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# From seeing to saving: How rhinoceros-based tourism in north-west Namibia strengthens local stewardship to help combat illegal hunting

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The opportunity to encounter wildlife, especially endangered species, has long been a major tourism draw for countries around the world with demand continuing to grow. Yet direct evidence testing the underlying assumptions of tourism as a wildlife conservation strategy has been more limited particularly where tourism benefits are assumed to “trickle down” to rural communities that foster local stewardship. A long-term case study from north-west Namibia’s communal lands presents and evaluates a theory of change for a community-level black rhinoceros conservation tourism model that explicitly incorporates local values and institutions in design expected to deliver results that enhance local-level stewardship and improving conservation outcomes for the population. Between 2012 and 2018, the numbers of tourists participating in and revenue generated from local ranger-based rhinoceros viewing encounters directly to local community institutions increased dramatically by over 200% with over USD \$1,000,000 generated during the 6 year period. Subsequent community re-investments in rhinoceros protection was evidenced by a 340% increase in the employment of local “Rhino Rangers” during the same period. Further, a strong positive relationship between community institutions that directly provide support to and benefit financially from tourism with the level of their reinvestment in rhinoceros conservation suggest that communities that benefited more from rhinoceros-based tourism demonstrated higher levels of stewardship. A strong negative relationship observed between rates of illegal hunting of the rhinoceros population and the level of local rhinoceros protection efforts suggest that the increase in local stewardship likely contributed to the reduction in illegal hunting. The Namibia Conservancy-led rhino conservation tourism case offers evidence and lessons that illustrate how carefully curated wildlife tourism that is designed specifically with community engagement and empowerment in mind may serve as a strong basis for enhanced local stewardship that helps improve wildlife and local human communities.

## KEYWORDS

rhinoceros, ecotourism, sustainability, community-based, evidence-based

## 1. Introduction

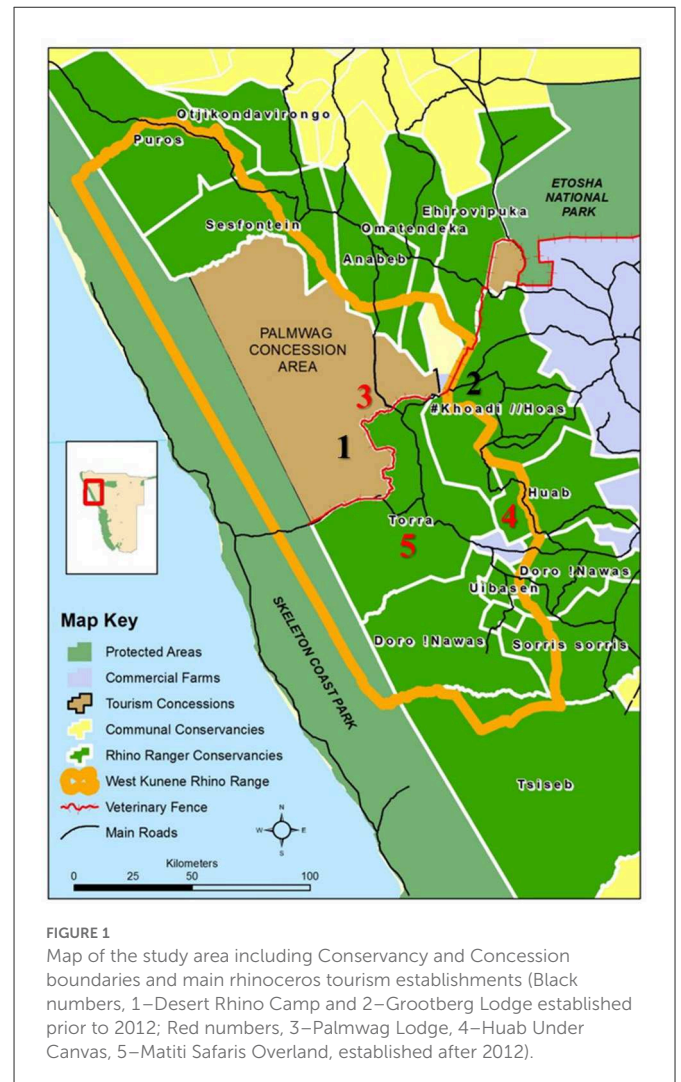
The opportunity to encounter wildlife, especially endangered species, has long been a major tourism draw for countries around the world with demand continuing to grow (Higham et al., 2008; Balmford et al., 2015). While the conservation benefits tourism has provided in protected areas and private reserves has been well-documented (Buckley et al., 2012, 2016) the role

and contributions of tourism toward conservation on communal lands, often managed by indigenous people, has been less studied. With recent research uncovering that indigenous lands support equal or even more species richness than formally protected areas (Schuster et al., 2019), the opportunity to examine, evaluate and share lessons to strengthen the evidence base from such linked conservation and community-based socio-economical contexts is timely. Specifically, case studies that seek to further understand and evaluate key attributes and actual assumptions that tourism benefits have or have not “trickled down” to rural indigenous communities that foster improved local stewardship are well-warranted.

Improving local stewardship is especially important for endangered species that are under threat due to direct human persecution such as the black rhinoceros. Since the early 1970’s, the global black rhinoceros population has declined by as much as 97% although more recent trends show a slight yet consistent increase from a low of 2,500 individual to now roughly 5,500 (Standley and Emslie, 2013). Despite these gains, the illegal hunting pressure for the use of their horns primarily in traditional Chinese medicine has largely persisted requiring range states and rhinoceros conservation organizations to increase their protection efforts. To date, these efforts has predominately been focused on strengthening law enforcement-based strategies (Ferreira and Okita-Ouma, 2012; Biggs et al., 2013, 2017; Cooney et al., 2017) while a few unconventional approaches seek strategies that improve the value local people attach to saving rhinoceros (Muntifering et al., 2017). Regardless of the approach, the costs of rhinoceros protection has increased tremendously over the past decade placing even greater importance upon identifying and implementing strategies are not just cost-effective but ideally generate their own income to help offset management costs.

Tourism as a conservation tool can be framed as a type of ecosystem service whereby the service provided (i.e., wildlife sightings) can lead toward improved livelihoods by enriching primarily local wealth (i.e., revenue back to local people) through direct (Eshoo et al., 2018) or indirect payments such as employment (NACSO, 2019). Examples of tourism being employed as a linked conservation and local livelihood improvement strategy date back to the early 1990’s, yet evidence has suggested many often fail to deliver on one or sometimes even both of the conservation and social development goals they sought to address (Kiss, 2004; Wells et al., 2004). While the growth in community-based tourism as conservation has led to greater diffusion of lessons and principles transferrable to other contexts helping advance its effectiveness (Salafsky et al., 2001), examples that explicitly define and evaluate assumptions in tourism as an agent of pro-conservation behavior change in local communities living alongside wildlife is still relatively scarce. In Laos, for example, a number of local villages have adopted tourism as a key income-generating mechanism to promote greater pro-conservation behavior away from illegal hunting (Eshoo et al., 2018). A number of community-based conservation-oriented tourism models have been designed and implemented in Africa as well (Stone and Stone, 2011; Snyman and Spenceley, 2012, 2019) yet few have been examined over an extended period of time to assess the degree to which the underlying assumptions that link how tourism is designed and delivered with conservation action and impact was or was not realized.

Here, we seek to add to this emerging body of evidence by describing and evaluating the effectiveness of a novel rhinoceros tourism model designed and delivered on communal lands



structured within multi-stakeholder partnerships in north-west Namibia primarily between 2012 and 2018. We present a theory of change (ToC—Figure 1) that explicitly illustrates assumptions *via* chronologically ordered linear pathways in the model and forms the basis of the descriptive evaluation. Specifically, we sought to test five key assumptions (also framed as objectives) that the rhinoceros tourism model as a conservation tool would produce (1) increased revenue from rhinoceros directly to community institutions, (2) enhanced local stewardship demonstrated by an increased number of community-employed rangers, (3) increased community-led rhinoceros monitoring, (4) reduction in illegal rhinoceros hunting and lastly (5) increased demand for community-led rhinoceros tourism experiences evidenced through growth in the number of operating joint-venture rhinoceros tourism enterprises that would feedback to increased revenue (1).

## 2. Context

The case study presented is situated across roughly 25,000 sq km of communal land in north-west Namibia (Figure 1). It includes sections of the northern Namib with a rainfall gradient

of 10–20 mm in the far west to over 200 mm in the eastern range (Mendelsohn, 2010). A substantial portion of the central extent of the black rhinoceros range is situated upon a volcanic basalt land surface known as the Etendeka Tablelands, formed more than 100 million years ago when Gondwanaland split apart, providing greater nutrients to the sparse vegetation and a higher density of natural springs. This in turn has helped produce surprisingly reasonable levels of population performance for the region's free-ranging black rhinoceros (Muntifering et al., in press). The land tenure is primarily divided into (1) three state-administered tourism concession areas whereby the tourism rights to the land has been devolved back to the neighboring Conservancies and (2) twelve communal Conservancies that participate in the Conservancy Rhino Ranger Programme. Four main ethnic groups reside within this landscape including ovaHimba, ovaHerero, Nama-Damara, and Riemvasmaak the majority of whom live semi-pastoral lifestyles farming with small stock or cattle. Presently, approximately 21,500 inhabitants are registered members of their Conservancy within the north-west rhinoceros landscape (NACSO, 2019).

Namibia has a long history of conservation both within and outside its network of formal protected areas. The landscapes outside formal protected areas typically fall within either commercial or communal land. On the communal lands, which comprise roughly 38% of Namibia's land surface, an innovative community-based natural resource management programme (CBNRM) was established in the 1990's by the government and non-government organizations as a mechanism to improve conservation and local livelihoods by devolving benefits and management rights from wildlife back to local residents through what is known as the Conservancy model. Based on Ostrom's design principles for collective action (Ostrom, 2007) in order to become legally registered as a Conservancy, residents on communal land must demonstrate an ability to adhere to a series of key conditions including democratically electing a representative committee, delineating boundaries, establishing a wildlife management and utilization plan. Once registered, the Conservancy as a local institution can legally require, for example commercial tourism activities operating or seeking to operate within their boundaries, contractual financial obligations back to the Conservancy (Jones et al., 2015). These rights can serve as powerful incentives to protect the wildlife most tourists come to view and encounter in Namibia and are supported by a number of non-governmental field-based conservation and development organizations whose collective efforts are coordinated under a national umbrella association called Namibia Association of CBNRM Support Organizations (NACSO).

In order to best leverage the strengths and opportunities of the Conservancy model with the Namibian government's explicit mandate to oversee all management of the country's black rhinoceros, the Ministry of Environment, Forestry and Tourism (MEFT) ensured that their Black Rhino Custodianship Programme, which was previously established to support rhinoceros conservation on commercial farmlands, was extended to include communal lands in 2005. The programme is at its core a value-sharing arrangement whereby the government offers to share power, respect and wealth in exchange for assistance with protection in the form of local monitoring and, if necessary, cooperation with law enforcement (Muntifering et al., 2017). Critically, despite

the government technically "owning" all black rhinoceros, the arrangement provides a sense of "de-facto" ownership back to local people as Conservancies now have a clear stake in and opportunity to directly benefit from having black rhinoceros on their land. However, becoming a Black Rhino Custodian also requires participating Conservancies to conduct regular monitoring and reporting on the status and distribution of "their" rhinoceros (Kotting, 2020). On paper this sounds reasonable and the task fits well with the rich history of community-led conservation efforts dating back to the 1980's whereby local headmen and chiefs appointed 'Community Game Guards' to conduct wildlife monitoring (Loutit, 1996; Owen-Smith, 2010). However, in practice effective individual-based rhinoceros monitoring requires a significant amount of investment and the reality on the ground was that many Conservancies did not have the human nor financial capacity to fulfill this responsibility.

Thus, in 2012, in the face of a dramatically escalating poaching pressure from neighboring South Africa (Knight, 2018), MEFT, Conservancy leadership and non-governmental rhinoceros conservation organizations came together to establish a unique partnership that became known as the Conservancy Rhino Ranger Incentive Programme (Muntifering et al., 2015). Importantly, the call to action came not from government or rhino non-governmental organizations, but the Black Rhino Custodians themselves whereby a request was made directly to rhinoceros non-governmental organizations to provide the necessary enabling conditions and incentives to improve both the quality and quantity of Conservancy-led rhinoceros monitoring. Save the Rhino Trust, which had been operating in the region honing its rhinoceros monitoring skills and techniques since the early 1980's, was a prime candidate to assist along with two other Namibian non-governmental organizations, Integrated Rural Development and Nature Conservation and Namibia Nature Foundation, both of which have been instrumental in facilitating key conservancy natural resource management and enterprise development support over the years. During the pilot period between 2012 and 2014 emphasis was directed toward building capacity by skills transfer in rhinoceros monitoring which included provision of equipment, transportation and patrol leadership and performance-based bonus payments resulting in 14 Conservancy-employed rangers were trained, equipped and motivated producing a slight increase in rhinoceros monitoring (Muntifering, 2019). Following this progression, the second phase of skills transfer shifted toward integrating knowledge and skills for leading a rhinoceros tourism experience into the rangers' repertoire which, if designed and delivered properly, could serve not only to increase the frequency of rhinoceros monitoring patrols but also provide new "rhinoceros revenue" back to the local Conservancy to help offset the increased costs incurred for rhinoceros protection.

Fortunately, a proof of concept already was in existence. Rhinoceros tourism in north-west Namibia began in the 1990's initially as an informal, *ad-hoc* activity (Owen-Smith, 2010) and evolved into a much more structured and systematic undertaking catalyzed by a novel joint-venture partnership between Wilderness Safaris and Save the Rhino Trust that formed in 2003. Between 2003 and 2008 targeted ecological research helped inform a number of policies for delivering responsible rhino tourism including a rotational use system (Muntifering et al., 2019b).



and a viewing protocol (Muntifering et al., 2019a). During this time, an effective policy process for multi-stakeholder rhino tourism was also established and the lessons learned and key principles helped lay the foundation upon which expansion could be realized (Muntifering et al., 2020). In other words, the interdisciplinary framework grounded in the policy sciences (Clark, 2002) would provide not only the technical fixes to the conventional ecological problems often associated with tourism (i.e., rhinoceros disturbance and displacement problem) but also the embedded social context and policy-oriented framework to improve the prospects for diffusion.

In summary, the institutional framework and linked relationships for rhinoceros tourism in north-west Namibia can be described across scales from national to regional to local (Figure 2). The primary link is (A) between the MEFT with individual communal Conservancies by entering into contractual agreement through the Black Rhino Custodianship Programme. Once this is established, field-based conservation organizations provide the necessary support to the Conservancy (B) as described above and then provide regular feedback to both the MEFT (C) and NACSO (D). Once rhinoceros monitoring capacity is established at the Conservancy level, joint-venture partnerships with private sector tourism companies are established (D) and further supported by field-based conservation organizations. NACSO maintain regular reporting arrangements with MEFT (E).

### 3. Key programmatic elements

In order to illustrate our model and underlying assumptions pertaining to the chronological results and impact, we established a simple theory of change (ToC) for our Conservancy-led rhinoceros tourism model (Figure 3). Employing a ToC to improve the practice of conservation programmes has been gaining in popularity (Margoluis et al., 2013; Biggs et al., 2017) and helps programme managers, practitioners and multi-stakeholder partnerships clarify how they believe the proposed strategy (e.g., Designing and Delivering Conservancy-led Rhinoceros Tourism) will lead to intended impact (e.g., maintaining rhinoceros population performance and improving local livelihoods). Importantly, ToC also require explicitly recognizing intermediate results that highlight underlying assumptions in the programme's theory (Salafsky, 2011). Thus, these intermediate results can be evaluated at various stages in the programme's implementation to assess for the soundness in the theory as well as identify poor assumptions and where additional measures or strategies are required to help improve overall effectiveness of the programme.

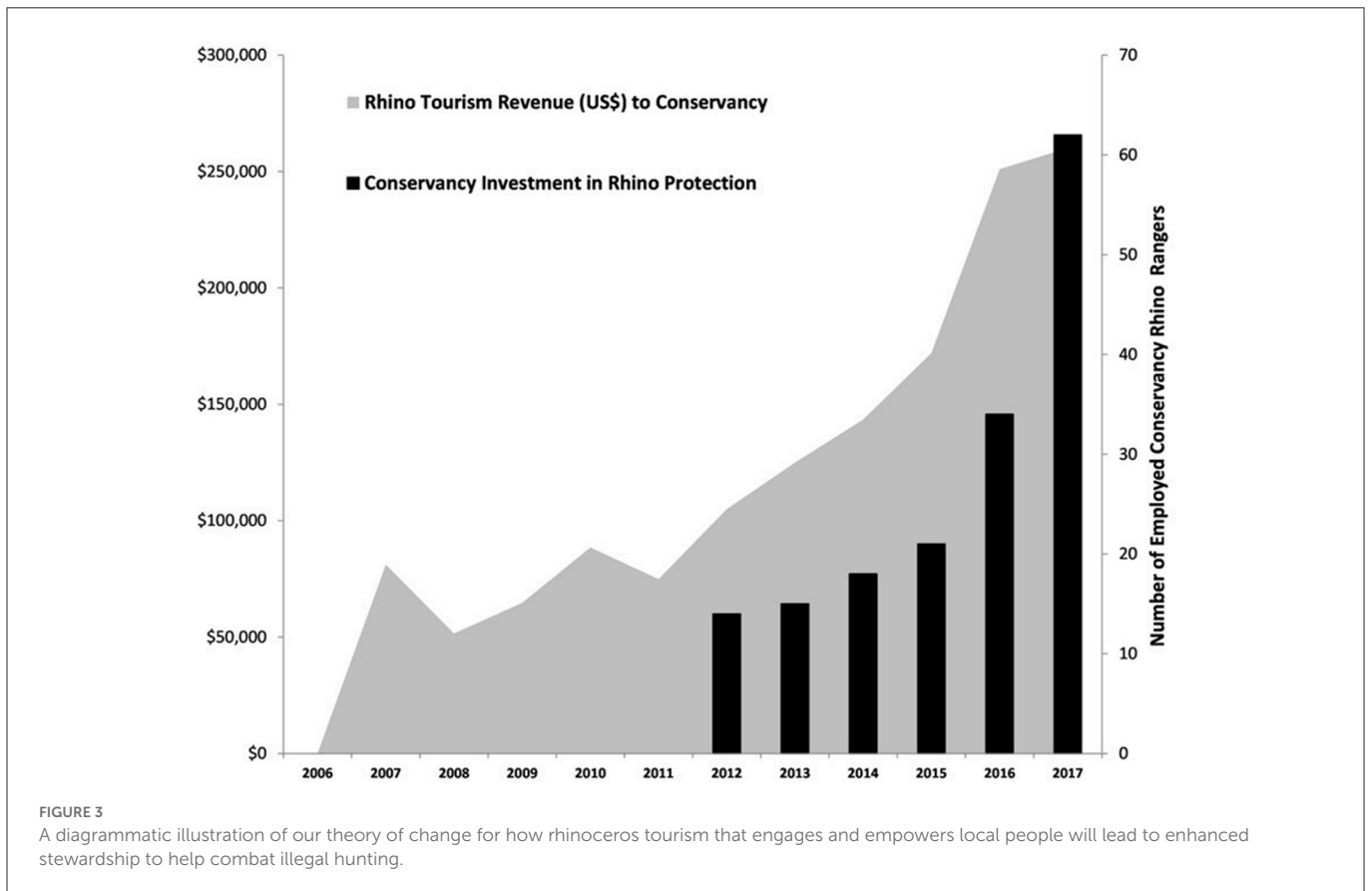
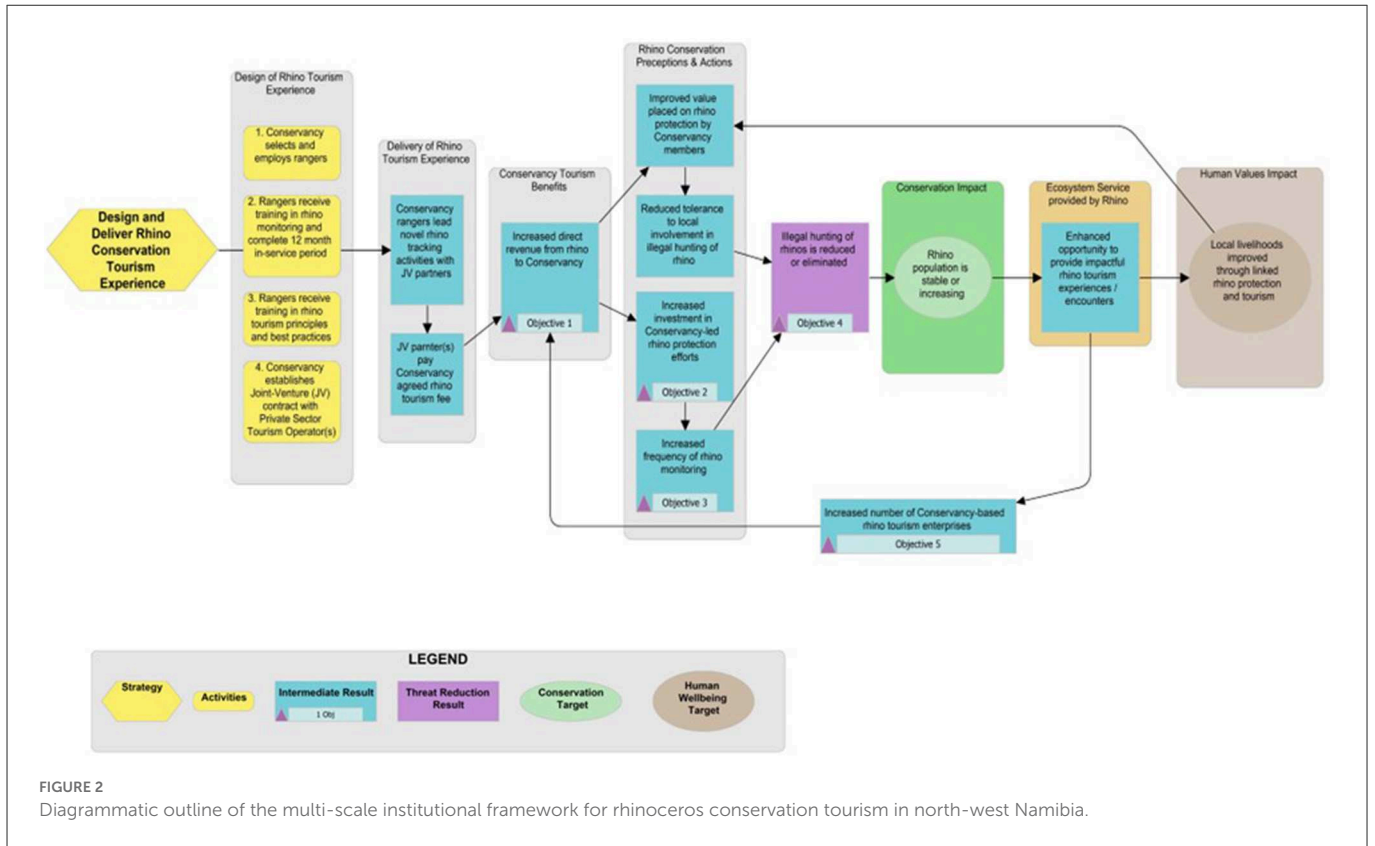
We loosely base our ToC on similar eco-tourism strategies (Eshoo et al., 2018) from Asia and fundamentally the Pathway B (Increasing incentives for stewardship) identified in a broader ToC for combating illegal wildlife trade (Biggs et al., 2017). We divided our ToC into four main intermediate segments (1) Design, (2) Delivery, (3) Benefits to Conservancy and (4) Rhinoceros Conservation Perceptions and Action followed by a series of impacts including a direct threat reduction result (minimize or eliminate illegal hunting of rhinoceros) and two linked goals of a stable or increasing rhinoceros population that supports improved local livelihoods by creating novel demand

for expanded rhinoceros tourism opportunities. This ordering did not necessary imply a simple linear relationship but rather to illustrate a chronological ordering to the expected results and impacts. Below we describe each intermediate result segment of our model by providing context and measurable results aligned with five main objectives (Objectives 1–5) linked to specific results in our ToC that included 3 intermediate results, 1 threat reduction result, and 1 feedback result following improvements upon our overall rhinoceros conservation goal. It should also be noted that this model is one of a suite of key strategies employed to advance rhinoceros conservation in north-west Namibia (Sullivan et al., 2021). As such, the rhinoceros tourism strategy should not be viewed as a panacea, but rather an important cog in the wheel that contributes toward long-term rhinoceros conservation that enriches local livelihoods particularly in our north-west Namibian context. Additional descriptive information on quantitative data collection is provided in the [Supplementary Appendix 1](#).

#### 3.1. Designing the Conservancy-led rhinoceros tourism model

Three primary steps were required to set the stage for Conservancy-led rhinoceros tourism to commence. First, the Conservancies had to appoint and employ their own rangers. This was a fairly straightforward process as the Conservancy management knew their community well, and although rhinoceros non-governmental organizations were asked for input in some cases, for the most part participating Conservancies organized and facilitated their own interview and selection processes. The critical element in this phase was the simple fact that these men and women selected resided in and were thus socially connected to their Conservancy. In our context and especially our community-centric goals and objectives, the trade-offs and risks seemed rational and just in that greater “ownership” and pro-rhinoceros behavior would only be possible if local people were engaged and empowered in actual rhinoceros protection. Once the Conservancy rangers were employed, the second phase of the design period was the provision of training in rhinoceros monitoring. Even in a tourism frame, this aspect was fundamental since the rangers needed to possess both the skills and professionalism to demonstrate rhinoceros conservation in action prior to delivering a successful rhinoceros tourism experience. Conservancy rangers were deemed proficient in rhinoceros monitoring following the completion of a full classroom-based course in theory and practice provided by Save the Rhino Trust based on standardized curricula suggested by the IUCN African Rhino Specialist Group followed by a full 12 months of in-service training with existing rhinoceros monitoring teams. Only then did the rangers progress to becoming eligible for training in rhinoceros tourism.

Rhinoceros tourism entailed more theory in responsible practices based on prior experience as well as a strong focus on rhinoceros conservation messaging. The importance of the messaging dimension became evident that a growing number of tourists were interested not only in maximizing their prospects of “seeing” a wild rhinoceros but also learning how and feeling their decision to partake in the specific activity were helping to “save” wild rhinoceros. In practice, this meant that the training would align with producing a more



holistic rhinoceros tourism experience led by Conservancy ranger that not only dramatically improved the likelihood of encountering a rhinoceros but also directly demonstrated to the tourists the passion and precision they placed upon working to save “their” rhinoceros. The structure and delivery of the messaging was loosely based upon theory of planned behavior (Ajzen, 1991) and followed similar efforts to inspire pro-conservation behavior in tourists through education (Powell and Ham, 2008). This included an indepth oral presentation by one of the Conservancy rangers following each rhinoceros encounter that provided additional dimensions of their work including more about their Conservancy and what rhinoceros means to the community.

The other critical step at the design stage is the contractual agreement between the Conservancy and their joint-venture tourism partner. One of the key strengths that the Conservancy legislation in Namibia provides is the ability to take legal action against any commercial tourism company operating within their boundaries that do not hold contractual agreements with them. These contracts include a clear and transparent operational and financial roles and responsibilities. The design and implementation of contractual obligations between Conservancy(s) and joint-venture tourism partners was vital to ensure that the operation was carried out in accordance with best practices and that the expectations on revenue sharing was made clear (see [Supplementary template](#)). In general, three main partnership models emerged: (1) Private sector owned lodge and business, Conservancy payouts, (2) Conservancy owned lodge and business, private sector management of tourism, and most recently (3) Private sector owned overland business, Conservancy Payouts. While the institutional arrangement details is fully reviewed elsewhere (Jones et al., 2015), it is important to note that the diversity of partnership arrangements reflects the diverse social context and Conservancy capacity. In other words, Conservancies with greater capacity to own and manage their own tourism enterprises have embraced this while others prefer to engage private sector tourism in more of a passive landlord-tenant type arrangement. The most recent partnership expansion with the overland tourism segment is indicative of the growing demand for the experience and flexibility of the structure.

Aligned with an overall goal of shifting the rhinoceros conservation agenda toward a more authentic bottom-up community-led approach, skills transfer in rhinoceros tourism to roughly 50% of the Conservancy rangers occurred between 2014 and 2016. Conservancies with existing joint-venture partners that had expressed interest in establishing new rhinoceros tracking activities with the Conservancy were prioritized. The training, led by practitioners from Save the Rhino Trust, harnessed principles and best practices established from over a decade of first-hand rhinoceros tourism experience conducted from Desert Rhino Camp (Muntiferung et al., 2020).

### 3.2. Delivery of rhinoceros tourism and Conservancy benefits that accrue to Conservancy

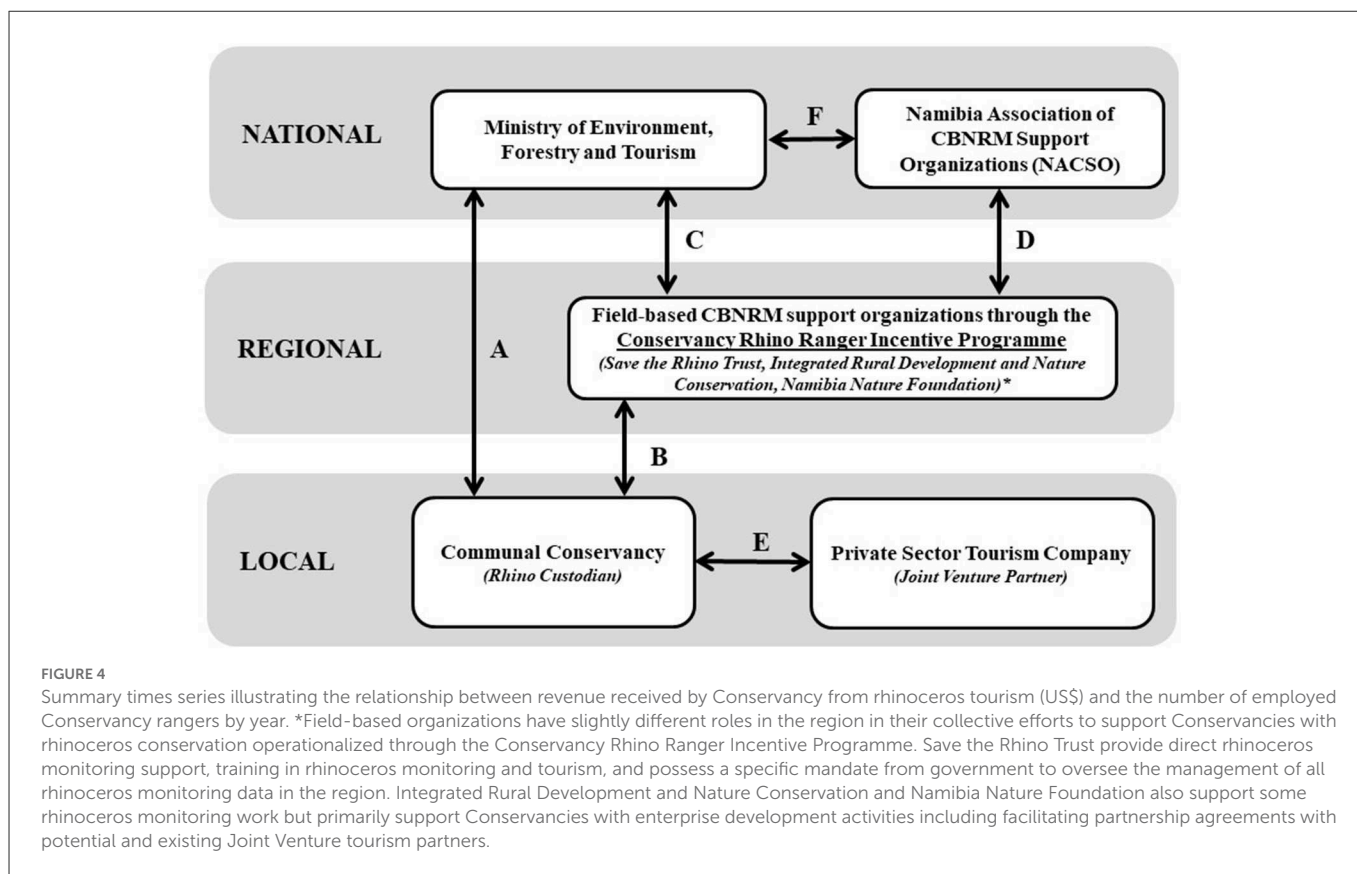
Regardless of the business model employed, the rhinoceros experience delivered on the ground is standard across all enterprises. This is primarily due to the fact that the safety and wellbeing

of both the rangers/guides and guests is non-negotiable and that protocol on viewing encounters is held constant. This also helps ensure that disturbance on the rhinoceros is minimized. Further, at present it is not legally possible to enforce that specific trained individuals must accompany tourists seeking to encounter a free-ranging rhinoceros. However, part of the promotion to prospective private sector tourism companies from both Conservancies and rhinoceros organizations has been the added value in terms of the substantially increased likelihood of find and viewing a rhinoceros as well as the benefits to community conservation dimension included when directly including local rangers in the experience. In fact research demonstrated that these attributes were critical in determining what rhinoceros tourists were willing to pay for the experience (Naidoo et al., 2021). Thus, to our knowledge, the vast majority of all commercial rhinoceros tracking experiences conducted in the landscape are led by two to three rhinoceros NGO staff or Conservancy rangers.

Between 2012 and 2018, a total of 16,635 rhinoceros tourists participated in the rhinoceros tourism experience. This number grew nearly 4 fold over the study period from 1,467 in 2012 where only NGO staff were leading rhinoceros tourism experiences to 4,297 in 2017. These numbers were accompanied by the growth of only two enterprises in 2012 to five in 2017 distributed across the landscape.

### 3.3. Conservancy benefits of rhinoceros tourism

Following the design and delivery of curated Conservancy-led rhinoceros tourism, we set out a series of assumed intermediate results that we believed would lead to broader rhinoceros and local livelihood impacts (see ToC). The following subsections present results that test our assumptions in our Theory of Change. Our first objective (ToC Objective 1) and assumption is that expanding the rhinoceros tourism model to partner Conservancies primarily through transferring skills to their rangers, would lead to increased revenue directly from rhinoceros. While the precise amount of income shared between private sector tourism company and partner Conservancy is always slightly different, each partnership involved a benefit sharing arrangement with the most direct measure being straight deposits from tourism company accounts, who market and manage the business, to Conservancy bank accounts for the agreed upon amount. This ranged from a percentage of turnover to a fixed dollar amount per paying guest. As a condition for each joint-venture private sector tourism partner sharing financial information, it was agreed that only aggregated data on overall revenue distributed to Conservancies from rhinoceros tourism would be presented. Generally, rhinoceros tourism grew substantially over the study period reaching what appeared to be a plateau in 2016 and 2017 of roughly USD \$250,000 per annum (Figure 4). In total, over USD\$1,000,000 over the study period was paid out to five of the 12 participating Conservancies exclusively from rhinoceros tourism activities. Specifically, revenue to Conservancies increased by 235% between 2011 (prior to the initiating of the Conservancy ranger programme) and 2018 demonstrating the general objective of increasing income to



Conservancies from rhinoceros tourism had been achieved (ToC Objective 1).

### 3.4. Rhinoceros Conservation perceptions and actions

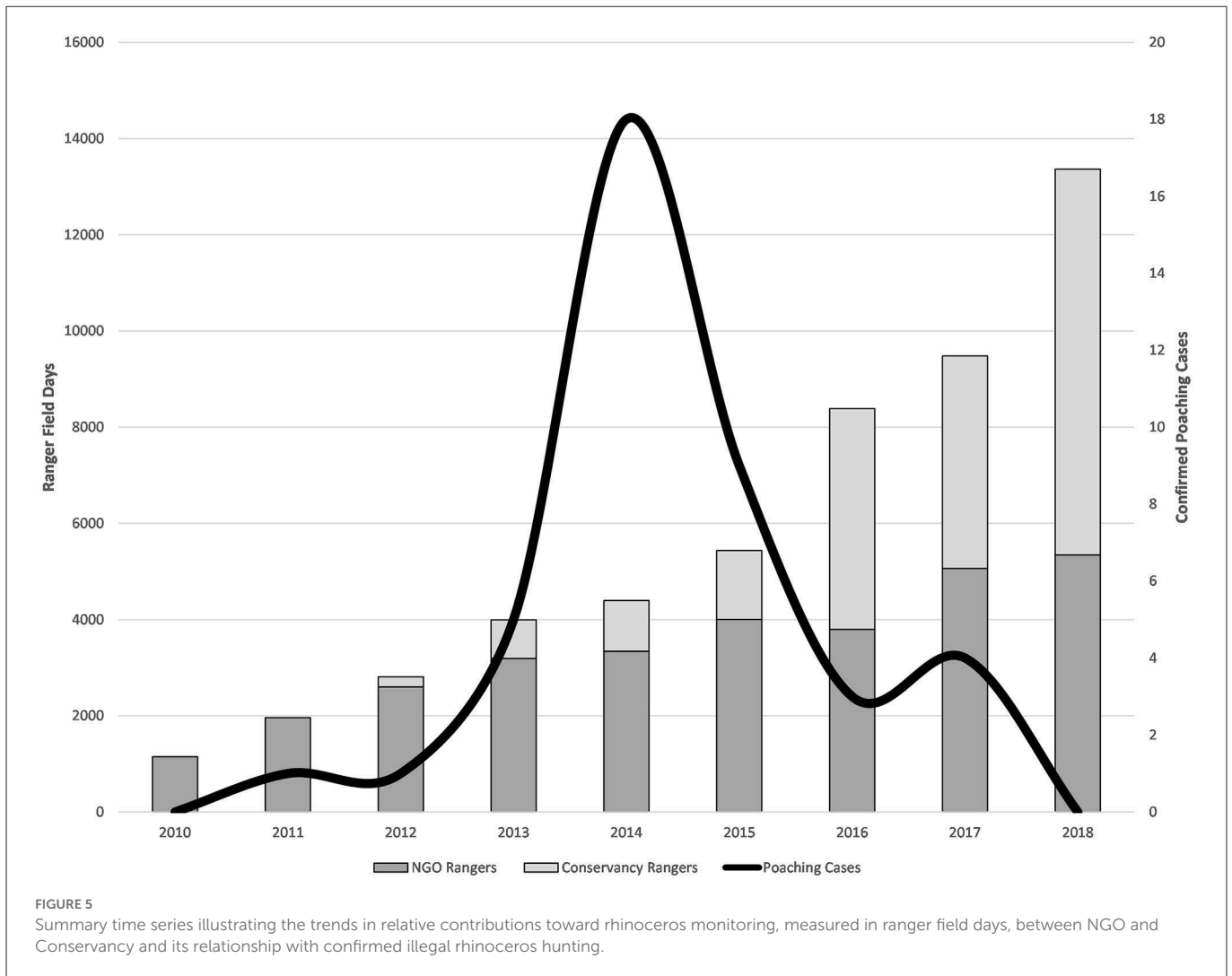
Our assumption that subsequent to the accumulation of income to Conservancies from rhinoceros tourism would result in increased re-investment in rhinoceros protection by the Conservancies (ToC Objective 2) as well as increased frequency of rhinoceros monitoring (ToC Objective 3) also was confirmed. We used the number of employed Conservancy ranger as our metric to demonstrate direct re-investment of Conservancy accrued income from rhinoceros back into greater rhinoceros protection. During the study period, the number of employed Conservancy rangers grew from 14 in 2012 to 62 up until 2018. Interestingly, the trends in the rate of growth between employed rangers and new rhinoceros revenue is almost identical at 245 and 235%, respectively (Figure 4). Furthermore, there was a strong positive relationship between the Conservancies that earned more revenue from rhinoceros and the number of rangers employed ( $n = 12$ ,  $r^2 = 0.641$ ). These results strongly suggest that Conservancy stewardship is enhanced as revenue (wealth) increases from, in this case, rhinoceros tourism.

A collateral result was also observed in the increased frequency of rhinoceros monitoring which increased substantially from

692 confirmed (identification card completed along with a time/date stamped photograph, GPS location verified by Save the Rhino Trust) rhinoceros sightings in 2012 to 3,193 by 2018. While not all Conservancy ranger lead tourism activities, the increase in tourism revenue clearly provided the needed financial resources to employ more rangers and produce more monitoring results.

### 3.5. Threat reduction results and conservation impact

Our rhinoceros tourism model sought to minimize or eliminate illegal hunting of rhinoceros by harnessing and improving local value for rhinoceros (ToC Objective 4). Despite our disclaimer above that our intention here is not to suggest rhinoceros as a panacea to combat rhinoceros illegal hunting, we observed a rapid increase followed by a rapid decrease in documented illegal rhinoceros hunting events during the study period (Figure 5). Illegal hunting peaked in 2014 with 18 cases reported but then swiftly fell by 78% with only 4 reported cases in 2017 and zero cases in 2018. Furthermore, the year-on-year rates showed very similar trends with the growth in both rhinoceros revenue to Conservancy and relative Conservancy contributions toward rhinoceros monitoring effort with Conservancy ranger days surpassing previously dominant NGO contributions in 2016 (Figure 5). These results, while not explicitly cause-effect, certainly suggest the growth in Conservancy-led tourism



likely played a positive role in combating illegal hunting in the landscape by empowering Conservancies to play a more active role in rhinoceros protection. By reducing the illegal hunting rates at or below average annual growth rate targets, we also met our goal of helping ensure the black rhinoceros population remains stable or increasing.

Rather than viewing our conservation and socio-economical goals as mutually exclusive which has been shown to present a danger of having to choose which to prioritize (Salafsky, 2011), we posited that maintaining a healthy and growing black rhinoceros population would produce “ecosystem services” in the form of improved opportunities for continued tourism expansion. This in turn would then continue enhancing local livelihoods while improving local value for rhinoceros. We also assumed if this was the case then we may observe a continued growth in the number of rhinoceros tourism enterprises being proposed and operationalized across the landscape (ToC Objective 5) which would feedback to our intermediate result of increased rhinoceros revenue to Conservancies. During the study period, we observed the number of joint-venture rhinoceros tourism enterprises more than double from two to five at the end of 2017 with numerous additional enterprises under development.

## 4. Discussion

While both the benefits and challenges of tourism as a conservation tool are reasonably well-established, cases studies that explicitly illustrate from design to delivery the type and magnitude of tourism’s contributions toward conservation and social development is less common. Here, we sought to fill this gap with evidence and lessons learned from Namibia’s Conservancy-led black rhinoceros tourism model. The model, which originated as a joint-venture between a rhinoceros conservation organization and private sector tourism company nearly 20 years ago, has evolved and intentionally shifted toward a more community-based initiative with Conservancy rangers championing the experience on behalf of their community. Our results demonstrate that tourism, when designed specifically with both conservation and local community engagement and empowerment in mind, can deliver results that help reduce threats and contribute toward positive conservation impact which may also lead to improved local livelihoods.

Our study also provides an example of how a Theory of Change can serve as a user-useful and user-friendly guide for both the design and evaluation process by forcing practitioners to be explicit in their



assumptions. Clarifying and testing these assumptions in practice helps identify “leaps of faith” where additional strategies or activities are required to achieve impact. While ToCs do not always prove cause and effect, especially for a complex and “wicked” problem like international wildlife crime, its usage does enable a more reflexive and learning environment. One important lesson we learned was not to become too rigid in your theory. It is best to consider your ToC a living and constantly evolving perspective. For example, we often adjusted our ToC retrospectively after we made mistakes in our judgement and rectified them. Moving forward we strongly urge a formalized policy to be endorsed by Namibia’s Ministry of Environment, Forestry and Tourism that will provide an enforcement tool that ensures Conservancies are fully engaged and empowered in rhinoceros tourism alongside regulations that improve our model’s long-term sustainability prospects that seek to benefit both people and wildlife.

## 5. Acknowledgment of limitations

We acknowledge two main limitations in our case study. First and foremost, we have yet to fully assess the strength of the feedback from improved opportunities for rhinoceros tourism expansion on local livelihoods that we believe leads to improved value local people attach to saving rhinoceros. Preliminary data from a recently published study in our region suggests direct and tangible benefits from rhinoceros may not be reaching the broader community (Naro et al., 2020) with similar findings from local people living outside a tiger reserve in India (Rao and Saksena, 2021). This finding is further supported by a number of studies have uncovered both fundamental and operational challenges within Namibia’s Conservancy model particularly poor governance illustrated by elite capture (Hoole, 2010) and lack of skills transfer in enterprise development leadership (Hoole, 2010). While certainly not limited to Conservancies, left alone these issues could undermine long-term viability of the model as a rhinoceros conservation tool. Thus, at present our model should be interpreted as likely having a much stronger and perhaps limited effect upon primarily Conservancy rangers and Conservancy leadership.

This issue is also linked to another limitation with our study which recognizes the complexity in and dangers of attempting to isolate any one strategy to combat a wicked problem such as international wildlife crime. Tourism as a rhinoceros conservation tool exists in a mix of other strategies and while we demonstrate strong correlations between our main threat reduction result (illegal rhinoceros hunting) and tourism-induced results they should not be interpreted as cause and effect relationships. This can be further illustrated by examining trends during COVID-19 pandemic when tourism all but collapsed in Namibia. Due to pro-active efforts to build non-tourist dependent financial mechanisms to support Conservancy rangers, employment and monitoring efforts during this time was held constant resulting in minimal illegal hunting. In other words, its likely that tourism *per se* is not driving the reduction in illegal rhinoceros hunting but rather serves as a key mechanism that provides a diverse and more resilient mix of strategies that combined contribute toward helping both wildlife and human communities to thrive.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Author contributions

All authors acknowledge equal contributions to the drafting of this manuscript. All authors contributed to the article and approved the submitted version.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/frsut.2022.1090309/full#supplementary-material>

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