fact that the sample's respondents were still active hunters, the number of days spent hunting over a career-to-date are likely less than those of older poachers who have "retired" or no longer hunt. While some highly involved poachers were likely hunting at the time of this research, results here may be an underestimate of actual hunter effort. Similarly, we do not include statistics of poachers who died in the course of poaching activities because respondents were asked exclusively about their own poaching activities, to decrease the chance for recollection error. Results may therefore be biased toward non-life-threatening injuries, and poaching may in fact be more injurious and fatal than these results indicate. In the analysis to follow, the terms "poaching" and "illegal hunting" are synonymous and used interchangeably. Data were collected over a 60-day period in 2007. Currency of USD was reported in 2007 and adjusted to 2009 rates. At the time of research USD \$1 was equivalent to 1,050 Tanzania Shillings.

Results

The majority of the sample (84%) responded that poaching is a difficult activity, while 7% said it was 'moderately difficult' and 9% reported it was 'easy.' The difficulty is likely due to the physical risks involved and demanding nature of the activity. Physical risks incurred by poachers resulted from aggressive wildlife, removing injured or dying wildlife from snares, hostile contact with Maasai people

while hunting, running away and concealing themselves from anti-poaching units, or being beaten by village officials after arrest. Although the magnitude of injuries was not recorded, 33% of respondents reported being injured in the midst of poaching activities, and 4% were injured more than once.

Of those who sustained injuries, over two-thirds (69%) had been injured by aggressive wildlife, and 24% of injuries had occurred in the process of removing wildlife from snares. Poachers also sustained injuries during successful escapes from anti-poaching rangers (7%). Based upon the total average number of days an individual poaches over a lifetime (1,901 days), the likelihood of sustaining an injury was 0.02% per day spent poaching (Fig. 2). An indirect measure of these risks was shown through respondent free-listing of subjects feared when poaching. Lions were feared most (30%) followed by anti-poaching rangers (28%), elephants (26%), and the Maasai people (7%). Some poachers feared the threat of wildlife more than that of anti-poaching rangers. Such individuals had sustained more injuries (0.7) from wildlife over their careers-to-date than those poachers who primarily feared rangers (0.2) ($F = 2.893$, $df = 1$, $p = .098$).

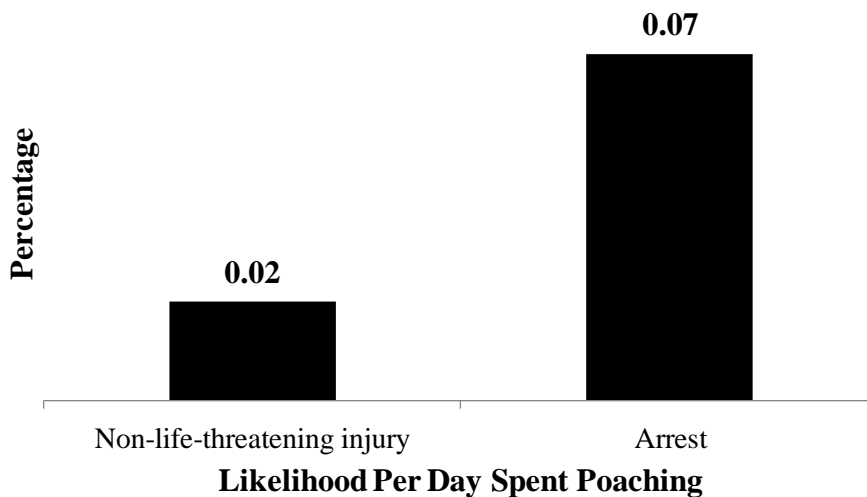


Fig. 2. Risks Faced by Illegal Hunters in western Serengeti, Tanzania

Poachers had successfully escaped from anti-poaching patrols an average of 9.7 times during their poaching careers-to-date. Such encounters often lead poachers to run and conceal themselves after they, or one of their snare lines or meat-drying camps have been detected. Although no two escapes are the same, fleeing poachers concealed themselves from anti-poaching units an average of 4 hours, with the longest lasting 48 hours. Poachers generally exited the bush at night after rangers left the vicinity. Analysis of variance revealed that a poacher's fear of rangers is related to the hours spent concealing himself after detection by an anti-poaching unit. Poachers who most feared rangers had concealed themselves for an average of 16.8 hours, compared to poachers who feared other threats more and hid for an average of 2.3 hours ($F = 19.045$, $df = 1$, $p = .002$).

The risks of prison sentences and fines were contingent upon getting arrested by anti-poaching patrols. The average poacher has been arrested 1.4 times over an average of 1,901 total days poached. Based upon this, an average poacher had a 0.07% of getting caught each time he embarked on a hunting excursion. Averaged over a career-to-date, individuals had spent 0.04 days in prison for all the days spent hunting. The number of years an individual poached correlated with the number of times

arrested ($R^2 = .226$, $p = .024$), but the number of days poached per year was not correlated with the number of times a poacher was arrested. One-third (33%) of all respondents had served a prison sentence for poaching. The number of times an individual was arrested correlated with the number of months spent in prison ($R^2 = .710$, $p < .001$). The average respondent had poached for 14.3 years and spent an average of 2.7 total months in prison.

Financial risks of poaching were the fines individuals were forced to pay if arrested and convicted. Over half (55.5%) of all respondents had paid a fine averaging \$USD 39.00. The number of times an individual was caught correlated with the amount of fines an individual paid over his career ($R^2 = .324$, $p < .001$). Based upon average total days spent poaching, an individual paid an average of \$USD 0.02 in fines for every trip taken.

In contrast to the financial risks, the monetary rewards for poaching are significant, especially in comparison with earnings generated from other typical livelihood endeavors. Over the course of a twelve-month period, respondents generated \$USD 79 from selling crops, \$USD 61 from selling livestock, and \$USD 118 from other trade or small business. The majority of poachers (96%) sold meat and earned an annual average of \$USD 425. The number of days an individual poached per year correlated with the amount of hunting income earned ($R^2 = .296$, $p = .011$) (Fig. 3).

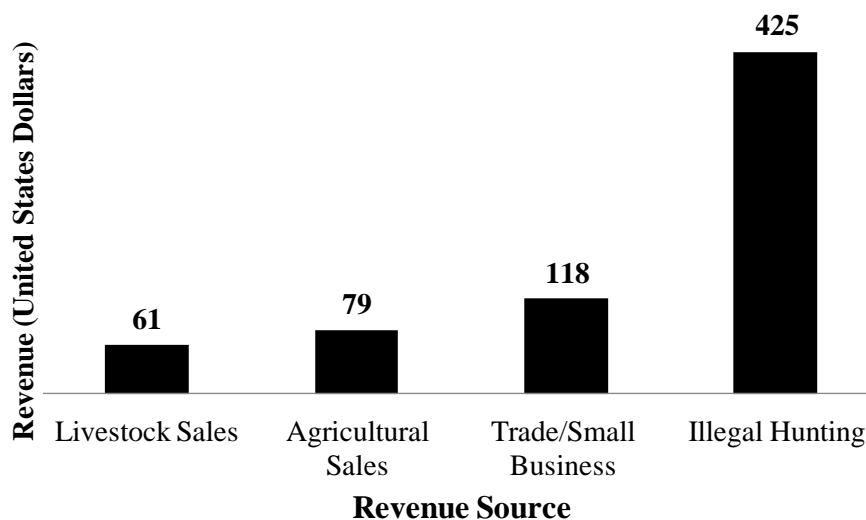


Fig. 3. Revenue generated by illegal hunters in western Serengeti, Tanzania

Poverty and an income shortfall were the most mentioned factors that led an individual to poach (86%). A smaller sample (7%) was driven by what they described as their “cultural heritage.” These individuals commented that they poached because it was a significant ethnic rite of passage that their ancestors practiced. In most of these cases, the ancestors the respondents referred to hunted legally on the same lands. Hunting on these same lands was deemed illegal and residents were dubbed “poachers” when Serengeti National Park was gazetted as a National Park in 1951 and its surrounding lands were added on as game reserves in the 1990s. Poachers tended to come from families with income shortfalls. Over half (58%) of respondents considered their parents ‘poor,’ 33% considered them ‘middle class,’ and 9% considered their parents to qualify as ‘rich.’ Other drivers for poaching included food shortages (4.9%) and land shortages (1.9%). These drivers are interrelated and could arguably be included under poverty and income shortfall.

Discussion

Results here suggest that the monetary benefits a typical poacher accrues through illegal hunting far exceed the costs he, or his household, may face if arrested. The sale of bushmeat provided households with USD\$307 more dollars than they could earn through a trade or small business. Proceeds from one year of bushmeat sales (USD\$425) significantly exceeded the total amount of income earned through legitimate trade, small business, livestock sales, and agricultural sales combined (USD\$258). Amounts for livestock income and on-farm income are corroborated by other studies in western Serengeti [16, 27]. For households in poverty, this straightforward assessment likely reveals why many individuals decide to poach, and continue poaching throughout their lives. In addition to the significant money one may earn, western Serengeti poachers also likely realize that poaching's associated costs, although potentially severe, are minimal in comparison. The likelihood of being arrested per hunting trip is low and if arrested, the likelihood of remaining in prison for a long time or paying a significant fine is lower still.

Integral to the discussion of costs and benefits is opportunity cost, which represents how much more income a poacher may have earned if his efforts were dedicated to other livelihood pursuits rather than poaching. Data from a sample of non-poaching households collected during the same time period in western Serengeti showed that they earned USD \$146 more in crop and livestock sales but USD \$30 less in trade than poaching households [10]. This total of USD \$116 of income lost to opportunity cost is far exceeded by the amount generated through poaching (USD \$425). Opportunity costs for poaching are therefore unlikely to be a deterrent, as it is a profitable enterprise with a low financial risk.

While financial risks are minimal, risks of incurring injuries by wildlife are significant. Poachers may lose entire livelihoods if the injuries they sustain are severe enough. One-third of all respondents had been injured by wildlife and 4% have been injured more than once. These results show that it is not uncommon to encounter dangerous wildlife during poaching excursions. Fear of such risks is well-founded, and it is hardly surprising that wildlife (lions) were more feared than anti-poaching personnel. Similarly, the possible "punishment" incurred by a dangerous wildlife encounter is potentially far more life-threatening and costly than being arrested. If a poacher is injured during a hunt, this livelihood option, along with other options like farming, may be temporarily or permanently lost depending on the magnitude of the injury. Average recovery time for wildlife injuries sustained while poaching was 1.1 months. Even though lions were the most feared, buffalo accounted for the majority of injuries (59%) followed by wildebeest (21%). This seeming disconnect between perceived fears and actual risk may be explained by the fact that lions are often attracted to dying herbivores caught in snares, are difficult to scare off, and are sometimes caught in snares themselves. In such cases, poachers reported having to abandon entire snare lines until lions had vacated the area. Other poachers reported meeting lions relatively frequently because both poachers and lions were active at night. Although poachers were rarely injured by lions, routine contact with this potentially lethal animal likely explains poacher fear.

Like the perceived fear of lions, the fear of being arrested by anti-poaching personnel is more likely fueled by perception and contact than by the reality of arrest or severe punishments. The average poacher reported having been arrested 1.4 times over his hunting career. But when divided by the total number of days spent poaching (1901 days), poachers faced arrest a chance of arrest of just 0.07%. On the rare occasions in which a poacher was arrested, prison sentences were short and the total amount (USD\$39) in fines a poacher paid was just 9% of his total income from one year of bushmeat sales. When total fines paid over a lifetime are divided by an average lifetime of poaching revenue, a poacher paid just 0.6% of his bushmeat revenue. This small percentage is unlikely to act as a financial deterrent

to poaching activity. Another facet of respondents' perceived fear of anti-poaching units may also have been due to the number of times that poachers were detected and pursued. Although poachers were actually caught and arrested only 14% of the time they were pursued, such chases, in which the outcome is uncertain, likely instilled a greater amount of fear.

Increasing the length of prison sentences for convicted poachers has the obvious advantage of ensuring the individual is no longer poaching and harming wildlife populations. But keeping poachers in prison is both costly for the government and may cause undue financial hardship on a poacher's household, potentially motivating other household members to poach to recoup the revenue lost to the stoppage. Despite hunting, some poachers face food insecurity throughout the year. Several respondents mentioned that prison sentences were positive developments because it ensured they would receive steady food during their incarceration during difficult times of the year.

It is unclear if raising the amount that convicted poachers have to pay in fines is an effective strategy for decreasing poaching in western Serengeti. First, if poverty is indeed the major driver, then further sapping an individual's—or his household's—finances may exacerbate the problem, potentially leading to a greater poaching effort. Second, if the arrest and fine precede a bushmeat sale, arrested individuals may lack the requisite money to pay it. In such cases, several convicted poachers paid their fines by collecting monies from relatives and friends. This practice can spread economic hardship to households not partaking in illegal activities. This again has the potential to lead other households into poaching. In some cases in which convicted poachers were unable to pay a fine, they were taken to prison. This transferred the financial burden to the Tanzanian government, which rarely has enough revenue for basic operations.

A recent study suggested that law enforcement is vital to curb illegal exploitation of wildlife populations [6]. Similarly, Hilborn et al. suggested that illegal hunting decreased in western Serengeti due to intensified anti-poaching patrols [23]. Even at intensified levels, the likelihood of arrest a poacher faces every time he entered the field remained small (0.07%). If increasing anti-poaching is a tenable strategy for poaching mitigation, the reason is more likely related to the greater fear it raises in poachers than to an increased likelihood of getting caught. Since poachers averaged far more successful escapes (9.7) than arrests (1.4) over their careers, it is likely that it is the chase that causes fear to increase. Since the number of hours that a poacher remained concealed after detection was strongly related to his fear of anti-poaching units ($F = 19.045$, $df = 1$, $p = .002$), it is clear that the presence of enforcement regimes does indeed affect poacher perceptions, even if it fails to greatly increase the actual number of arrests.

Where high educational costs are causing poachers to hunt, the creation of scholarship funds or price reductions for secondary education might be more advantageous than increasing anti-poaching patrols. Where poachers hunt because it is part of their cultural heritage, however, scholarship funds or any other form of monetary assistance are unlikely to reduce poaching. Research has shown that poachers in western Serengeti attained a significantly lower level of secondary schooling than non-poaching individuals [10]. Unlike primary schooling, secondary education in Tanzania is not provided free by the government. This creates a financial hurdle that many rural households cannot overcome. A system of governmental scholarships targeted to such households could potentially curb poaching by occupying a would-be poacher's time [28] and ultimately result in more employment possibilities.

Implications for conservation

Studies indicate that anti-poaching enforcement is effective and necessary for maintaining viable wildlife populations [6, 23]. The study here does not contradict this point but shows, rather, that anti-poaching units and related punitive measures are feared by poachers and have an overt effect on poaching perceptions. What remains unclear, however, is whether or not increasing an anti-poaching presence can result in a meaningful reduction of poaching behavior over an area as large as the GSE. This study demonstrates that poachers are arrested exceedingly infrequently over their illegal hunting careers. Since just 4% had been arrested more than once, it also suggests that poachers may adapt to anti-poaching patrols and devise more effective evasive strategies. The use of cellular phones, for example, was reported by many poachers to be essential for successful evasion of anti-poaching patrols.

If poverty is indeed the driving force of poaching and human population densities continue to grow, it is unlikely that such a relatively lucrative enterprise as poaching will subside, even if significant increases in anti-poaching efforts are made. Although most poachers described their lifestyle as 'difficult,' the monetary and protein-based benefits they accrue greatly exceed the costs, recounted here as potential injuries, fines, and prison sentences. Until poachers perceive these costs to be higher than the financial benefits, poaching will likely continue unabated in western Serengeti. It bears keeping in mind, however, that although outside the scope of this study, bushmeat demand could plausibly increase if poverty decreases in the region giving households more access to revenue. Such a scenario would likely affect the current costs and benefits a poacher faces.

Community- and incentive-based programs have been—or are in the process of being—implemented in western Serengeti. While these programs have had decidedly mixed results [6, 29, 30], they are theoretically sound in their attempts to link local people with wildlife conservation and show the value of having wildlife around. Until these links are strengthened and local people receive and perceive tangible benefits from conservation, however, wildlife will be pressured from illegal hunting [31]. While community-based initiatives are well-intentioned, poverty remains at the root of poaching in western Serengeti. Lifting poachers and their respective households out of poverty through employment is essential for long-term conservation viability [28]. For conservation to succeed in the short-term, however, a maintained presence of anti-poaching enforcement should accompany such efforts to lift households out of poverty.

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