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Syndicate recruitment, perceptions, and problem solving in Namibian rhinoceros protection

Elizabeth M. Naro[a,b,*], Samantha M.L. Maher[a,f], Jeff R. Muntifering[c,d], Adam J. Eichenwald[a,e], Susan G. Clark[a]

[a] Yale School of Forestry and Environmental Studies, 195 Prospect St, New Haven, CT, 06511, United States of America
[b] African People & Wildlife, P.O. Box 11306, Arusha, Tanzania
[c] Minnesota Zoo, 12000 Zoo Blvd, Apple Valley, MN 55124, United States of America
[d] Save the Rhino Trust, PO Box 2159, Swakopmund, Namibia
[e] Tufts University, 200 College Ave, Medford, MA 02155, United States of America
[f] EcoHealth Alliance, 460 W 34th St. Floor 17, New York, NY 10001, United States of America

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ABSTRACT

In the last decade, poaching of high-profile wildlife species has increased across Africa, particularly threatening the viability of rhinoceros populations. Protection efforts and anti-poaching measures have increased across the continent, but a lack of research on the motivations driving the recruitment of local people by poaching syndicates may limit successful law enforcement. We explore the societal drivers and personal motivations behind individuals' involvement in poaching syndicates in Namibia and how this process is perceived at different levels of decision-making. There was a general consensus across all informant populations that wildlife crime syndicates are divided into five tiers of engagement. Poachers, the lowest tier, are typically recruited by a second tier of local business people via a cycle of dependency and debt. Further, although anti-poaching efforts are generally aimed at apprehending individuals at the lowest tier, the dependency mechanism used by local recruiters supplies syndicates with a consistent source of recruits. We also identified a misalignment of perceptions between local people and socially distant conservation practitioners regarding the personal motivations and societal drivers of commercial poaching. We urge conservation practitioners to invest in developing a more contextual understanding of local perceptions and perspectives prior to establishing rhinoceros protection measures. Such contextual information is critical to ensuring that limited conservation resources are used effectively to achieve the greatest positive impact for both people and rhinoceros.

1. Introduction

The escalation in poaching across Africa over the past decade threatens the long-term viability of rhinoceros (*Rhinocerotidae*) populations (Warchol, 2004; Ayling, 2013; Di Minin et al., 2015). This escalation is directly attributable to the rise of highly organized, international crime syndicates specializing in wildlife poaching and the distribution of wildlife products (Warchol, 2004; Montesh, 2013; Emslie and Knight, 2014; Wittig, 2016). Syndicates are characterized as an affiliation of individuals or organizations to promote a common cause, and the organized environmental crime industry is considered comparable to other transnational crime including trafficking in narcotics, arms, and humans (Nellemann et al., 2014). There is increasing convergence between syndicates dealing in these different illicit markets (Nellemann et al., 2014; Wittig, 2016). Organized crime syndicates operating in southern Africa supply foreign markets with rhinoceros horn (Warchol, 2004; Ayling, 2013; Challender and MacMillan, 2014). Literature describing the various methods used to prevent the damage caused by these networks generally focuses on curtailing demand, such as via a controlled legalized horn economy (Di Minin et al., 2015; Hanley et al., 2018) or more targeted law enforcement against leaders in criminal syndicates (Ferreira and Ouma, 2012; Ayling, 2013; Wasser et al., 2015). Research has also examined the potential negative side-effects of the militarization of anti-poaching efforts known as 'green militarization' (Duffy, 2014; Büscher and Ramutsindela, 2015). However, little is known about the beginning of the horn supply chain.

Rhinoceros protection, and anti-poaching efforts specifically, may be limited by a lack of understanding of the origins of the horn supply

* Corresponding author at: Yale School of Forestry and Environmental Studies, 195 Prospect St, New Haven, CT 06511, United States of America.
E-mail address: enaro@tanzaniapeoplewildlife.org (E.M.,. Naro).

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chain (Challender and MacMillan, 2014; Hübschle, 2016). Poaching syndicate operations are highly dependent on the involvement and cooperation of individuals at all levels of the supply chain, particularly those residing in areas where high-profile target species are found (Warchol et al., 2003; Warchol, 2004; Wittig, 2016; Huebschle, 2017). This is of particular issue in Namibia where the Community-based Natural Resource Management (CBNRM) model adopted by Namibia's Ministry of Environment and Tourism has returned the rights to tourism benefits and wildlife management, including the monitoring for a significant population of black rhinoceros (*Diceros bicornis*), to communal conservancies (Jones and Murphree, 2001; Scanlon and Kull, 2009; Muntifering et al., 2017). On the one hand, custodianship and the conservancy framework provide a unique circumstance where local people become formally engaged in rhinoceros protection, allowing benefits from conservation to accrue at the local level. On the other hand, poaching syndicates operating in Southern Africa have become particularly invested in the recruitment of local community members, often those with knowledge of rhinoceros whereabouts, through informant networks and operational support (Warchol et al., 2003; Montesh, 2013; Massé et al., 2017). Therefore, local involvement in Namibian rhinoceros conservation is crucial, as community members have the potential to either disrupt (through monitoring, anti-poaching, and intelligence networks) (Muntifering et al., 2017; Muntifering, 2019), or intensify (through collusion with poachers and illegal hunting) the continued supply of rhinoceros horn from Southern Africa (Montesh, 2013; Muntifering et al., 2017).

Gathering information on the personal motivations and socio-economic stressors that lead individuals to become involved with the commercial poaching trade is imperative to strengthening anti-poaching efforts (Warchol et al., 2003; Muntifering et al., 2017) and improving the effectiveness of rhinoceros protection programming and pro-wildlife initiatives (Kahler and Gore, 2012; Muntifering et al., 2015; Muntifering, 2016). Identifying differences in how each group involved (conservancy members, law enforcement, and conservation groups) perceives the underlying causes of syndicated poaching and the role of the other groups in this process highlights where rhinoceros protection programming can be adapted or improved. Such use of a problem-oriented, value-based approach to combating poaching at the community level deepens practitioners' understanding of the personal motivations and societal drivers exacerbating organized wildlife crime (Clark and Wallace, 2015; Muntifering et al., 2017).

In this paper, we present results from an investigation of the socio-economic variables associated with the recruitment of local people into the supply chain for poaching syndicates in Namibia. We investigate two main questions: 1) which factors influence the likelihood of recruitment to and continued involvement with syndicates at a local level? 2) which social and economic stressors drive commercial poaching at a national scale? and 3) to what extent do responses to the previous two questions depend on an informant's relationship to poaching syndicates? We contextualize our results by identifying and describing the tiered structure of poaching syndicates operating in Namibia and examining the differing values and motives at each tier. Finally, we examine whether perceptions of these questions are different among various groups involved in poaching and anti-poaching efforts, as such differences can result in friction and resentment that perpetuate the poaching problem. We hypothesized that responses would be dependent on informant population and that populations would diverge on questions regarding personal motivations and societal drivers of poaching.

2. Methods

2.1. Study area

Namibia's conservancy program is comprehensive and country-wide (Weaver and Skyer, 2003; Jones and Weaver, 2009; Scanlon and Kull, 2009; Naidoo et al., 2016), with nearly 44% of the country's area designated as freehold or conservancy land (Behr et al., 2015). The conservancy institution provides communal and commercially-registered conservancies with legal rights to manage and benefit from wildlife protection on their lands (Nott and Jacobsohn, 2004; Scanlon and Kull, 2009). Wildlife tourism and associated lodges provide much of Namibian conservancy income (Boudreaux and Nelson, 2011; NACSO, 2017). Tour operators and conservancies often work in conjunction with non-governmental organizations (NGOs), including Integrated Rural Development and Nature Conservation (IRDNC), which provides technical support in natural resources management, enterprise development and conservancy governance, and Save the Rhino Trust Namibia (SRT), which, under a formal memorandum of understanding (MOU) with the Ministry of Environment and Tourism, focuses on rhinoceros conservation through joint monitoring efforts and responsible rhinoceros tourism ventures led by SRT-trained, and local Conservancy-employed Rhino Rangers (Muntifering et al., 2015; Muntifering et al., 2017).

The study was conducted across twelve sites and four regions in Namibia from May – August 2017. The Torra, Anabeb, and Sesfontein Conservancies were all represented from within the Kunene Region in north-west Namibia. Two of the sites, Palmwag Lodge, and Desert Rhino Camp, are located within the Palmwag Tourism Concession, a government-administered land concession within which private tourism companies, local conservation organizations, and conservancies jointly or individually manage tourism camps. A third site, Grootberg Lodge, is located in adjacent ≠Khoadi-//Hôas Conservancy. Waterberg Plateau Park was the only formally protected study site managed exclusively by the Ministry of Environment and Tourism via Namibia Wildlife Resorts. A map of study sites can be found in Fig. 1. Sites were selected according to several criteria. We chose areas that had a history of poaching incidents, presence of rhinoceros, history of community-based natural resource management projects, and access to individuals in the community through chain-referral sampling. Some sites, including the Ministry of Environment and Tourism (MET) in Windhoek, were selected specifically due to the presence of key government informants who then provided contacts for informants at Waterberg Plateau Park.

2.2. Sampling methodology and data collection

Data were collected primarily through informant interviews with conservancy members and participants at multiple levels of involvement in wildlife security initiatives. Wildlife security initiatives represented include the Namibia Ministry of Environment and Tourism National Park Rangers and anti-poaching personnel, Namibian Police, SRT, Conservancy Rhino Rangers, and Intelligence Support Against Poaching (ISAP). Due to the challenges of conducting a human subject study in rural areas on a politically and culturally sensitive topic, we obtained access to interviewees primarily through chain-referral sampling (Biernacki and Waldorf, 1981; Penrod et al., 2003). Initial contacts were SRT-affiliated investigators, staff, beneficiaries, and MET contacts. At the end of each initial contact interview, we asked the informant to provide contact information for or facilitate an introduction to any other informants they think would provide critical information to the study. In most cases, additional informants were contacted by phone and asked to participate. In some cases, particularly for community members directly involved in poaching operations, SRT initial contacts facilitated an in person introduction between the informants and the interviewers. In the case of the MET officials interviewed, one interviewer obtained permission to enter MET in Windhoek and informants were provided by MET. No compensation was provided to initial contacts, although community member informants did receive tea at the end of their interview to thank them for their time. In all, 90 potential informants were contacted with 88% accepting an interview and 12% declining to participate.

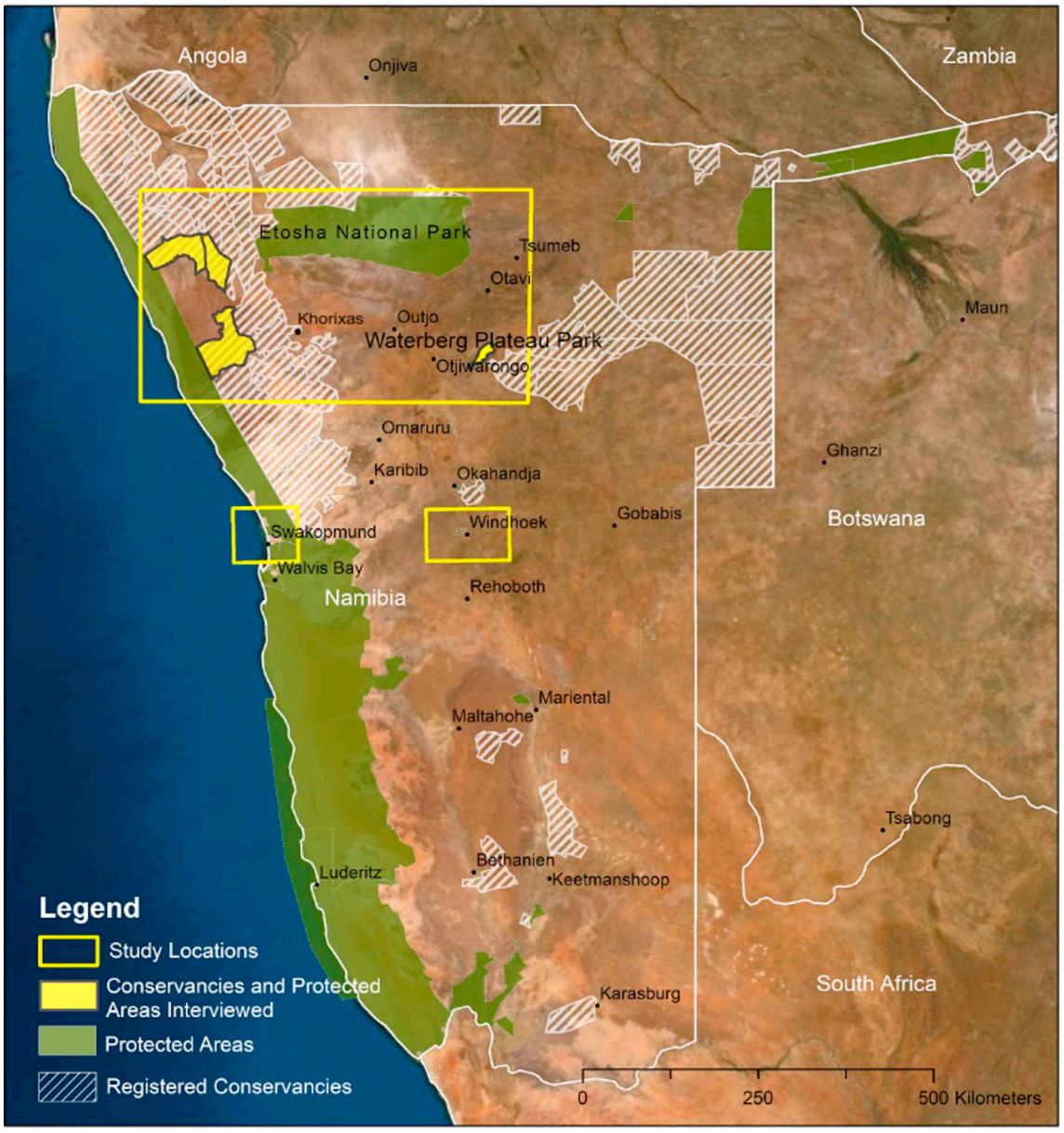

Fig. 1. Map of study sites.

We performed a total of 79 semi-structured informant interviews, which included a combination of quantitative and qualitative questions. Each interview was conducted with two interviewers, with the exception of interviews at MET where only one interviewer was granted permission, and responses were transcribed on an iPad. A translator was only used when necessary in a total of 25 interviews (32%). Some questions required a quantitative response from the informant, but most were open-ended and allowed informants to provide anecdotal or experiential evidence. Generally, the twenty-question survey resulted in sixty to ninety minute interviews. Surveys began with questions related to the informant's educational, familial, financial, and social background, followed by their current relationship to poaching syndicates. The second set of questions pertained to poaching syndicate structure and operations in Namibia. The third set of questions was aimed at understanding the informants' perceptions of individual motivations for joining poaching syndicates. The final set of questions targeted perceptions on the societal drivers of commercial poaching at a national scale.

We sought to mitigate the effects of informant and researcher biases during qualitative interviews. We anticipated acquiescence bias among all informants, most strongly with conservancy members, and minimized this bias with open-ended rather than binary response questions and asking questions in multiple ways if the informant showed signs of acquiescence. Anticipated researcher biases included leading questions bias and confirmation bias. We minimized leading question bias by reviewing interview protocols with an independent qualitative interview technique specialist.

We mitigated confirmation bias during coding and analysis by refraining from creating formal codes before our interviews began. Interview questions were semi-structured and qualitative, allowing informants to take the conversation in several different directions based on their perceptions. Codes were then crafted according to themes that emerged throughout the interview process. We describe our coding process in greater detail below.

2.3. Data analysis

Each informant was sorted based on their social distance from

commercial poaching syndicates and given a unique identification number. Social distance was determined by both physical location (i.e. proximity to conservancies where rhinoceros are known to range) and social networks (i.e. direct relationships with individuals involved in organized crime) (Parrillo and Donoghue, 2005; Wark and Galliher, 2007). Physical location was determined by the informant's response to a question on where they live. If the informant was a resident member of a conservancy, they received a 1. If the informant lived outside a conservancy or regularly traveled outside of the conservancy, they received a 2. If the informant lived in a city not within the conservancy system, they received a 3. Social network was determined by the informant's response to a question on their level of relationship with individuals involved in poaching. If the informant was a self-identified former poacher, had provided information to poachers, or knew any poachers on a personal level (friends or family), they received a 1. If the informant worked in anti-poaching or law enforcement or had met any poachers (arrested poachers or used poachers for investigative purposes but did not consider them friends or family), they received a 2. If the informant worked for an environmental NGO, academic institution, or government, and did not claim to know or have met any poachers, they received a 3. The informants' ratings for physical location and social network often corresponded. The two numbers were averaged, and the informant was categorized as primary (if the average was closest to 1), secondary (if the average was closest to 2), or tertiary (if the average was closest to 3).

Names were redacted from interview notes for confidentiality, leaving informant IDs as the only identifier of each interviewee. Due to anonymity and IRB security protocols, no direct quotations drawn from interviews are presented in this paper. However, all paraphrased or summarized descriptions of informants' perspectives were verified post hoc by reviewing the interview transcriptions.

We investigated qualitative interview responses through manual, three-phased thematic analysis. The first phase, theme extraction, was an iterative and reflective process. After the first 20 interviews, the two interviewers independently reviewed the transcriptions, identifying initial themes for each question. The interviewers then combined their analyses to find common themes and diverging ideas. Common themes were defined by reflecting on the interviews and reviewing relevant literature on frequently occurring topics such as alcohol dependence and unemployment. Responses in later interviews were sorted into these common themes, or, where a response did not fall into one of these themes, were listed as a potential new theme. After each set of 20 interviews, we conducted another iteration of theme extraction to identify any new emergent themes.

The second phase, theme reduction, was conducted in order to perform statistical analysis on some emergent themes and answer our third research question. Each defined theme was discussed and reduced to a single-word text code. For example, the theme for personal motivations defined as *a desire to obtain new things or money for personal gain or internal satisfaction* was coded as "greed" whereas the theme defined as *a desire to obtain new things or money to elevate status with peers or for external validation* was coded as "status". We then performed a series of Pearson Chi-Square Tests of Independence (Minitab 17 Statistical Software) by cross-tabulating responses with informant population as the independent variable. Where significant dependence of a response on informant population was found, we cross-tabulated the dependent response variable with a series of other categorical variables. For instance, when the societal driver of poaching variable was found to be associated with informant population, we then cross-tabulated that variable with other responses, such as perceived best approach to combat poaching, to determine if the two responses were correlated.

The third phase, narrative development, was conducted after all interviews were complete. This phase was intended to incorporate the richness and depth of informants' experiences and stories. Since the interviews were semi-structured, many informants provided anecdotes that could not be thematically analyzed or coded but were important for understanding context and framing recommended anti-poaching efforts. These anecdotes inform much of our discussion section.

3. Results

Informants were sorted into a population based on their social distance from community-level participation in organized crime syndicates. Primary informants (n = 12) comprised 15% of total interviewees and included self-identified former poachers, as well as farmers, herders, and conservancy members currently living in regions with incidents of commercial poaching. This population had the closest social relationship to commercial poachers. Our secondary informant population (n = 38), 48% of total informants, was comprised of law enforcement, Conservancy Rhino Rangers, SRT staff, and others involved in anti-poaching, wildlife security, or with direct experience with poachers. Tertiary informants (n = 29), comprising 37% of total informants, included representatives from various environmental NGOs, government officials, and other informants affiliated with an academic institution. Government officials included employees of the Namibian Ministry of Environment and Tourism. Tertiary informants had the farthest social distance from commercial poaching syndicates.

3.1. Syndicate structure

Informants repeatedly outlined multiple levels of involvement in syndicate operations, which we have separated into five tiers (Fig. 2). This description is a result of narrative development analysis and includes experiential and anecdotal evidence. While we find this to be a useful tool for framing the discussion, we note that this result is subjective. The pyramidal structure drawn from the experience of our informants should therefore be used as a foundation for future research.

Tiers 4 and *5* refer to the demand-side of the market, namely the final consumers of rhinoceros horn (*Tier 5*) and the country liaisons for these buyers (*Tier 4*). These tiers were frequently referenced by our tertiary informants (NGO and government representatives). Informants in all three populations identified and described a *Tier 3*, consisting of "middlemen" connecting Africa-based suppliers and international buyer liaisons (*Tier 4*). Informants had comparatively less information on the demographic composition of *Tier 3*, despite referencing these middlemen frequently and distinguishing them from other tiers. Secondary informants who self-identified as having exposure to poaching syndicates reported that middlemen range in age and work experience but generally have a higher level of education than their lower-tier counterparts.

Informants placed shooters and trackers into *Tier 1*, while syndicate-associated recruiters were designated as *Tier 2*. Informants described *Tier 2* syndicate affiliates as primarily responsible for identifying and

Fig. 2. Structure of poaching syndicates operating in Namibia, as explained by our informants.

recruiting individuals to conduct poaching operations or provide intelligence on rhinoceros locations. This tier includes small business owners, including owners of local drinking establishments (*shabeens*) or members of rural/suburban communities that are perceived as having disposable wealth. A majority of primary and secondary informants indicated that *shabeens* and other small businesses are places of recruitment through which *Tier 2* individuals develop rapport with potential shooters and trackers by offering credit in their businesses. Recruitment occurs as *Tier 1* individuals become indebted to *Tier 2* individuals and are coerced or convinced into joining poaching operations.

The trackers and shooters in *Tier 1* generally conduct operations in small groups of two to four individuals. These groups are a combination of local residents familiar with the area and syndicate members who have moved to the region but may not be members of the local ethnic group. Informants explained that this tier was comprised primarily of men ages 18–30, who often received little to no formal education and were either unemployed or herders without disposable income.

We identified a potential *Tier 0*, which includes people who may or may not be aware of their ties to or participation in organized wildlife crime, primarily through the sharing of information. Informants had difficulty identifying members of this tier, since this group may include school children, traditional healers, foreign tourists, farmers, herders, and other individuals residing in or familiar with the immediate area where rhinoceros are known to range. Unlike the diagrammed tiers, *Tier 0* is perceived to include a higher percentage of women and girls. Although we do address its importance in our discussion, we do not include *Tier 0* in our syndicate figure.

3.2. Perceptions of the role of alcohol in syndicate recruitment

Informants identified multiple mechanisms by which *Tier 2* individuals recruit potential trackers and shooters to *Tier 1*. This description is a result of thematic extraction and theme reduction. Codes derived from informants in all three informant populations who responded to questions about recruitment mechanisms show that recruitment was conducted by people at *shabeens* (36%), local businessmen (47%), or through friends and familial connections (17%). Informants who listed business people as the primary recruitment mechanism often specified later that the business people they referenced were *shabeen* owners, though qualitative coding distinguished businessmen from people in *shabeens*.

Tertiary informants were less likely to reference the connection between *shabeens* and syndicate recruitment than their primary and secondary counterparts, although all three populations agree that local business owners make up *Tier 2*. However, the tertiary population put a greater emphasis on recruitment through friends and family (Fig. 3C). Further, we found a significant association between informant population and mentions of alcohol use and abuse, where primary and secondary informants were more likely to reference alcohol and *shabeens* than were tertiary informants, X^2 (2, N = 79) = 6.81, $p < .033$.

Social distance from poaching syndicates was found to be significantly associated with perceptions of *Tier 1* spending preferences, X^2 (6, N = 79) = 20.31, $p < .002$. 64% of primary informants referenced the alcohol market as the principle benefactor of *Tier 1* income with another 18% referencing luxury markets (Fig. 3D). No primary informants listed necessities as a main purchase of *Tier 1* individuals. Secondary informants, on the other hand, thought that *Tier 1* individuals would spend money in multiple markets including necessities such as food and shelter (32%) and luxuries such as designer clothing and cars (35%) (Fig. 3D). 63% of tertiary informants believed that *Tier 1* individuals would put the majority of their money into luxuries with only 13% referencing the alcohol market. 9% of all informants believed that *Tier 1* individuals did not purchase anything since they did not think *Tier 1* individuals received enough money from poaching operations to affect local markets.

3.3. Drivers, motivations, and deterrents

All three informant populations shared similar perceptions of the personal motivations of syndicated poaching at a national scale. This description is a result of thematic extraction and theme reduction. Codes derived from these responses included greed (38%), desperation (31%), opportunity (22%), and status (5%), while a small percentage of informants referenced human-wildlife conflict (2.5%) and alcohol dependence (1.5%). Desperation and greed were seen as the most common personal motivations for individuals to become involved in *Tier 1* operations, with desperation referring to a need for necessities and greed referring to a desire for luxuries (Fig. 3A). These variables were found to be independent of informant population, with no significant association between the informants' social distance to poaching syndicates and their perception of personal motivations ($p > .05$).

In contrast, each informant population had significantly different perceptions of the societal drivers of syndicated poaching. 100% of primary informants attributed the rise in syndicated poaching in Namibia primarily to high unemployment rates in rural conservancies with 73% also referencing dissatisfaction with the conservancy benefit distribution system as a leading societal driver. In contrast, 63% of tertiary informants attributed it more to systemic poverty and the cultural importance of demonstrable wealth and status, with only 27% referencing dissatisfaction with conservancies as a factor (Fig. 3B). The relationship between an informant's social distance from poaching syndicates and their perceptions of the societal drivers of syndicated poaching was found to be significant, X^2 (4, N = 78) = 18.37, $p < .001$, with those socially closer to syndicates more likely to consider unemployment and dissatisfaction with conservancies to be the primary drivers. Further, we found an association between informants' responses to the question on societal drivers and the question on effective anti-poaching methods, X^2 (6, N = 78) = 19.73, $p < .003$. Informants who thought that poverty was the main societal driver of poaching – generally tertiary informants – tended to believe that stricter punishment and longer jail sentences were the best deterrent to involvement in *Tier 1*. However, informants who thought that unemployment and status were more significant societal drivers of syndicated poaching – generally primary and secondary informants – tended to suggest that consistent employment opportunities were a better use of anti-poaching resources.

4. Discussion

Our informants revealed the overall structure of poaching syndicates operating in Namibia and provided an insight into how these criminal groups recruit to ensure consistent involvement from community members. While framing this discussion through the 5-tiered model we propose in Fig. 2, we recognize that the syndicate is not isolated, but rather exists in a broader socio-political and economic system. Lower tier individuals were generally characterized by our informants as less educated, lower income young men, living in primarily rural areas with limited political power or involvement in civil society. Higher tier consumers were characterized as wealthy members of urban societies on the opposite side of the globe. These drastically differing lifestyles between individuals involved with wildlife crime syndicates suggest that the syndicate is shaped more by global economic trends than by individual's motivations. Given the external constraints on the wildlife product market, including strengthening international legislation and enforcement protocol, the linkages between syndicate tiers are likely loose affiliations rather than close personal connections. Similar to the individuals within each tier, these affiliations between tiers exist within a broader political system as well, suggesting multiple levels of corruption or coercion. We focused our analysis on *Tiers 1* (trackers and shooters) and *2* (local recruiters) of poaching syndicates. Anecdotal evidence from our interviews suggests that *Tier 2* recruiters frequently exploit a cycle of dependency that grants syndicates a reliable supply of

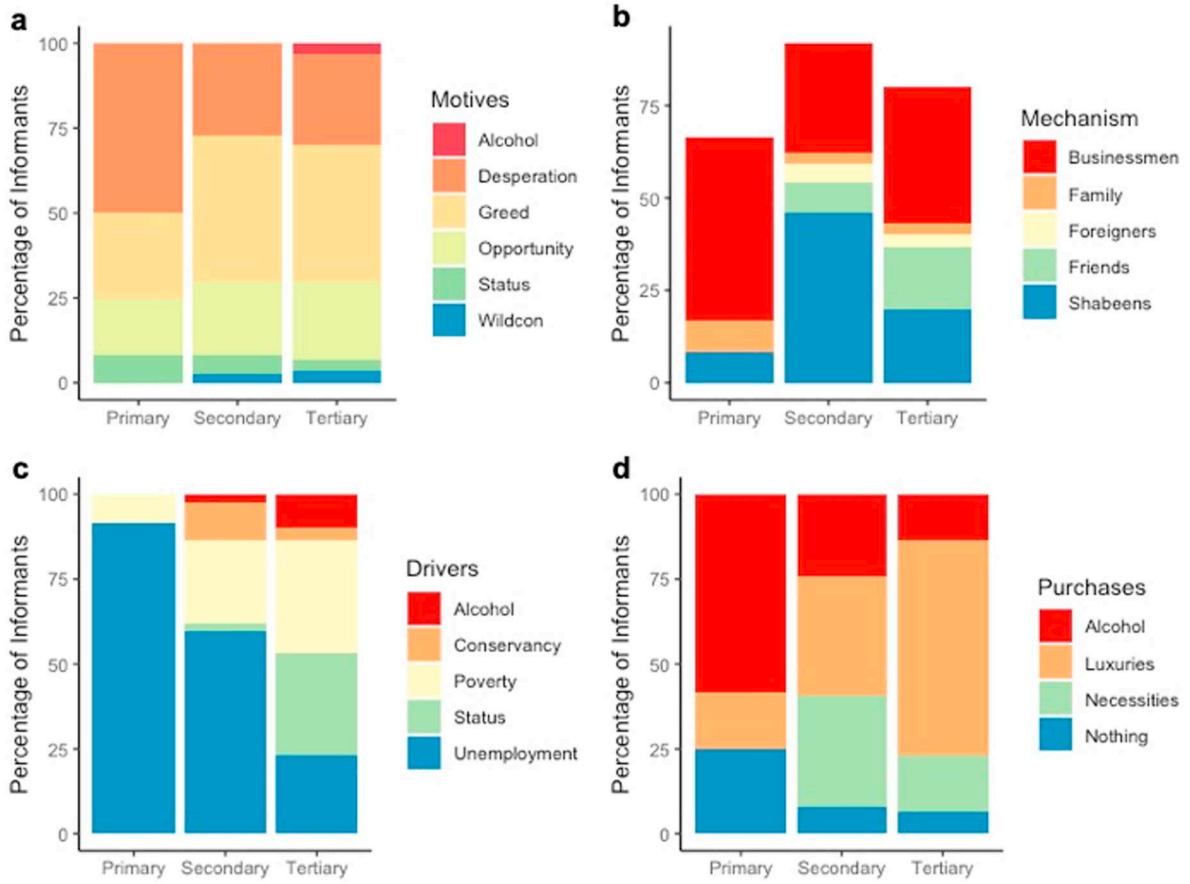

Fig. 3. Comparisons between answers from primary, secondary, and tertiary informants when asked about most likely personal motives for *Tier 1* operatives to engage in poaching (a), most likely methods of recruitment of Tier 1 operatives (b), most likely societal drivers of poaching by *Tier 1* operatives (c), and what *Tier 1* operatives are most likely to purchase with money gained from poaching (d). Note that not all informants discussed recruitment methods, thus chart b includes null values.

Tier 1 poachers and trackers.

Our findings in Namibia suggest this cycle begins and ends in local businesses and drinking establishments. *Tier 2* recruiters often run local businesses, particularly *shabeens*, and provide goods and services such as alcohol on credit, with the knowledge that many customers are unemployed and will be unable to make the payments. Unemployment threatens individuals' sense of purpose and undermines the values of respect, skill, power, and wealth (Mattson and Clark, 2011; Clark and Wallace, 2015). It can also breed boredom and lead to high rates of alcoholism (Henkel, 2011), which directly feeds this cycle of dependency. Purchasing on credit generates goodwill among youth seeking higher social status and a cure to unemployment-generated boredom, but simultaneously places these people in social (especially if there is a familial linkage) and financial debt. Recruiters can then demand repayment and coerce debtors into *Tier 1* operations temporarily or permanently. Primary and secondary informants revealed that the money generated by *Tier 1* individuals from poaching operations is often spent on alcohol (Fig. 3D), providing *Tier 2* recruiters with the opportunity to perpetuate the cycle of debt, dependency, and coercion. Similarly, *Tier 1* participants can be kept in this cycle of dependency when syndicates post bail and demand repayment. Our tertiary informants were at least partially aware of this potential nature of recruitment. However, they did not appear to perceive that commercial poaching money was funneled back in to the *shabeens* to perpetuate this cycle as the primary and secondary informants emphasized.

Intimately linked to the cycle of dependency and unemployment-fueled desperation are the feelings of resentment and disenfranchisement among primary informant populations. For example, secondary and tertiary informants considered poverty a main driver of poaching, but primary informant conservancy members placed more of an emphasis on unemployment. While community members perceived unemployment as a systemic issue largely outside of their control, they perceived poverty to be a result of individual laziness. Thus, in being aware that secondary and tertiary informants focused on poverty as a driver, primary informants expressed resentment at the idea that they were considered impoverished. Lacking the values of respect and rectitude from secondary and tertiary populations, primary informants demonstrated a loss of human dignity and consequent vulnerability to the coercive recruitment mechanisms of syndicates (Mattson and Clark, 2011). These feelings of resentment can undermine the efforts of tertiary informants and act as catalysts for the growth of *Tier 1*, as well as the expansion of the *Tier 0* informant network (Mattson and Clark, 2011; Muntifering et al., 2017).

Friction between primary informants and conservancies was an additional catalyst for recruitment. The majority of primary informants expressed distrust with conservancies, referencing that although conservancy boards had promised that the presence of high profile game species would benefit the community, they had not observed any such benefits. The primary informants were the only group to point to dissatisfaction with the conservancy as a significant driver of poaching, demonstrating a disconnect between how each population perceived conservancies. Such a disconnect can feed directly into increased poaching activities because conservancy members or local residents who are not registered members of the conservancy in rural areas with knowledge of rhinoceros movements are more likely to be involved with poaching syndicates when they feel disenfranchised by the

conservancy. For example, the lack of available transport to conservancy meetings was cited as both a cause of resentment and a "legitimate" reason to spend illegally obtained money on vehicles. Primary informants anecdotally expressed a "for the greater good" view with regards to using money from illegal activities to help the community obtain necessary transport, exposing a vulnerability to recruitment by organized crime. Thus, improving the inclusiveness and transparency for the conservancy benefit distribution plan decision process as well as ensuring that the approved plans are implemented accordingly is paramount, as noted in IRDNC's strategic plan (IRDNC, 2015).

Access to affordable transportation for rural people was anecdotally referenced by all informant populations as a threat to community involvement in pro-wildlife initiatives (Silva and Mosimane, 2013; Silva and Mosimane, 2014; Silva and Motzer, 2015). Addressing this challenge may require programming outside the standard repertoire of conservation organizations. Regardless, vulnerable segments of the population should be considered a key audience for future rhinoceros awareness and outreach programming (Muntifering et al., 2015). For example, recent interventions based upon this research specifically entail new routine engagements between local ranger teams and rural farmers to help improve relationships and build social capital between potential *Tier 0* & *1* and rhinoceros protection practitioners (Muntifering, 2019). In other areas with spatial attributes like dense human populations or trans-national boundaries that challenge community-based anti-poaching approaches, such as around Kruger National Park (Lunstrum, 2014), a multitude of transportation strategies may be necessary to ensure community inclusion and outreach. Conservation organization outreach to rural populations can have the dual benefit of increasing community involvement in conservancy activities and decreasing community vulnerability to syndicate recruitment through enhancing their values of respect, power, and rectitude (Mattson and Clark, 2011; Muntifering et al., 2017). Thus, programs aimed at protecting rhinoceros should consider addressing the problem at the lowest tiers of the syndicate pyramid through values-based approaches to rural community engagement (Muntifering, 2019).

Lastly, differences in perceptions of motives for *Tier 1* individuals among our informants provided further evidence for friction between primary, secondary, and tertiary groups. Primary informants generally cited desperation as a motive for poaching, while secondary and tertiary informants pointed to greed as the primary motive (Fig. 3A). The term "greed" has a negative connotation, while the term "desperation" elicits empathy, revealing a fundamental difference in how each group views the individuals in *Tier 1*. This difference in mindsets between those closely involved with or linked to organized crime and those enforcing laws and designing programs while removed physically and socially from the problem creates a tension that can hinder anti-poaching measures and may further spur the recruitment of individuals into *Tier 1* (Hübschle, 2016). Practitioners demonstrating strong ties to local communities and decreasing social distance from organized crime syndicates may find more success in wildlife security programming, particularly in reducing the negative effects of the community-based *Tier 0* informant network (Muntifering, 2019).

4.1. The problem of misinformed perceptions

The types of solutions and strategies promoted and implemented by groups and individuals are heavily, if not exclusively, influenced by the way they perceive the problem which often make many assumptions about other people's goals (Clark et al., 2011). Our results demonstrate a discrepancy between informants' social distance from poaching syndicates, their understanding of societal drivers of poaching, and the most effective deterrents. Wildlife protection strategies are often designed by government officials and conservation practitioners far removed from the problem (Cheteni, 2014; Duffy, 2014; Mogomotsi and Madigele, 2017). As our tertiary informants corroborated, they tend to focus on militarized anti-poaching and stricter punishments for *Tier 1* individuals. Conversely, groups with closer social distance to poaching recruitment recommended different uses of anti-poaching resources. Primary informants repeatedly stated that pro-wildlife initiatives would be more effective if they addressed their need for access to conservancy meetings, reliable conservation-based employment, and tangible benefits from the presence of high-profile game in their conservancies. Secondary informants suggested anti-poaching resources would be better spent in building informant networks and offering payments for information. They tended to maintain that combating syndicates through income-generating informant opportunities would deter potential *Tier 1* individuals from being coerced into riskier poaching operations.

The disconnect in understanding of both the recruitment mechanisms and key deterrents between those directly involved and those designing anti-poaching programming suggests that conservation practitioners may be overlooking critical factors in the perpetuation of syndicated wildlife crime. There were significant differences between informant populations' perceptions of societal drivers – namely poverty versus unemployment – but informants in different populations had similar perceptions about personal motivations for syndicate recruitment. This suggests that individuals are more likely to understand personal motives than they are to understand societal drivers and trends. This lack of understanding the broader systemic and constitutive issues at play often manifests in misguided conservation program design, ineffective resource use, and perpetuation of misinformation (Roe and Booker, 2019). Conversely, evidence from Namibia's Conservancy Rhino Ranger Incentive Programme demonstrates that effectiveness in combating poaching can be achieved when problems and solutions are defined and implemented by groups and individuals with closer social ties (i.e. locally based) to the poaching recruitment (Muntifering, 2019).

Overall, we identified a series of systemic issues at the local level, including a lack of transparency in conservancy actions, lack of economic mobility, high unemployment, and high rates of alcoholism. These issues are all embedded in national, regional, and global trends and cannot be solved with quick technical solutions – particularly due to the influence of an alcohol-fueled cycle of dependency. Conservation programs rarely include alcohol awareness projects or support for individuals suffering from alcohol or substance dependence. Yet with these issues tied so closely to the objectives of anti-poaching programming, partnerships with public health or rehabilitation organizations become increasingly important. Furthermore, this cycle of dependency is perpetuated by youth unemployment, which breeds boredom, loss of personal meaning, and degradation of social respect. Programming targeted at building and strengthening social connections, particularly for the values of respect and affection, in places that are not alcohol-centered may mitigate these feelings, even when employment options remain low (Muntifering, 2019). Sports programs for youth may be particularly successful in creating positive social networking opportunities and could reduce the time spent in drinking establishments and may be integrated with strong conservation messages (C4C, 2016). While still an area for further evaluation and research, many conservation organizations including IRDNC and Save the Rhino Trust Namibia have implemented pro-wildlife community sports programs in an effort to address the social values aspect of syndicate recruitment.

NGOs and government ministries alike may consider examining not just the structure of syndicates operating in their areas, but also the social connections that link each tier. In order to more effectively reduce the impacts of commercial poaching and trafficking on the local, national, and global economy, we should consider implementing anti-poaching efforts at all tiers and seek to break the links between them (Ayling, 2013; Roe and Booker, 2019). More research is needed to identify the structural and demographic features of *Tier 0*, which forms the base of knowledge transfer from community-level individuals to higher tier syndicate operatives. Alternative livelihood programs at the

Tier 1 level and education and awareness programs at the *Tier 5* level are necessary and serve an important role in ensuring the long-term persistence of high-profile wildlife species. Yet a problem-oriented and contextual approach to targeting *Tiers 2–4*, along with the recruitment at each tier, is also needed. *Tier 3* middlemen provide the crucial connection between domestic providers and international markets and this requires further study. Anti-poaching and trafficking practitioners, law enforcement, and governments should seek to deepen their understanding of the personal, societal, and cultural factors that create both supply and demand of wildlife products.

Although these results should provide much-needed context to adapt community-level anti-poaching efforts, they alone will not solve the poaching crisis. Wildlife crime syndicates pull in vast sums of money (Ayling, 2013), and it is implausible that they will terminate such a lucrative business if anti-poaching mechanisms begin to cut into recruitment. Indeed, attempting to cut into the profits of other forms of organized crime at the *Tier 1* and *Tier 2* level can result in an increase in criminal activity as the syndicate adapts in response (Montalvo-Barbot, 1997). To avoid this, application of these results must come in tandem with continued pressure at all tiers, particularly where the financial incentive is based: *Tier 5*.

Syndicated poaching remains a critical threat to the long-term persistence of many high profile species and anti-poaching efforts have often placed great emphasis on stopping syndicate shooters and trackers through green militarization (Challender and MacMillan, 2014; Duffy, 2014; Lunstrum, 2014; Büscher and Ramutsindela, 2015). These syndicates operate at multiple tiers, and focusing anti-poaching efforts at a single level is unlikely to succeed (Montalvo-Barbot, 1997; Wright, 2017). Although programming to reduce demand for wildlife products from these species is necessary, additional efforts must be spent to curtail the influence of organized crime syndicates in supply countries. With the information we present here, conservation practitioners will be better able to target programs at individuals vulnerable to syndicate recruitment so long as they actively engage at the local level. However, wildlife and wildlands crime requires multi-faceted, adaptive, and flexible solutions at all tiers of crime syndicates. Only with a dynamic systems-thinking approach and a deep commitment to community driven anti-poaching initiatives, can we ensure the healthy development of rural communities and the non-exploitative use of wildlife and wildlands resources on which they depend.

CRediT authorship contribution statement

Elizabeth M. Naro: Conceptualization, Methodology, Investigation, Writing - original draft. **Samantha M.L. Maher:** Conceptualization, Methodology, Investigation, Writing - review & editing. **Jeff R. Muntifering:** Conceptualization, Project administration, Resources, Writing - review & editing. **Adam J. Eichenwald:** Writing - review & editing, Formal analysis, Software. **Susan G. Clark:** Supervision, Funding acquisition.

Declaration of competing interest

Our manuscript contains original research carried out by the authors, all of whom agree to the contents and submission to Biological Conservation. Any research not carried out by the authors has been fully acknowledged in the manuscript. No part of this manuscript has been published in any form elsewhere nor is the manuscript being considered for publication elsewhere at this time. No form of the manuscript has previously been submitted to Biological Conservation. All sources of funding are acknowledged in the manuscript and none of the authors have direct financial benefits to declare that could result from publication. All appropriate ethics and other approvals were obtained for the research. Research protocols and methodology were approved by the Yale University Institutional Review Board prior to undertaking the research.

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