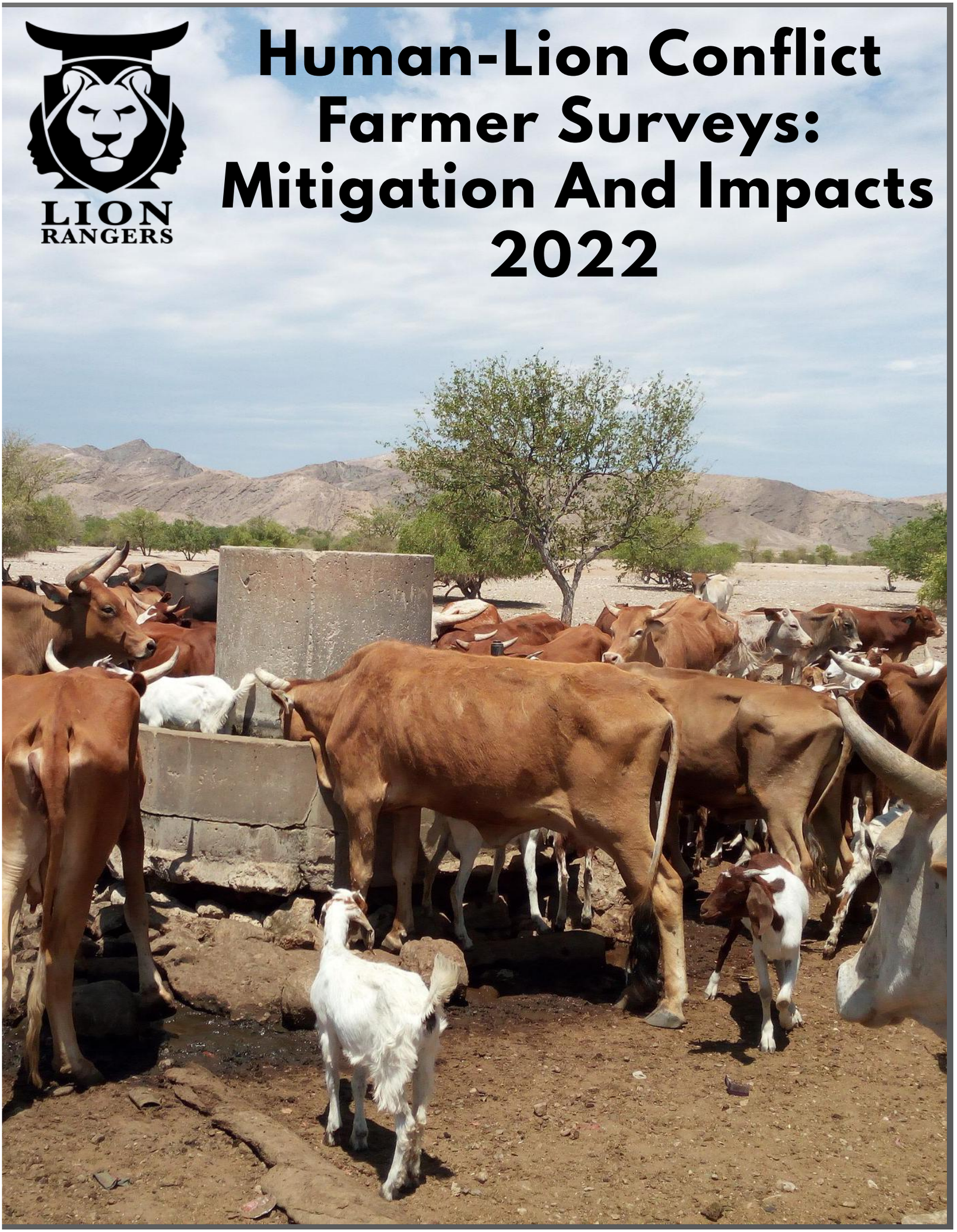
LION RANGERS

Human-Lion Conflict Farmer Surveys: Mitigation And Impacts 2022



CONTENTS

INTRODUCTION

Communal farmers in northwest Namibia live with the effects of human-wildlife conflict (HWC). Recently implemented projects, such as the HWC Rapid Response Teams, Early-Warning Systems, Lion Rangers, and predator-proof kraals, have begun yielding positive results, particularly for mitigating human-lion conflict (HLC), and are being well-received among affected communities. However, data on intervention effectiveness have been lacking. Social surveys are effective for measuring attitudes among constituents within participatory entities, such as communal conservancies.

Following the implementation of the Ministry of Environment, Forestry and Tourism's (MEFT) *Human Lion Conflict Management Plan for North West Namibia* (GRN 2017), and as part of the *National Policy on Conservation and Management of Large Carnivores in Namibia* (GRN 2016), Heydinger et al. (2019), implemented social surveys examining the quantitative and qualitative effects of drought and HLC within three core lion-range conservancies (Anabeb, Puros, and Sesfontein). Results indicated large-scale losses suffered by communal pastoralists. These results have been used to motivate HWC interventions, focusing on mitigating and preventing HLC. Alongside local partners, 339 similar surveys were repeated from late 2021 to early 2022. Surveys focused on livestock-owning household heads in 12 conservancies constituting the core of desert-adapted lion range. Targeted conservancies include: Anabeb, Doro !Nawas, Ehi-rovipuka, ≠Khoadi-//Hôas, Omatendeka, Orupupa, Otjikondavirongo, Puros, Sesfontein, Sorris Sorris, Torra, and Tsiseb.

SURVEY OVERVIEW

Surveys were primarily performed with heads of households at their homesteads. Sampling was limited to one response per household. Topics included demographic information, experiences regarding conservancy membership, livestock ownership, experiences and perspectives regarding interactions with predators emphasizing African lions, experiences and perspectives regarding human-predator conflict emphasizing livestock losses to lions, and experiences and perspectives of HLC interventions. Surveys were performed in the preferred language of the respondent, including English, Afrikaans, Otjiherero, and Damara and generally took 35-45 minutes to complete. All responses were recorded on standardized survey forms. Data were analyzed and visualized using Microsoft Excel. Data analysis was performed across the 12 conservancy landscape, and within each 'Lion Block'. As part of a forthcoming Wildlife Credits program, conservancies are being divided into four Lion Blocks. These blocks have been primarily determined based upon the geography of desert-adapted lion subpopulations. The four lions blocks are: Black (Anabeb, Otjikondavirongo, Sesfontein, and Puros), Red (Ehi-rovpuka, Omatendeka, and Orupupa), Green (≠Khoadi-//Hôas and Torra), and Blue (Doro !Nawas, Sorris Sorris and Tsiseb). Where relevant (Anabeb, Puros, and Sesfontein), livestock ownership numbers were compared to prior surveys. Survey responses were quantitative or categorized according to response - e.g. when asked "what type of important benefits are you receiving from your conservancy" responses were grouped where possible, such as "meat," "money," or "seeds for gardens." When a set list of possible responses was available - e.g. "how common are lions in your conservancy:" a) very common; b) common; c) rare; or, d) absent - respondents were given the chance to answer freely. When responses to questions contained discrete answers - e.g. "how would you describe the problems you have with lions: none, low, moderate, or serious?" - levels were not pre-defined. Surveys facilitated open dialogue: whenever possible comments were used to clarify responses.

SUMMARY & RECOMMENDATIONS

SUMMARY

Livelihoods

Household livelihoods in the landscape rely primarily on livestock. If the dramatic decline in livestock numbers year over year in the Black Block – where comparative historical data are available – are indicative of livestock losses across the landscape, then livelihoods have been decimated (see page 22). As shown on page 9, livestock ownership across the region is low, and skewed towards a relatively small number of livestock owners.

Conservancies

Among respondents, fewer than half (40%) have received conservancy benefits (see page 9). Additional oral evidence suggests many people hold negative attitudes towards conservancies in general, though the conservancy may serve as a proxy for dissatisfaction with the nature conservation-rural development nexus. Problems respondents associate with their conservancy are numerous with certain spatial differentiation. Additionally, some respondents associate environmental problems such as drought with conservancy problems.

Predator Problems

Respondents overwhelmingly identify drought and predators as the primary threats to their livestock. To what extent interventions can more proactively address these challenges is an important consideration. Across the landscape, 66% (n = 223) of respondents are losing livestock to predators at least monthly (see page 10). Perceived high frequency of loss is a critical challenge to predator conservation on communal lands. These losses are not primarily driven by lions, though we did not ask respondents to specify among other species, though across the landscape, spotted hyena are identified as the premier predator threatening livestock (see page 10). Absent other conclusive information, and given hyenas' high fear of people and primarily nocturnal activities, livestock losses to spotted hyena may be largely due to inattentive herding practices. New approaches to limiting human-livestock-hyena conflict should be considered.

Compensation for lost livestock is limited. Only 36% of respondents say they have received compensation for losing livestock to predators (see page 10). It is worth noting that in three of the four Lion Blocks, between 40-46% of respondents have received compensation; the Red Block (Ehi-rovipuka, Omatendeka, and Orupupa) is a significant outlier, with only 18% saying they have received compensation (see page 25). The confluence of respondents identifying conservancy problems with predators, HWC, poverty, and problems with the compensation program (see page 10) should receive further attention if livestock and predators are to co-exist within a landscape of tenuous household livelihoods.

Lions

Lions are viewed largely, though not universally, negatively across the landscape (see page 11).

Respondents' sense of lions' relative presence within their conservancy requires contextualization. Lions are considered common or very common among 72% of respondents in the Black Block (see page 19), among 50% of respondents in the Red Block (see page 26), among 75% of respondents in the Green Block (see page 31), and among 14% of respondents in the Blue Block (see page 31). While it must be emphasized that information concerning lion presence across the landscape is still emerging, and recent collar data suggests that lions are highly mobile, respondents in the Black and Green blocks appear to have an outsized perception of lion presence within their conservancies, compared to the Red Block, where recent evidence suggests lions are more common. This may be due to the high levels of attention given to lion conservation in the Black and Green Blocks over the past few decades.

SUMMARY & RECOMMENDATIONS

SUMMARY (cont.)
Lions (cont.)
Earlier research suggests respondents view relative lion presence in comparison to historical presence (Heydinger 2020). Since lions were nearly extirpated from communal lands during the 1980s-1990s, while maintaining a robust population inside Etosha National Park, respondents from the Black and Green Blocks may be speaking primarily from an historically-informed perspective. Finally, respondents in the Red Block may be contextualizing lion presence relative to the higher density of lions within Etosha National Park (estimated at approximately five times the density of communal areas) (Goelst et al. 2018). How respondents' perceptions of lion presence and HLC challenges are formed requires further examination.

Respondents' negative attitudes towards lions tracks with negative feelings towards lions persisting in their conservancies (see page 13). It is worth noting that 79% of respondents state they are not benefitting from having lions in their conservancy (see page 13). Negative attitudes towards lions may be largely driven by the threats they are seen to pose to people, as well as livestock. Nearly two-thirds of respondents stated that when lions fail to catch livestock at a farm, they would target humans (see page 12). Given the low levels of livestock ownership it can be inferred that many farmers feel an acute *and growing* threat to human safety from lions. This was illustrated during discussions surrounding predator-proof kraals: many respondents stated a desire for having fencing, similar to that of predator-proof kraals, constructed around their homestead to keep lions and other dangerous animals away from people.

Concerning human-lion interactions as a whole, there remains ample space to create better attitudes towards lions from communal farmers. Much emphasis has been placed on minimizing livestock losses through various interventions – as discussed below – however, survey results suggest that losses of livestock to lions are only a small part of attitudes towards living with lions. For example, the lack of benefits people are receiving from living with lions requires attention.

Human-Lion Conflict Interventions
Linked to HLC interventions, respondents report the single greatest source of information about lions remains other farmers in their conservancy (see page 13). An important aspect of HLC interventions includes ensuring accurate information regarding lions is disseminated. This is an area where further interventions may improve attitudes towards lions and lessen HLC.

Interventions around HLC show initial success, though much work is needed to increase the footprint of these interventions. While 39% of respondents view the HWC Rapid Response Teams positively, 51% report a neutral or unsure attitude towards these Teams – overwhelmingly because they report little or no knowledge of them (see page 14). Similarly for the Lion Rangers, 47% report a neutral or unsure attitude towards them – for similar reasons (see page 15). The onus is on those overseeing the deployment and performance of the Rapid Response Teams and Rangers, as well as the Teams and Rangers themselves, to ensure greater landscape coverage. Similarly, information concerning the Early-Warning Systems should be more broadly disseminated. Among the interventions, predator-proof kraals are viewed most favorably by respondents (see page 16).

Survey Implementation
There was some concern about the timeliness and extent of the social surveys. In the Black, Red, and Blue Blocks, while the number of survey responses collected was sufficient for a representative sample size, the geographic extent within these conservancies was limited, with many surveys taking place in larger settlements. This may have led to a skewed set of respondents, for example concerning livestock numbers. Though this is not considered a critical shortcoming, future surveys should strive for response sets that more comprehensively cover conservancies. To better understand the socio-economics of respondents, future surveys should also spend more time focusing on livestock-related data, as livelihood security may be an important factor in HWC tolerance, and for the prospects for durable wildlife conservation within the conservancies. Repeating these surveys – with limited adjustments to questions asked – will be a great benefit to assessing the efficacy of conflict interventions going forward.

SUMMARY & RECOMMENDATIONS

RECOMMENDATIONS

- Greater emphasis to be placed on human-carnivore conflict for non-lion species.

- Greater attention to interventions supporting the livelihoods of conservancy farmers, including conservancy residents receiving benefits from lions.

- More widespread dissemination of field activities of HWC Rapid Response Teams and Lion Rangers.

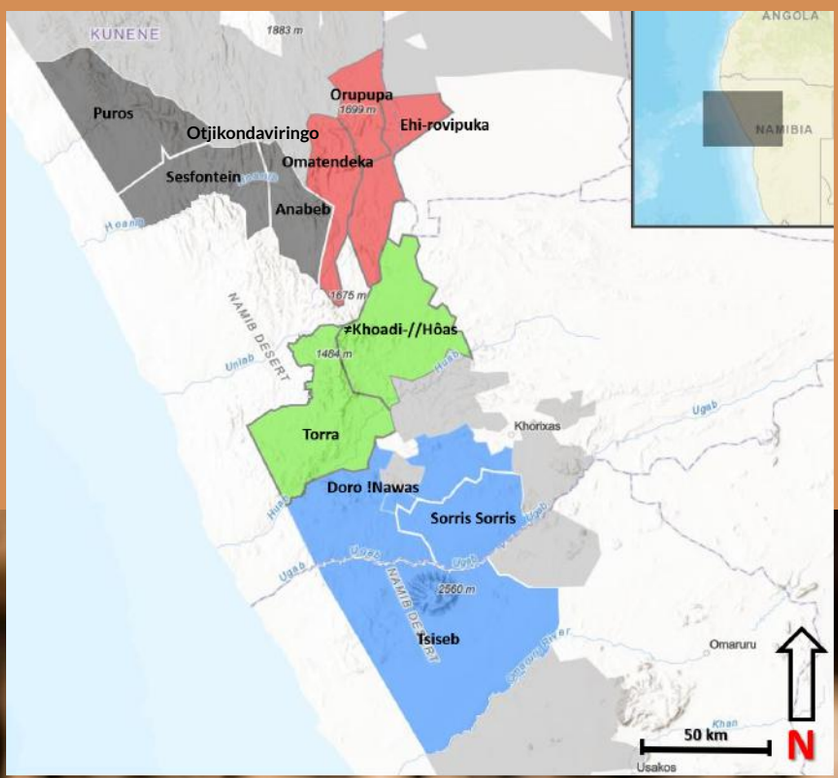
- Greater emphasis on communicating accurate information about lions and other predators to conservancy residents.

- Careful consideration and more information concerning the effectiveness of the conservancies in terms of providing benefits and supporting the livelihoods of conservancy farmers, including the performance of the HWC Compensation Scheme.

- Repeat these surveys – with limited alterations to focus on livestock and livelihoods – in four years time and consistently in years to come.

Desert-adapted lion cub, Puros Conservancy Photo: U. Muzuma

SURVEY LANDSCAPE



CONSERVANCY	HUMAN POPULATION	AREA (KM²)
Anabeb	1402	1570
Otjikondavirongo	1794	1067
Puros	641	3562
Sesfontein	1491	2465
Ehi-rovipuka	1846	1980
Omatendeka	1985	1619
Orupupa	2024	1234
ǂKhoadi-‖Hôas	4308	3364
Torra	1064	3493
Doro !Nawas	1242	3978
Sorris Sorris	950	2290
Tsiseb	2415	7913

Livestock in Orupupa Conservancy. Photo: A. Wattamaniuk

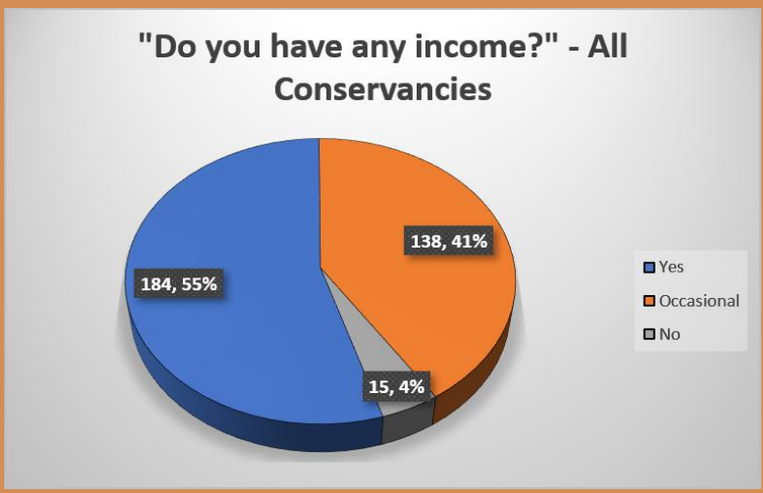
LION RANGERS

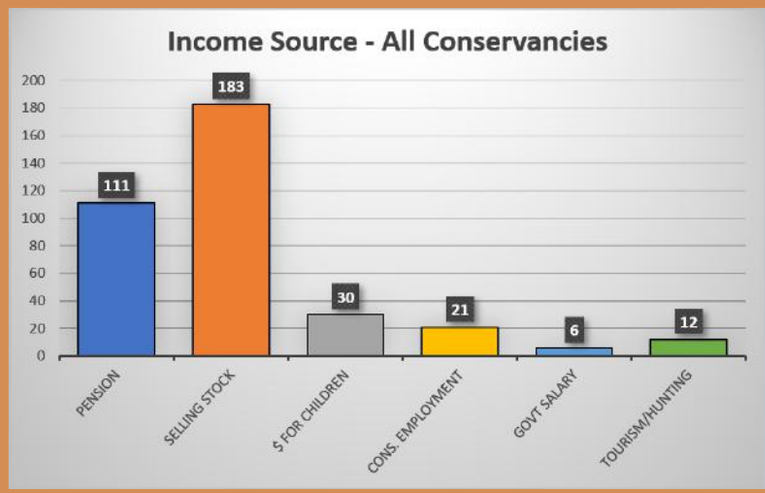
LANDSCAPE RESULTS

339 respondents representing 120 different farming areas were surveyed. All responses were analyzed, though not every respondent answered every question and/or a limited number of responses were unrecorded. 33% of respondents self-identified as Herero, 24% as Himba, 32% as Damara, 4% as Riemvasmaker, and 5% identified as another group or their ethnicity was not recorded. 66% of respondents self-identified as male and 34% as female. Respondents' age were classified as 20-29, 30-39, 40-49, 50-59, and pensioner; the median age category was 50-59.

Income

When asked whether they have any source of income, 55% (n = 184) have a regular source of income, 41% (n = 138) have only an occasional source of income - overwhelmingly from selling livestock, and 4% (n = 15) report no source of income. The most consistently mentioned sources of income were from selling livestock (54%; n = 183) and from a government pension (33%; n = 111). Other sources of income mentioned include government assistance for children (8%; n = 30), conservancy employment (6%; n = 21), or tourism/hunting sector employment (4%; n = 12).



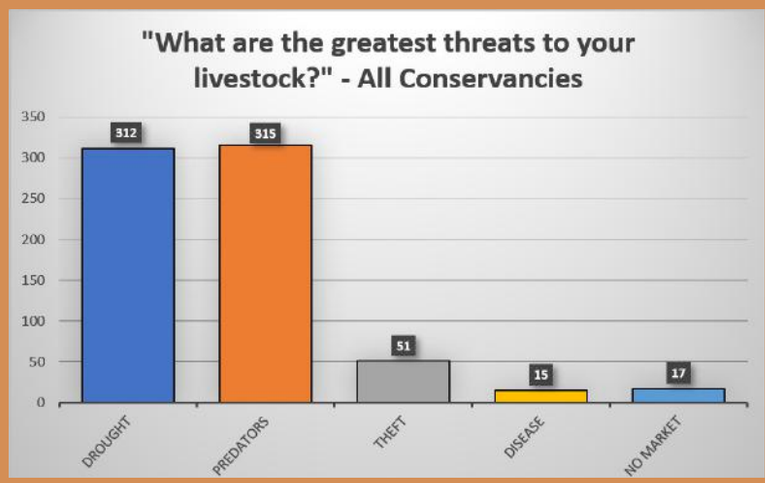


Livestock

When asked, are you currently keeping livestock, 91% (n = 310) answered affirmatively, while 64% (n = 220) stated they are currently selling livestock for income. Among all respondents, the median number of cattle owned was zero (mean = 4.35). The median number of sheep owned was zero (mean = 7.98). The median number of goats owned was 25 (mean = 37.69). The median number of donkeys owned was zero (mean = 0.87). Concerning changes in livestock ownership over the last three years, 0% claim their number of cattle have increased, 83% (n = 280) claim their number of cattle have decreased, and 15% (n = 51) cited no change in cattle ownership over this period. For sheep 1% (n = 5) cited an increase, 81% (n = 275) cited a decrease, and 15% (n = 52) cited no change. For goats these numbers were 3% (n = 11), 92% (n = 313), and 4% (n = 12), respectively. For donkeys they were 1% (n = 3), 81% (n = 276), and 15% (n = 52), respectively. Across the entire landscape, the total number of cattle currently owned by survey respondents are 1,472. The total number of sheep owned are 2,699. The total number of goats owned are 12,739. The total number of donkeys owned are 294. The rightward skew of all livestock species indicates that livestock ownership is heavily concentrated in certain households. When asked about the greatest threats to their livestock, overwhelmingly the most frequently identified threats were predators (95%; n = 315) and drought (94%; n = 312) (see next page).

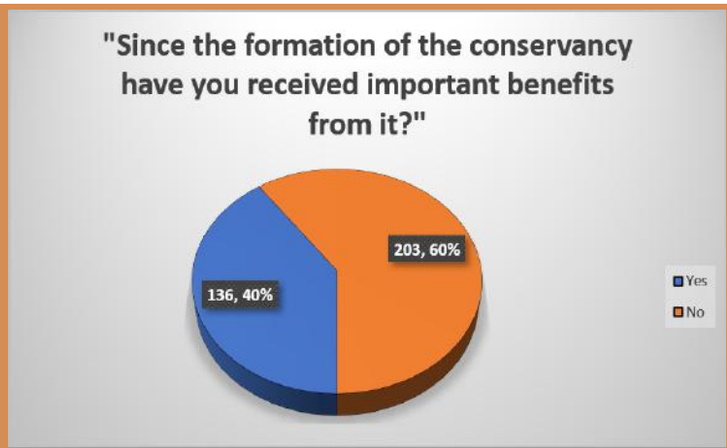
LANDSCAPE RESULTS

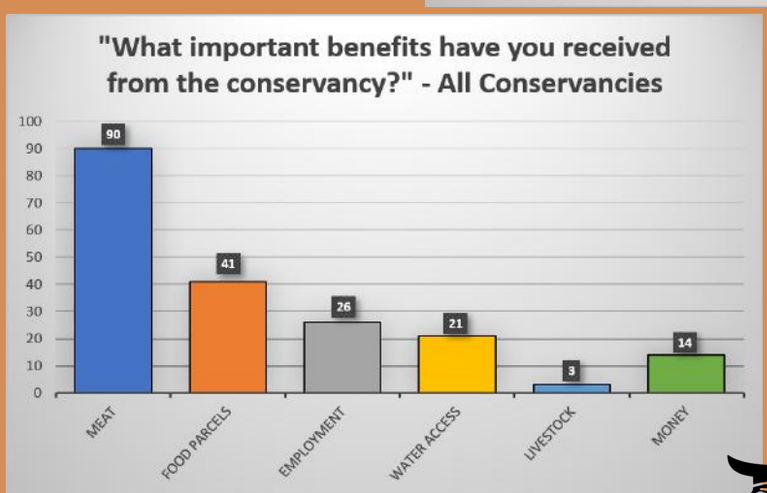
	CATTLE	SHEEP	GOATS	DONKEYS
Mean	4.36	7.99	37.69	0.87
Median	0	0	25	0
Skew	4.085	3.216	3.160	2.358
Min	0	0	0	0
Max	94	110	361	11
Total	1472	2699	12739	294
Count	338	338	338	338

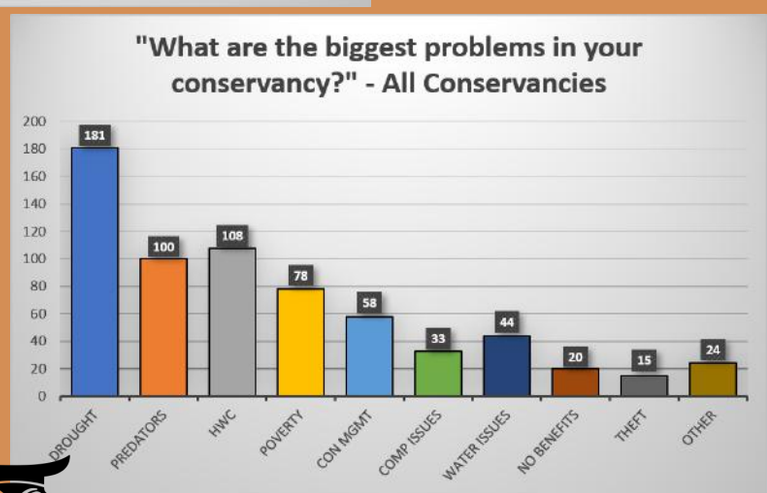


Conservancy

When asked whether they have ever received important benefits from their conservancy, 40% (n = 136) replied affirmatively, while 60% (n = 203) say they have not. Of those responding affirmatively (that they are receiving benefits), the most consistently identified benefits include meat distribution (66%; n = 90), food parcels (30%; n = 41), conservancy employment (19%; n = 26), assistance with water infrastructure (15%; n = 21), and cash benefits (10%; n = 14). When asked to identify the biggest problems in their conservancy, the most consistently identified problems were drought (53%; n = 181), predators (29%; n = 100), HWC (32%; n = 108), poverty (23%; n = 77), and issues with conservancy management (17%; n = 58).





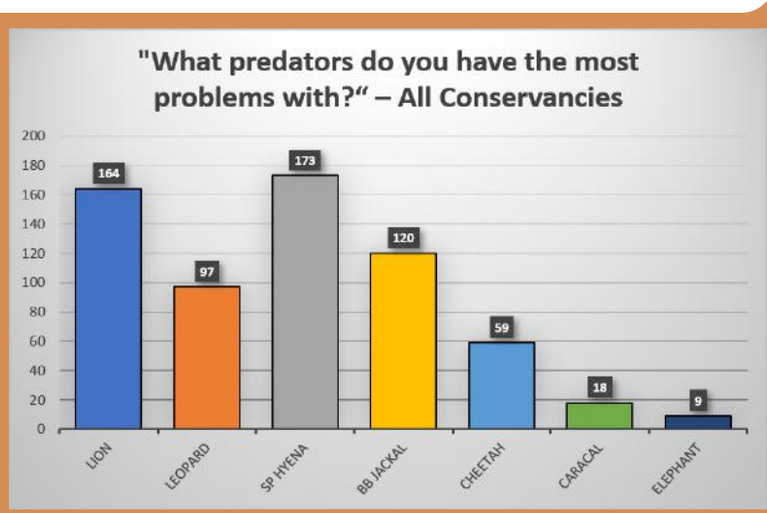


LANDSCAPE RESULTS

Predator Problems

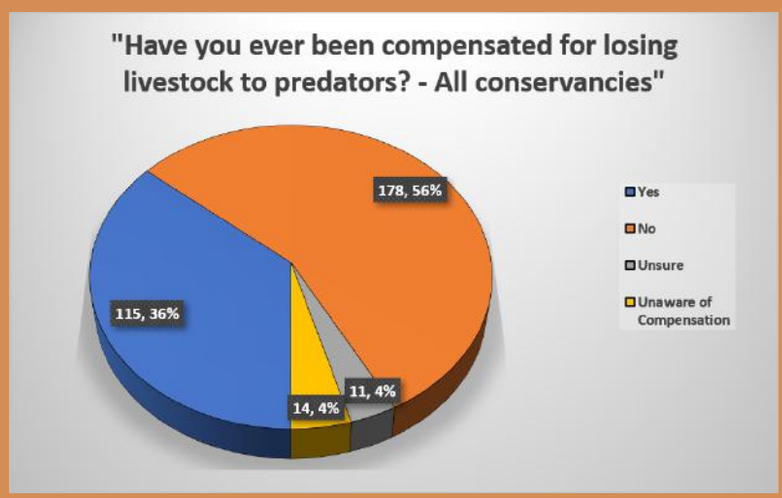
When asked which predators do you have the most problems with, the most commonly given responses were spotted hyena (52%; n = 173), lion (49%; n = 164), black-backed jackal (36%; n = 120), and leopard (29%; n = 97). For this question only the top three most problematic predators were recorded per respondent.

Human-wildlife conflict result, Anabeb Conservancy. Photo: A. Wattamaniuk



Predator Problems (cont.)

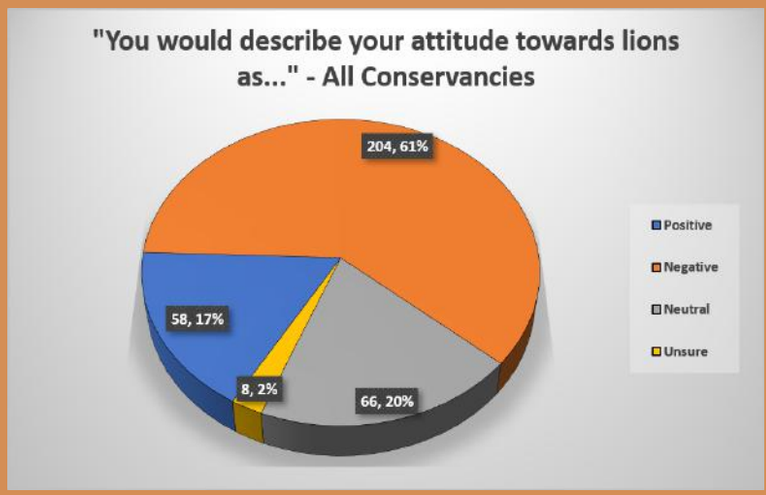
When asked, how often are you losing livestock to predators, 66% (n = 223) of respondents answered either "weekly" or "monthly." When asked have you ever been compensated for losing livestock to predators, 36% (n = 115) of respondents answered that yes they have, 56% (n = 178) answered they have never been compensated, 4% (n = 11) were unsure, while 4% (n = 14) were unaware of a livestock compensation program.

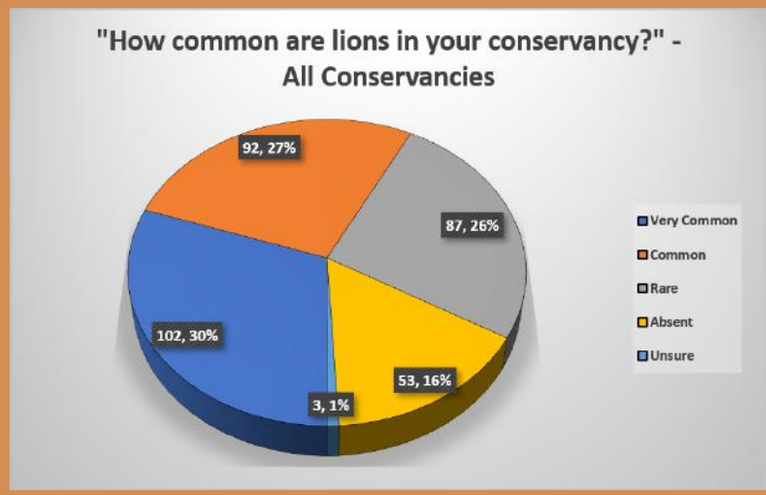


LANDSCAPE RESULTS

Lions

Numerous questions were asked to ascertain respondents' attitudes towards lions in their conservancy. When asked to describe their attitude towards lions, 61% (n = 204) of respondents' attitude towards lions was classified as negative, 17% (n = 58) of respondents' attitude towards lions was classified as positive, while 20% (n = 66) of respondents' attitude was classified as neutral. When asked, how common are lions in your conservancy, 57% (n = 194) stated lions were either "very common" or "common" in their conservancy, 26% (n = 87) stated lions were "rare," while 16% (n = 53) stated lions were not present in their conservancy.

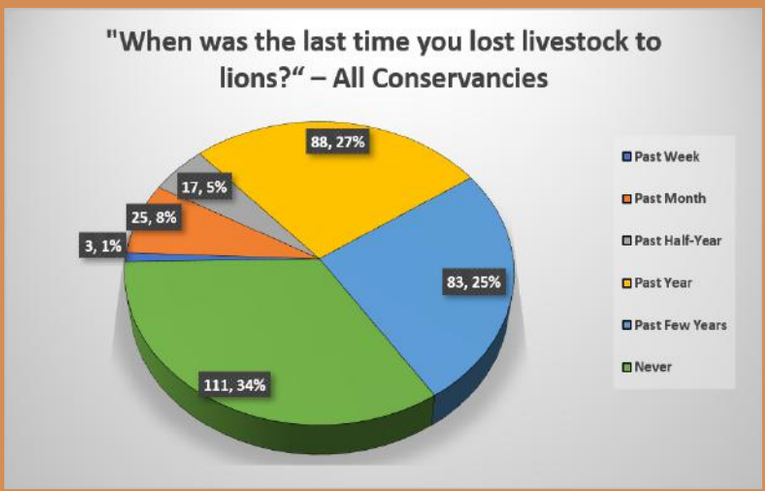


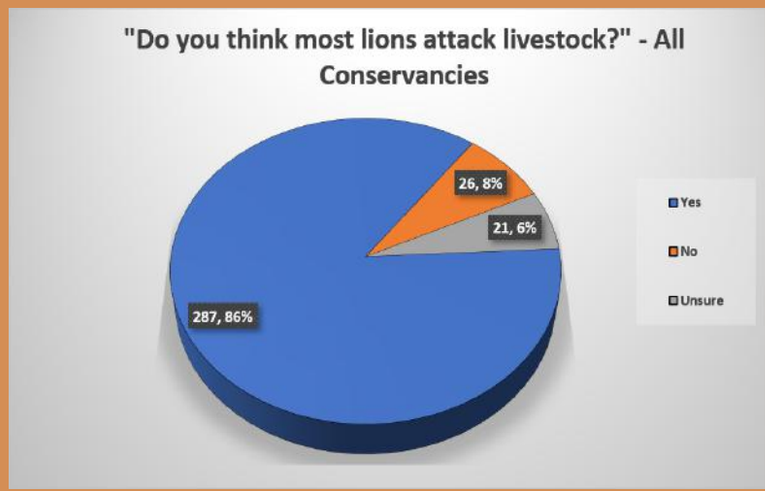


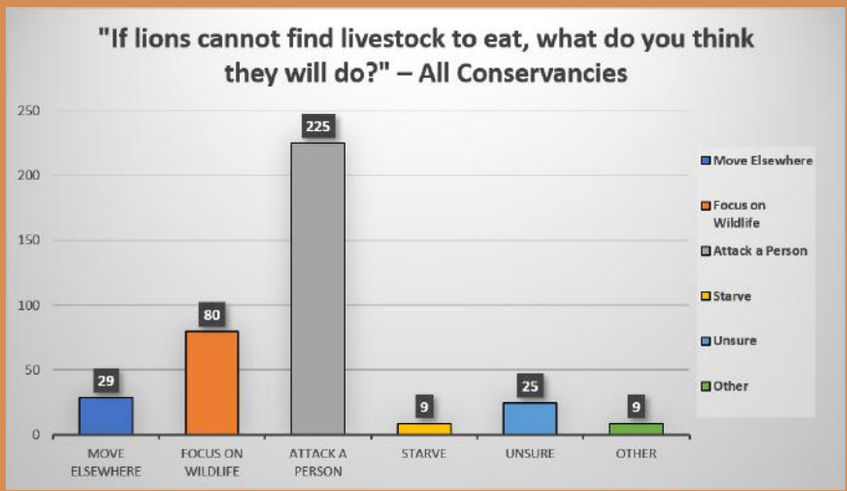
Looking for lions, Puros Conservancy Photo: A. Wattamaniuk

LANDSCAPE RESULTS

Lions (cont.)
When asked when they last lost livestock to lions, 14% (n = 45) stated they had lost livestock to lions within the past half year or less, 52% (n = 171) stated they had lost livestock to lions in the past year or few years, while 34% (n = 111) stated they had never lost livestock to lions. When asked whether they think most lions will attack livestock, 86% (n = 287) answered affirmatively, while 8% (n = 26) answered they thought only certain lions will, and 6% (n = 21) were unsure. When asked what lions will do if they come to a homestead and cannot find livestock to eat, 71% (n = 225) responded that lions will attack a person.



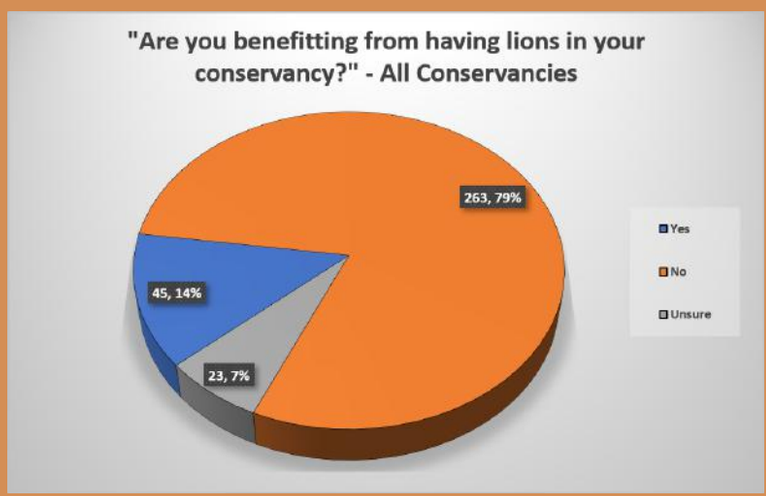


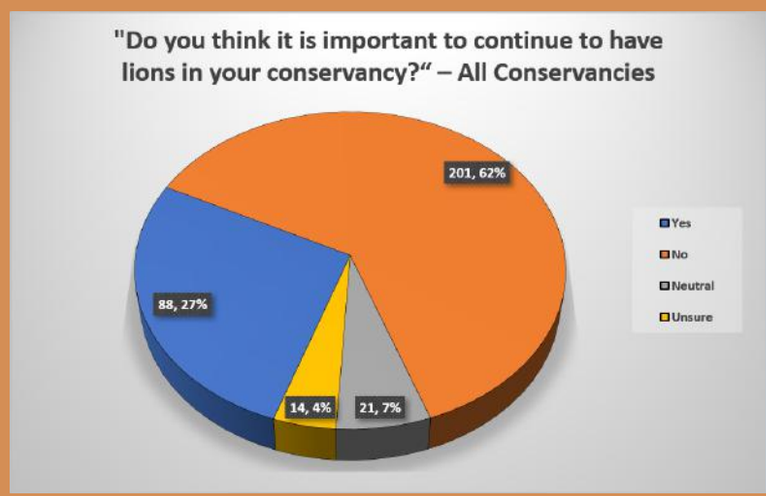


Lion tracks, Otjikondavirongo Conservancy
Photo: A. Wattamaniuk

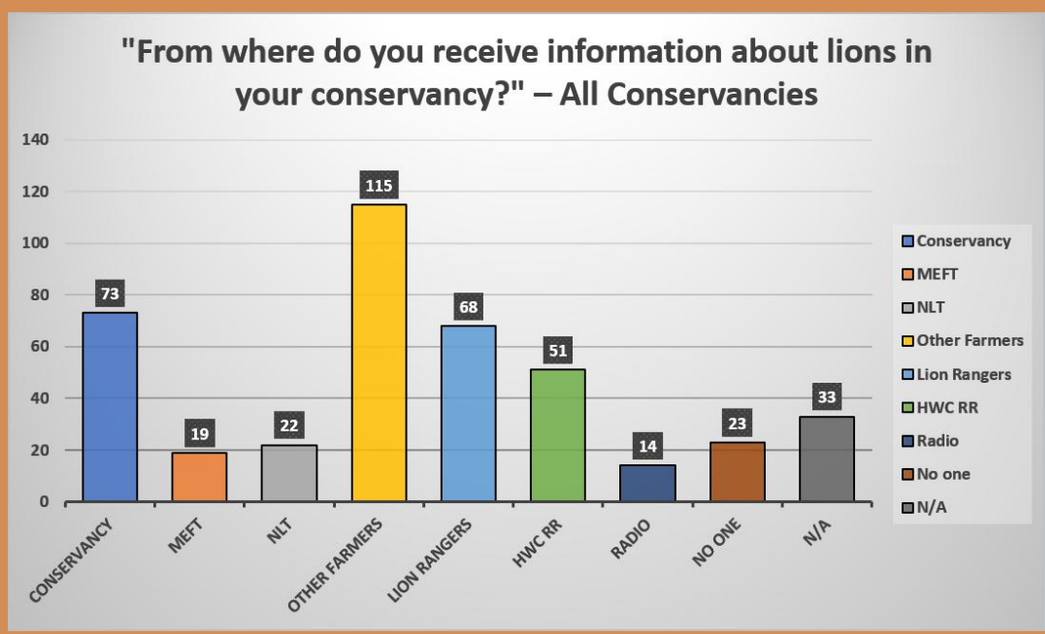
LANDSCAPE RESULTS

Lions (cont.)
When asked whether they were benefitting from having lions in their conservancy, 79% (n = 263) said they were not, while 14% said they were. When asked whether they think it is important to continue to have lions in their conservancy, 62% (n = 201) stated it is not, 27% (n = 88) answered that it is important to continue to have lions, while 11% (n = 35) were either neutral or unsure.





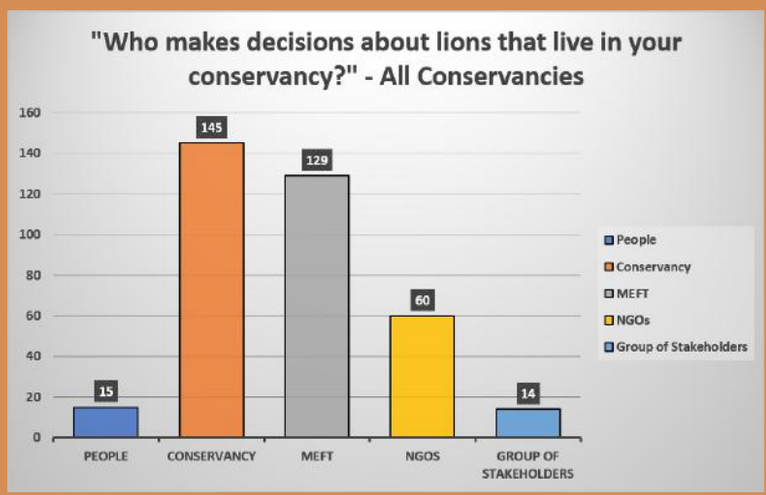
When asked who they receive information about lions within their conservancy from, the most common response given was from other farmers (34%; n = 115), followed by from conservancy personnel (22%; n = 73), the Lion Rangers (20%; n = 68), and the HWC Rapid Response Teams (15%; n = 51).



LANDSCAPE RESULTS

Human-Lion Conflict Interventions

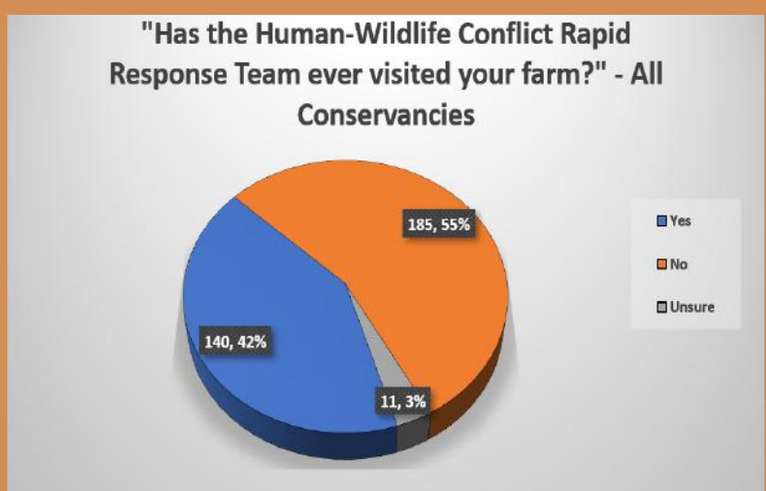
Respondents were asked a series of questions relevant to HLC interventions taking place within their conservancy. When asked who makes decisions pertaining to lions within their conservancy, the most frequently given responses was that the conservancy itself is the decision maker (44%; n = 145), followed by MEFT (39%; n = 129), and NGOs (18%; n = 60). A handful of respondents provided multiple answers to this question.

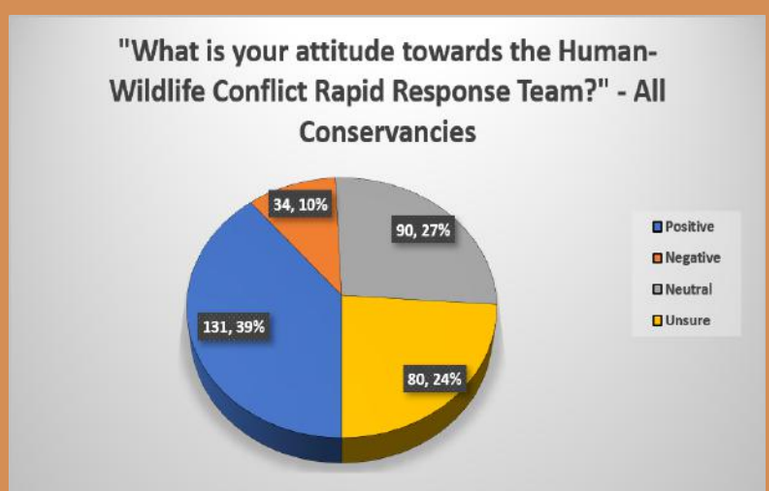



Lioness, Anabeb Conservancy

HWC Rapid Response Teams

When asked whether they had heard of the Human-Wildlife Conflict Rapid Response Teams, 64% (n = 215) replied affirmatively. When asked whether a HWC Rapid Response Team had visited their farm, 42% (n = 140) replied that they had, while 55% (n = 185) replied they had not. When asked about their attitude towards the HWC Rapid Response Teams, 39% (n = 131) characterized their attitude as positive, 10% (n = 34) characterized their attitude as negative, 27% (n = 90) characterized their attitude as neutral, while 24% (n = 80) stated they were unsure - primarily because they do not know about the HWC Rapid Response Teams.

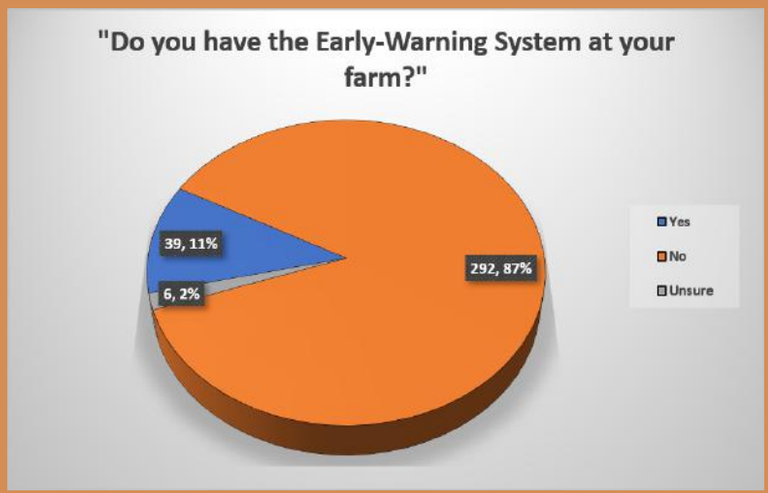


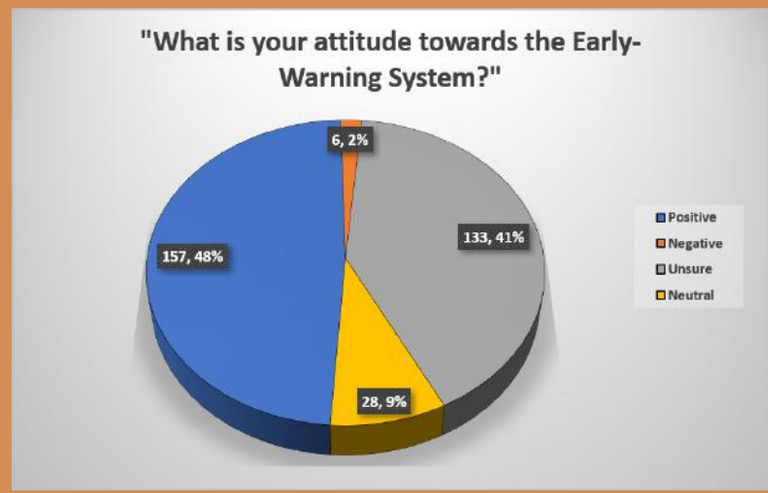


LANDSCAPE RESULTS

Early-Warning System

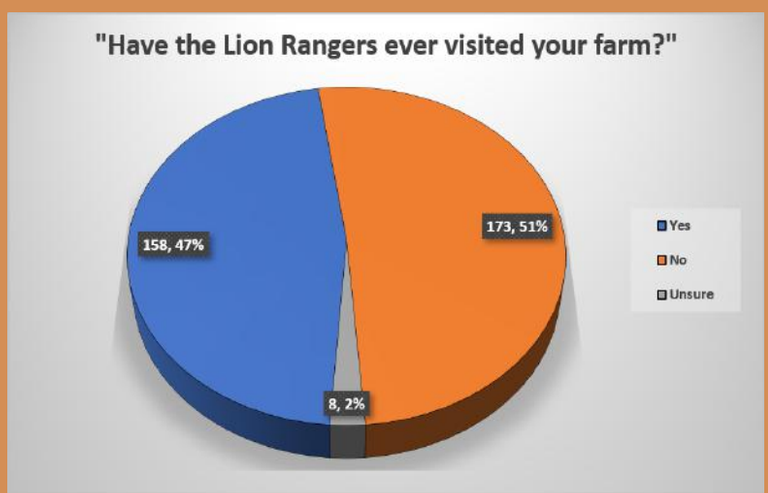
When asked whether they had heard of the Early-Warning System, 51% (n = 173) replied affirmatively. When asked whether they have an Early-Warning System tower at their farm, 11% (n = 39) replied affirmatively, while 87% (n = 292) replied they do not. When asked about their attitude towards the Early-Warning System, 48% (n = 157) characterized their attitude as positive, 2% (n = 6) characterized their attitude as negative, 9% (n = 28) characterized their attitude as neutral, while 41% (n = 133) stated they were unsure - primarily because they do not know about the Early-Warning System.

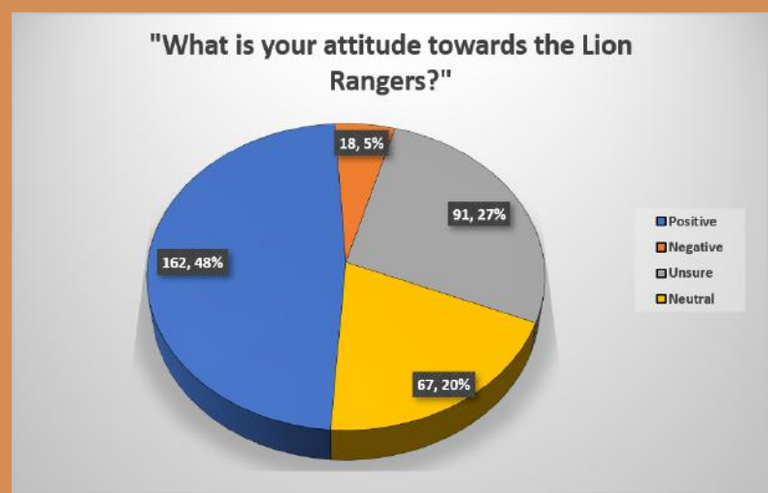




Lion Rangers

When asked whether they had heard of the Lion Rangers, 76% (n = 259) replied affirmatively. When asked whether the Lion Rangers had ever visited their farm, 47% (n = 158) replied affirmatively, while 51% (n = 173) replied that they have not. When asked about their attitude towards the Lion Rangers, 48% (n = 162) characterized their attitude as positive, 5% (n = 18) characterized their attitude as negative, 20% (n = 67) characterized their attitude as neutral, while 27% (n = 91) stated they were unsure - primarily because they do not know about the Lion Rangers.

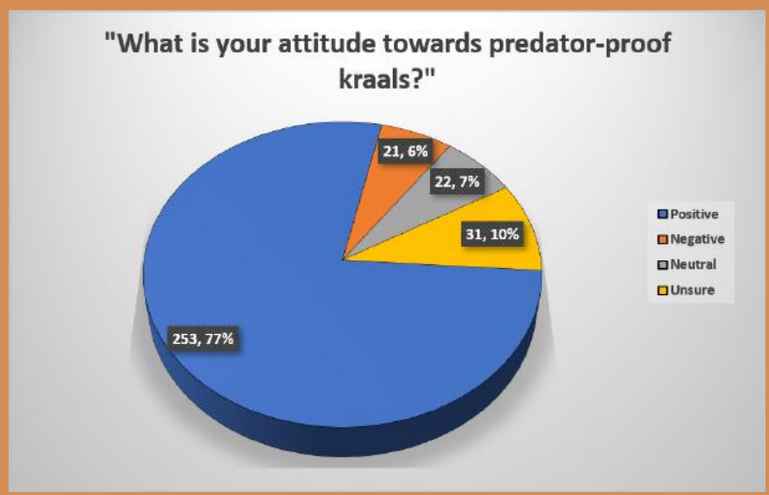




LANDSCAPE RESULTS

Predator-Proof Kraals

When asked whether they had heard of predator-proof kraals, 86% (n = 293) replied affirmatively. When asked whether they have a predator-proof kraal at their farm, 28% (n = 94) replied affirmatively, while 71% (n = 241) replied that they do not. When asked about their attitude towards predator-proof kraals, 77% (n = 253) characterized their attitude as positive, 6% (n = 21) characterized their attitude as negative, 7% (n = 22) characterized their attitude as neutral, while 10% (n = 31) stated they were unsure - primarily because they do not know about predator-proof kraals.



Omatendeka Conservancy

LION BLOCKS RESULTS

LION BLOCKS

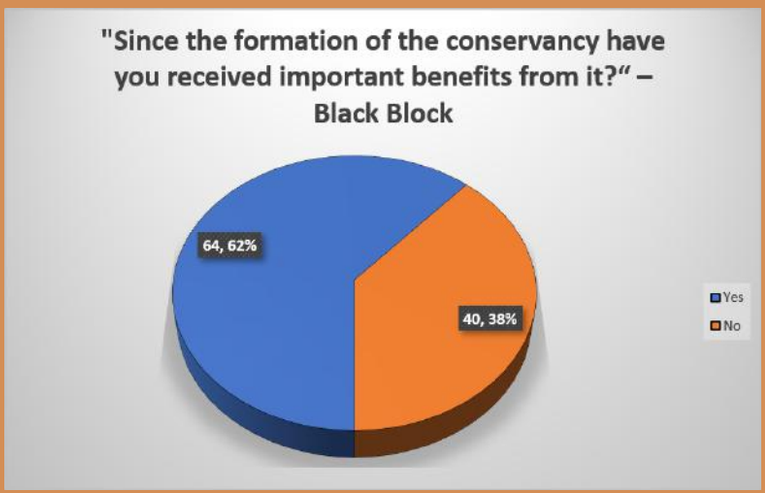
Lion Blocks group neighboring conservancies together based on considered subpopulations of the desert-adapted lions, as well as communities of affiliated interests among conservancies. Because lions do not recognize conservancy boundaries, inter-conservancy cooperation may encourage neighboring conservancies to align their lion-related activities, as well as potentially lowering administrative costs, and reducing redundancy of efforts. These blocks have been innovated in specific response to a forthcoming Wildlife Credits program, whereby communities will receive tangible benefits from living alongside lions. How these benefits will be distributed - at the landscape, Lion Block, conservancy, and community level - is being finalized by stakeholders.

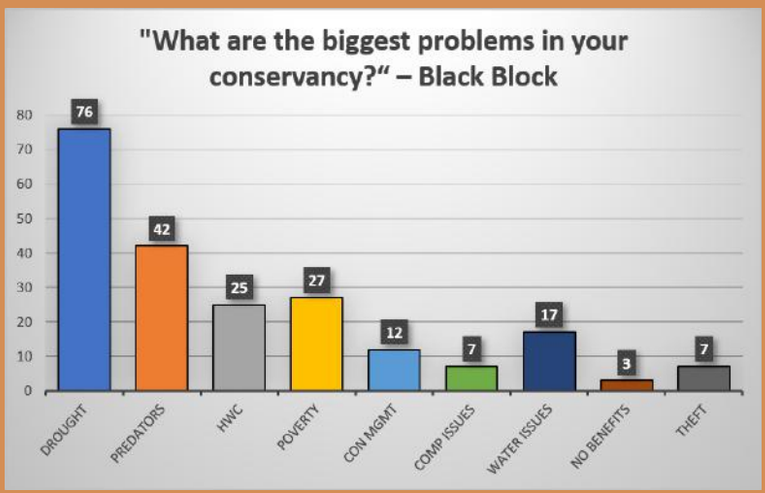
BLACK BLOCK

The Black Block consists of Anabeb (gazetted in 2003), Otjikondavirongo (2013), Puros (2000), and Sesfontein (2003) conservancies. In total these conservancies cover 8,655 km², and consist of 5,328 people. Within this block Anabeb, Puros, and Sesfontein are among the oldest conservancies in the Kunene Region and also home to the lion subpopulation that has been monitored most extensively, almost entirely by Desert Lion Conservation since the late 1990s. These same three conservancies were the subject of the initial round of HWC surveys, performed by Heydinger et al. (2019) in late 2017. Anabeb and Sesfontein both border the Palmwag Tourism Concession and Anabeb borders the Etendeka Tourism Concession. Major drainage lines in these conservancies include the Hoaruseb, and Hoanib ephemeral rivers. Each of these conservancies lies north of the Veterinary Control Fence.

Conservancy

When asked whether they have ever received important benefits from their conservancy, 62% (n = 64) replied affirmatively, while 38% (n = 40) say they have not. When asked to identify the biggest problems in their conservancy, the most consistently identified problems were drought (73%; n = 76), predators (40%; n = 42), poverty (26%; n = 27), HWC (24%; n = 25), and issues related to water infrastructure (16%; n = 17).



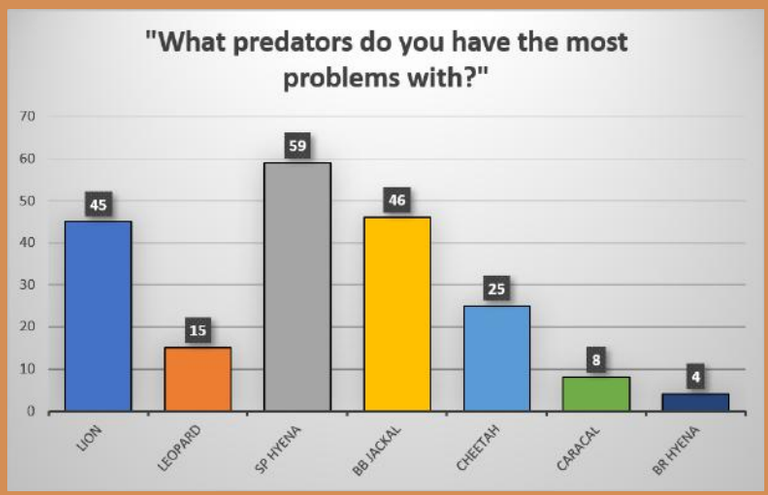


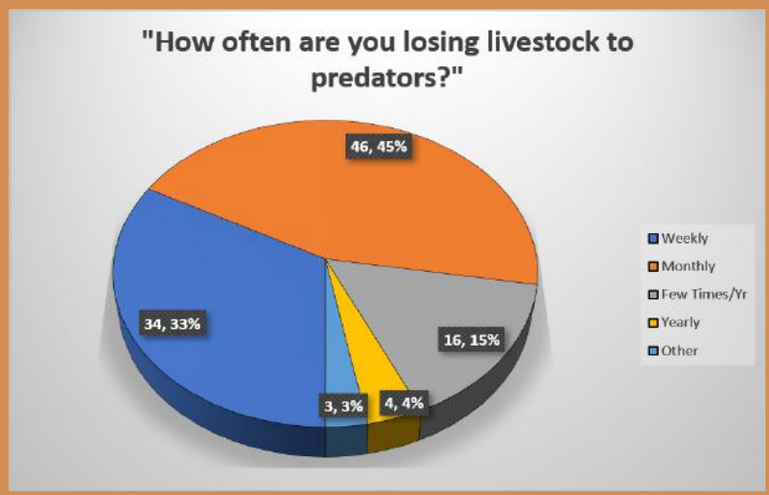
BLACK BLOCK RESULTS

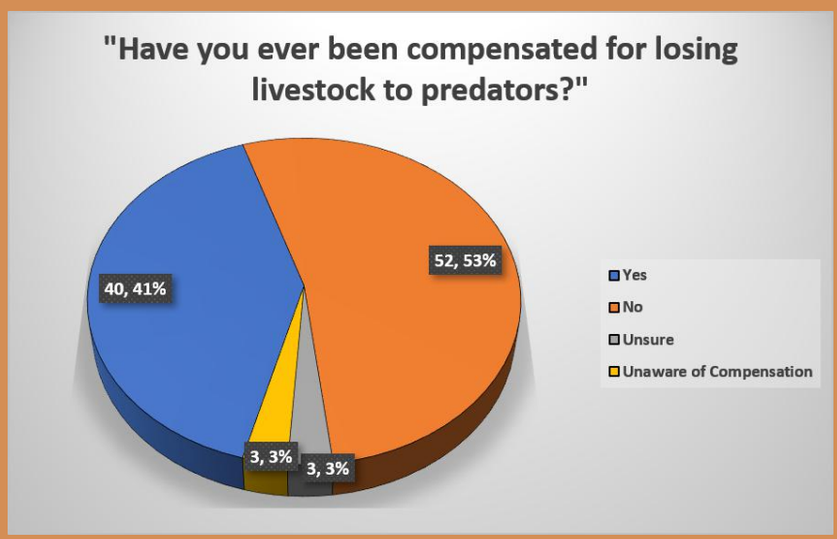
BLACK BLOCK (cont.)

Predator Problems

When asked which predators do you have the most problems with, the most commonly given responses were spotted hyena (57%; n = 59), lion (43%; n = 45), black-backed jackal (44%; n = 46), and cheetah (24%; n = 25). For this question only the top three most problematic predators were recorded per respondent. When asked, how often are you losing livestock to predators, 78% (n = 80) of respondents answered either "weekly" or "monthly." When asked have you ever been compensated for losing livestock to predators, 41% (n = 40) of respondents answered that yes they have, 53% (n = 52) answered they have never been compensated, 3% (n = 3) were unsure, while 3% (n = 3) were unaware of a livestock compensation program.





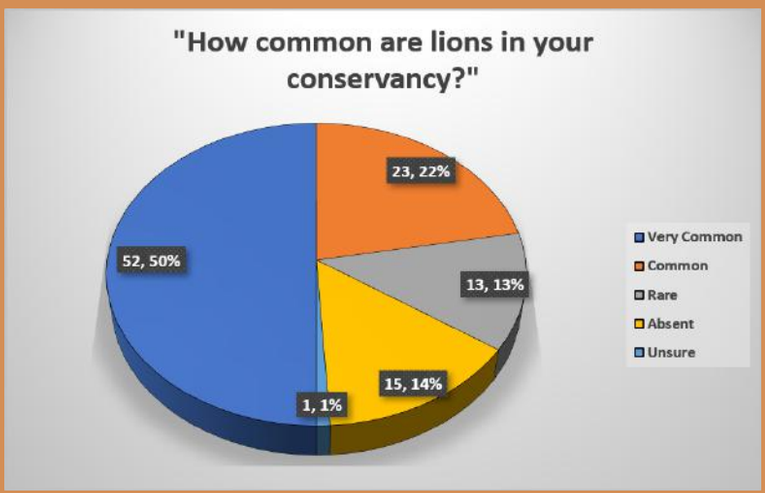


BLACK BLOCK RESULTS

BLACK BLOCK (cont.)

Lions

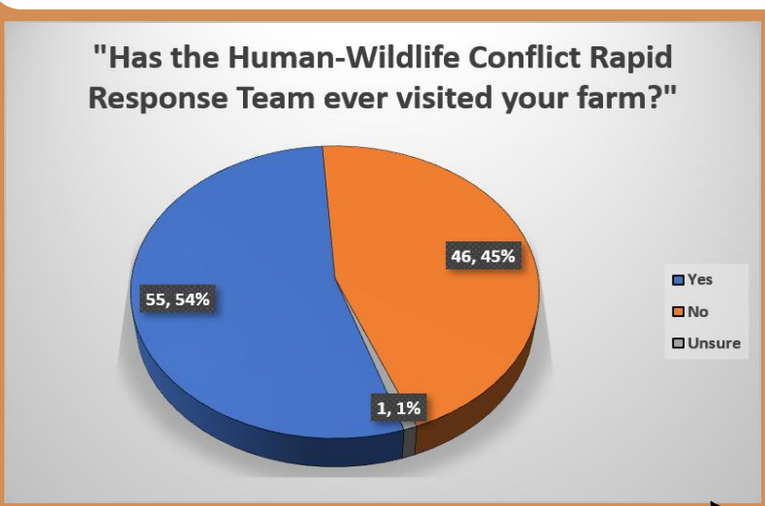
When asked, how common are lions in your conservancy, 72% (n = 75) stated lions were either "very common" or "common" in their conservancy, 13% (n = 13) stated lions were "rare," while 14% (n = 15) stated lions were not present in their conservancy. When asked when they last lost livestock to lions, 28% (n = 29) stated they had lost livestock to lions within the past half year or less, 39% (n = 39) stated they had lost livestock to lions in the past year or few years, while 33% (n = 34) stated they had never lost livestock to lions.

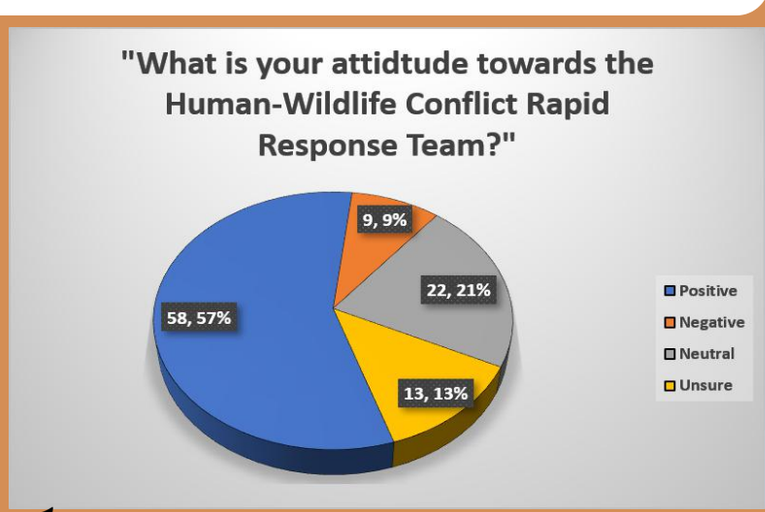


Human-Lion Conflict Interventions

HWC Rapid Response Teams

When asked whether they had heard of the Human-Wildlife Conflict Rapid Response Teams, 78% (n = 80) replied affirmatively. When asked whether a HWC Rapid Response Team had visited their farm, 54% (n = 55) replied that they had, while 45% (n = 46) replied they had not. When asked about their attitude towards the HWC Rapid Response Teams, 57% (n = 58) characterized their attitude as positive, 9% (n = 9) characterized their attitude as negative, 21% (n = 22) characterized their attitude as neutral, while 13% (n = 13) stated they were unsure - primarily because they do not know about the HWC Rapid Response Teams.



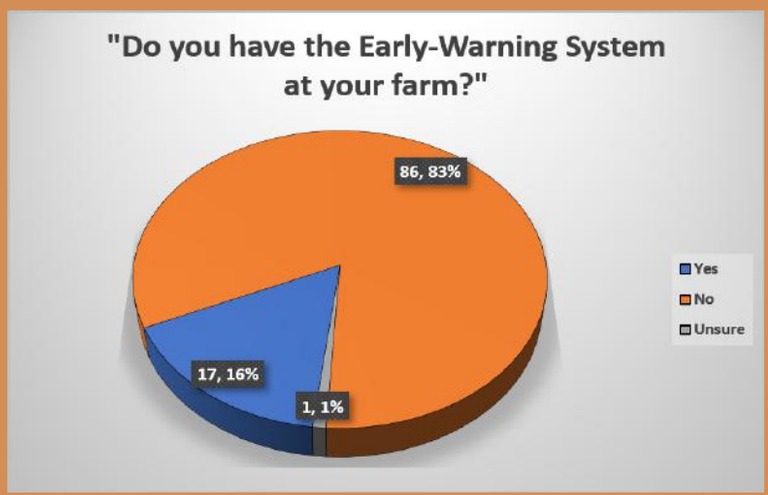


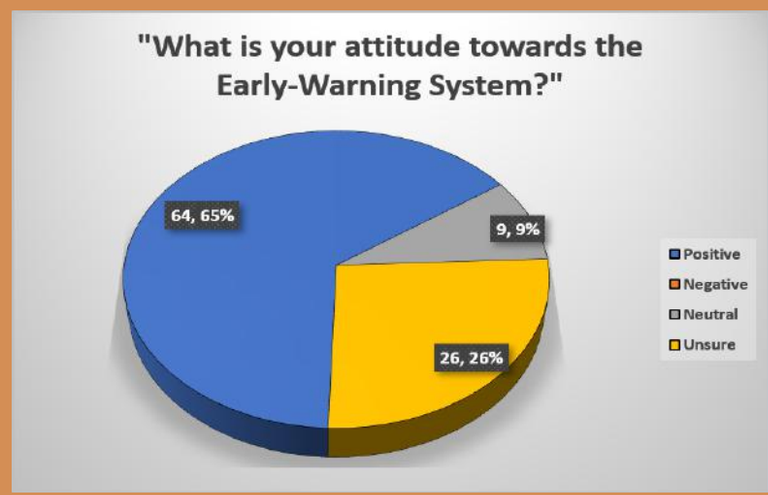
BLACK BLOCK RESULTS

BLACK BLOCK (cont.)

Early-Warning System

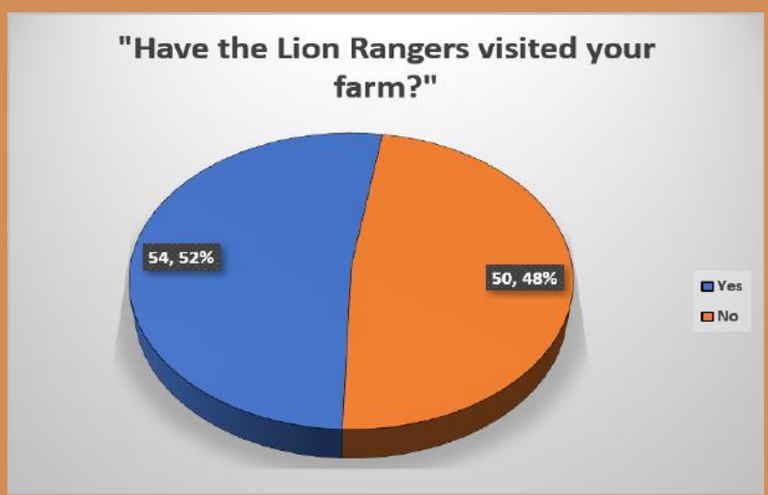
When asked whether they had heard of the Early-Warning System, 66% (n = 69) replied affirmatively. When asked whether they have an Early-Warning System tower at their farm, 16% (n = 17) replied affirmatively, while 83% (n = 86) replied they do not. When asked about their attitude towards the Early-Warning System, 65% (n = 64) characterized their attitude as positive, no respondents characterized their attitude as negative, 9% (n = 9) characterized their attitude as neutral, while 26% (n = 26) stated they were unsure - primarily because they do not know about the Early-Warning System.

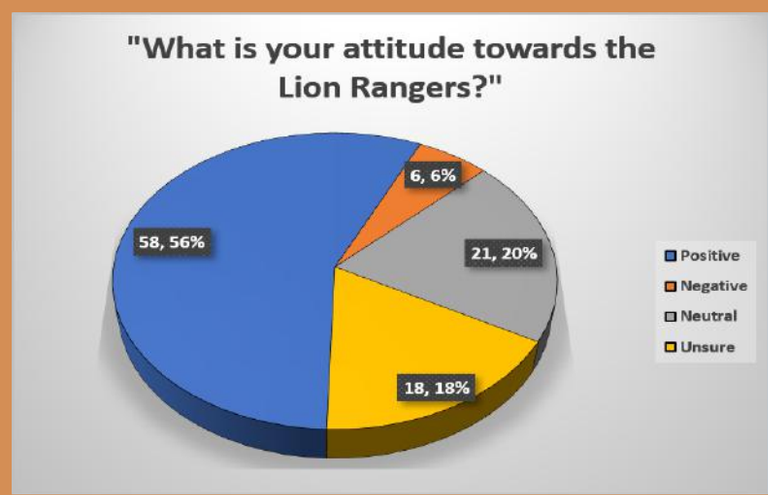




Lion Rangers

When asked whether they had heard of the Lion Rangers, 86% (n = 89) replied affirmatively. When asked whether the Lion Rangers had ever visited their farm, 52% (n = 54) replied affirmatively, while 48% (n = 50) replied that they have not. When asked about their attitude towards the Lion Rangers, 56% (n = 58) characterized their attitude as positive, 6% (n = 16) characterized their attitude as negative, 20% (n = 21) characterized their attitude as neutral, while 18% (n = 18) stated they were unsure - primarily because they do not know about the Lion Rangers.



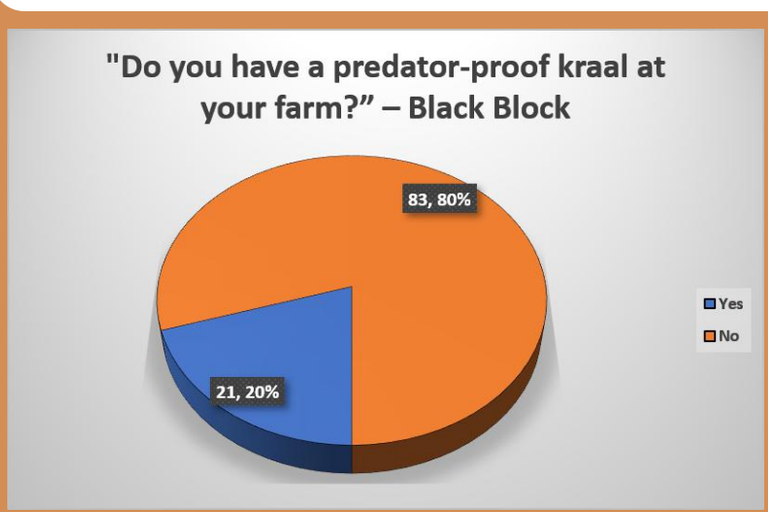


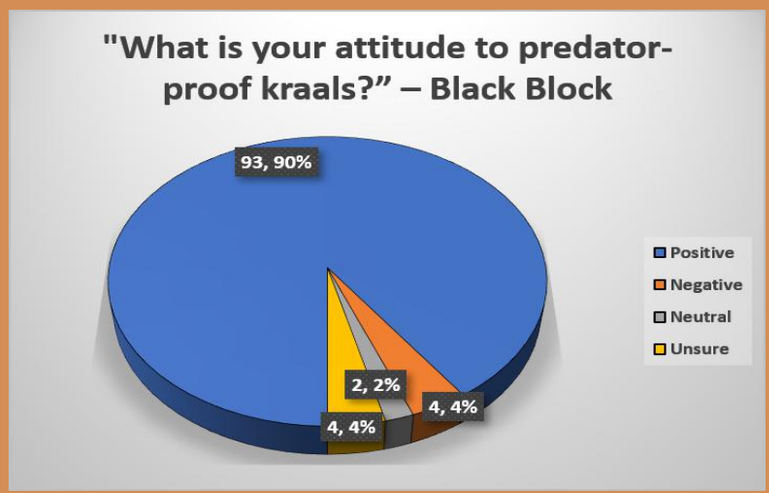
BLACK BLOCK RESULTS

BLACK BLOCK (cont.)

Predator-Proof Kraals

When asked whether they had heard of predator-proof kraals, 93% (n = 97) replied affirmatively. When asked whether they have a predator-proof kraal at their farm, 20% (n = 21) replied affirmatively, while 80% (n = 83) replied that they do not. When asked about their attitude towards predator-proof kraals, 90% (n = 93) characterized their attitude as positive, 4% (n = 4) characterized their attitude as negative, 2% (n = 2) characterized their attitude as neutral, and 4% (n = 4) stated they were unsure.





Traditional kraal, Torra Conservancy.

BLACK BLOCK RESULTS

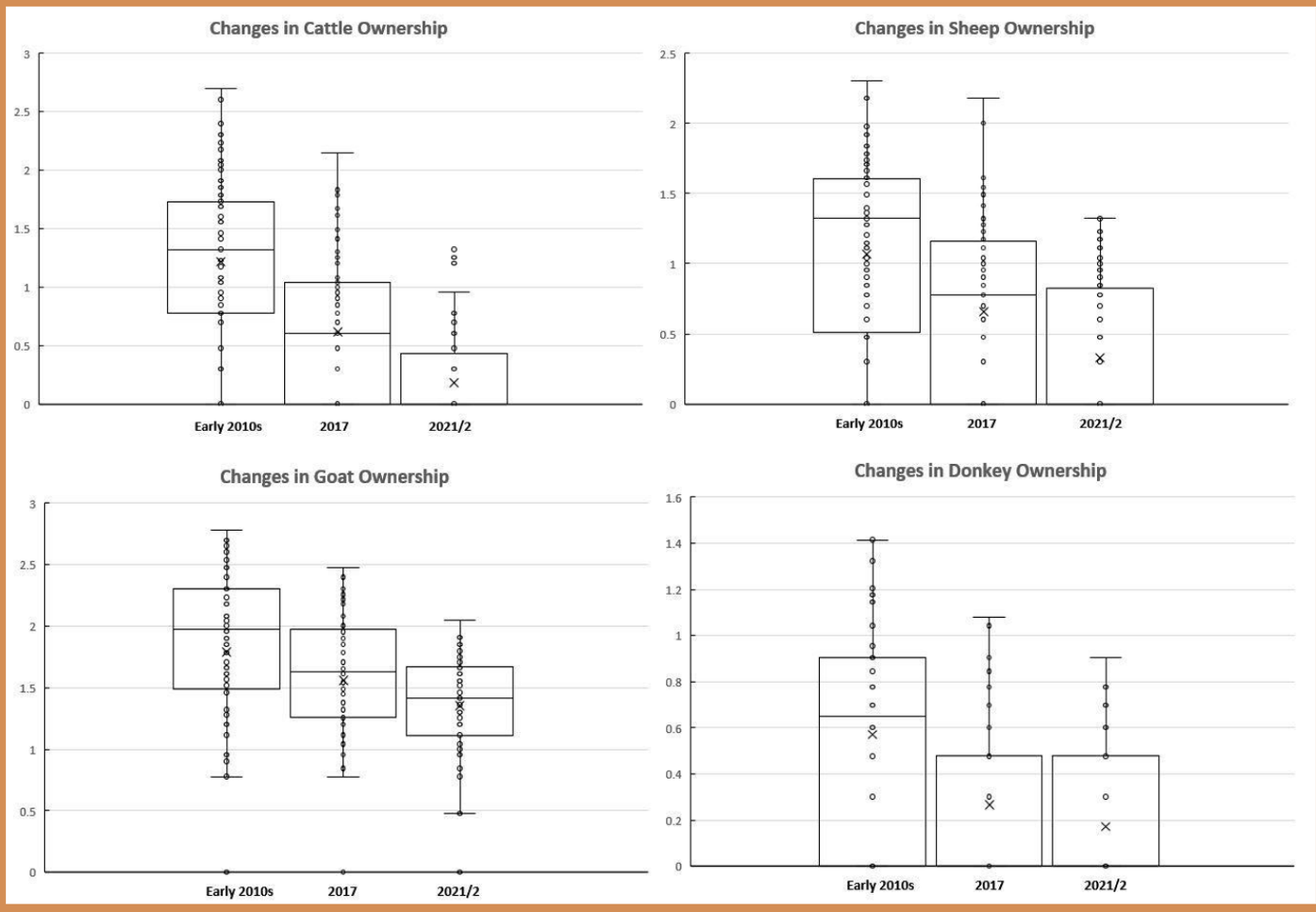
BLACK BLOCK (cont.)

Livestock Trends

Households within three conservancies in the Black Block (Anabeb, Puros, and Sesfontein) were previously surveyed in 2017, for the effects of drought and predators pertaining to livestock ownership (Heydinger et al. 2019). These 2017 surveys serve as a basis of comparison within these three conservancies concerning livestock ownership (comparing prior results to other conservancies within this survey would be misleading).

Boxplots: Changes in Livestock Ownership (Anabeb, Puros, Sesfontein)

Boxplots display self-reported household level livestock ownership for each individual species, comparing Early 2010s, 2017, and 2021/2 ownership, data from Early 2010s and 2017 are from previous Heydinger et al. (2019) survey. Data have been log10+1 transformed for normalization, visualization, and ease of relative comparison. This visualization demonstrates that livestock ownership - particularly of cattle, sheep, and donkey - is unequally distributed, being that it is concentrated within a few relatively wealthy households, and that livestock losses over the previous decade have exacerbated this concentration. Boxes visualize the inter-quartile range (those values falling within the middle 50% of respondents), horizontal lines within the box visualize mean response, " X " within box visualizes the median response.



BLACK BLOCK RESULTS

BLACK BLOCK (cont.)

Summary Statistics: Changes in Livestock Ownership (Anabeb, Puros, Sesfontein)

The same data (non-transformed) as pervious page. Mean: mean average number of specific livestock owned; Median: median number of specific livestock owned; Skew: Pearson's second skewness coefficient, positive values indicates rightward skewness (greater inequality) among responses; Min: minimum number of specific livestock owned; Max: maximum number of specific livestock owned; Total: aggregate amount of specific livestock owned across respondents; Count: number of respondents for each specific type of livestock.

CATTLE	Early 2010s	2017	2021/2	SHEEP	Early 2010s	2017	2021/2
Mean	48.23	10.29	1.33	Mean	28.69	10.98	3.07
Median	25	4	0	Median	20	5	0
Skew	3.622	4.041	3.925	Skew	2.430	4.718	1.675
Min	0	0	0	Min	0	0	0
Max	500	140	20	Max	200	150	20
Total	4003	854	117	Total	2381	911	270
Count	83	83	88	Count	83	83	88
GOATS	**Early 2010s**	**2017**	**2021/2**	**DONKEYS**	**Early 2010s**	**2017**	**2021/2**
Mean	142.98	71.01	30.66	Mean	5.06	1.57	0.8182
Median	100	50	25	Median	4	1	0
Skew	1.253	1.503	0.897	Skew	1.731	2.058	1.955
Min	0	0	0	Min	0	0	0
Max	600	300	110	Max	25	11	7
Total	11867	5894	2698	Total	415	129	72
Count	83	83	88	Count	82	82	88

Livestock, Sesfontein Conservancy. Photo: A. Wattamaniuk.

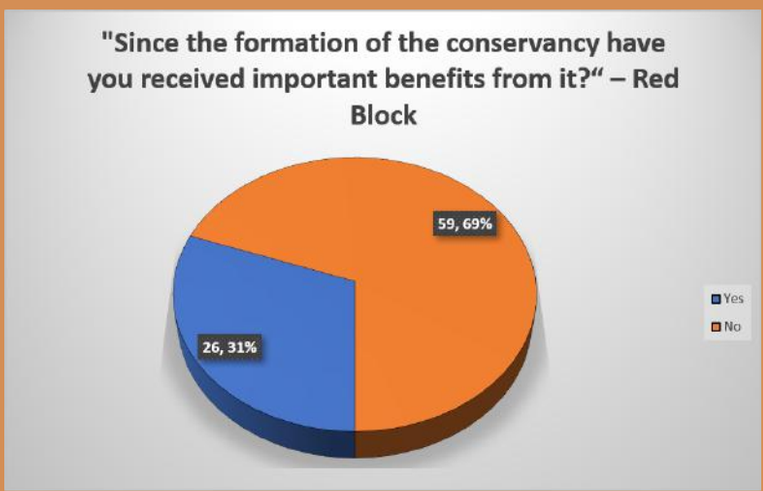
RED BLOCK RESULTS

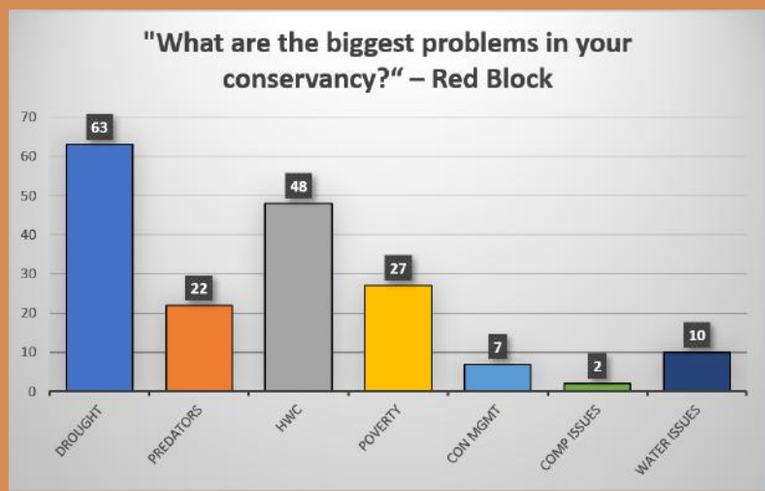
RED BLOCK

The Red Block consists of Ehi-rovipuka (2001), Omatendeka (2003), and Orupupa (2011) conservancies. In total these conservancies cover 4,833 km² and consist of 5,855 people. Within this block Ehi-rovipuka Conservancy borders Etosha National Park, thus experiencing HLC challenges both from the desert-adapted lions inhabiting communal lands and from Etosha vagrants. Since 2011, the Namibian Lion Trust has been performing HLC monitoring and research within the Ehi-rovipuka and Omatendeka conservancies. Ehi-rovipuka Conservancy also borders the Hobatere Tourism Concession, while Omatendeka borders the Etendeka Tourism Concession. Major drainage lines in these conservancies include the Ombonde and Otjivasandu ephemeral rivers. Each of these conservancies lies north of the Veterinary Control Fence.

Conservancy

When asked whether they have ever received important benefits from their conservancy, 31% (n = 26) replied affirmatively, while 69% (n = 59) say they have not. When asked to identify the biggest problems in their conservancy, the most consistently identified problems were drought (74%; n = 63), HWC (56%; n = 48), poverty (32%; n = 27), predators (26%; n = 22), and issues related to water infrastructure (12%; n = 10).





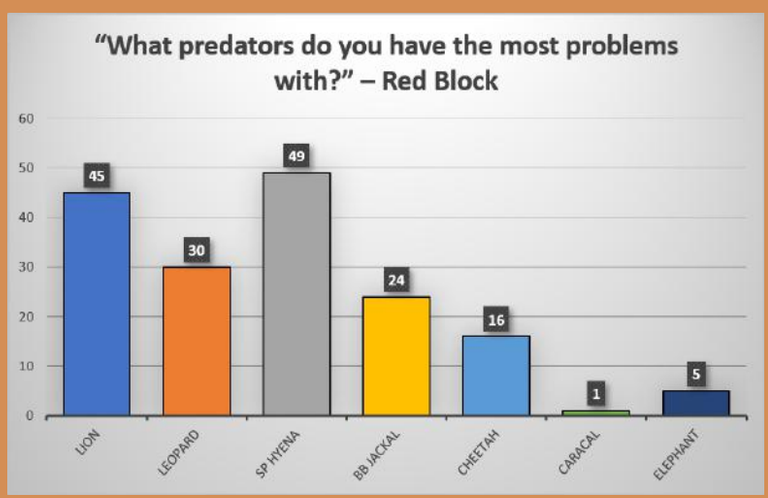
Committee meeting, Ehi-rovipuka Conservancy.

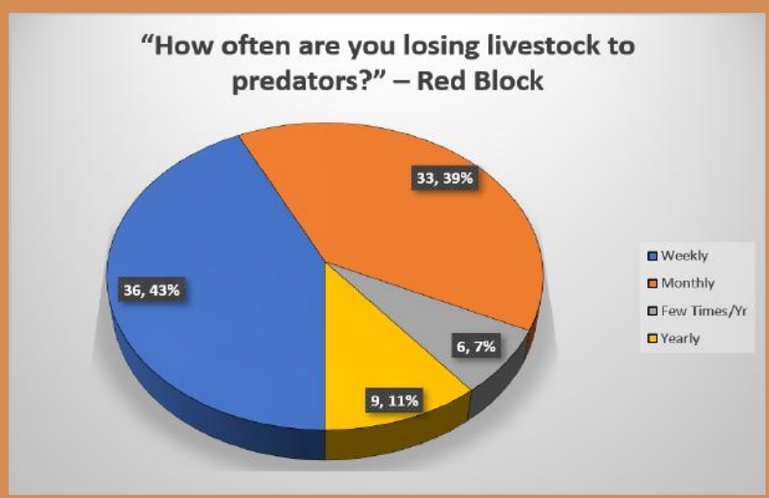
RED BLOCK RESULTS

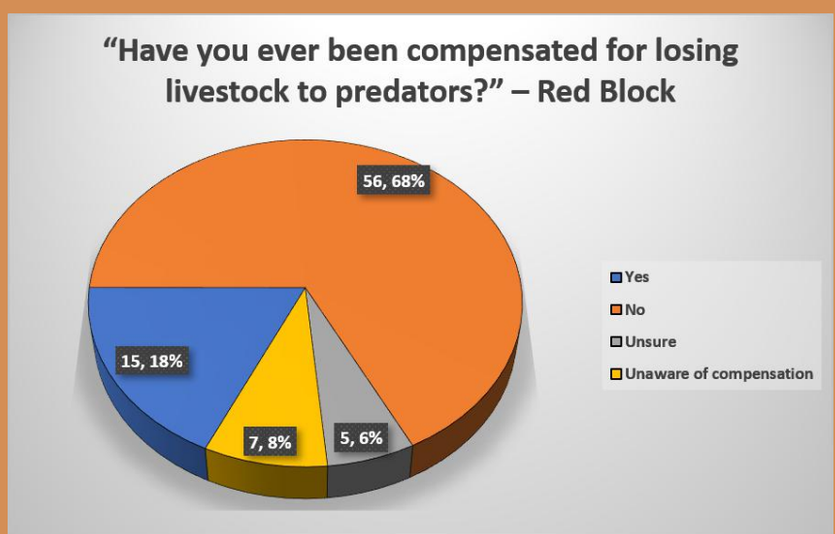
RED BLOCK (cont.)

Predator Problems

When asked which predators do you have the most problems with, the most commonly given responses were spotted hyena (58%; n = 49), lion (53%; n = 45), leopard (35%; n = 30), and black-backed jackal (28%; n = 24). For this question only the top three most problematic predators were recorded per respondent. When asked, how often are you losing livestock to predators, 82% (n = 69) of respondents answered either "weekly" or "monthly." When asked have you ever been compensated for losing livestock to predators, 18% (n = 15) of respondents answered that yes they have, 67% (n = 56) answered they have never been compensated, 6% (n = 5) were unsure, while 8% (n = 7) were unaware of a livestock compensation program.





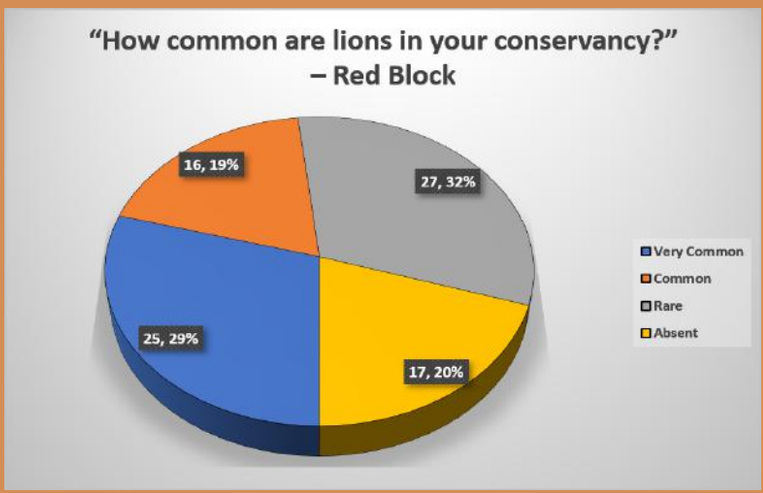


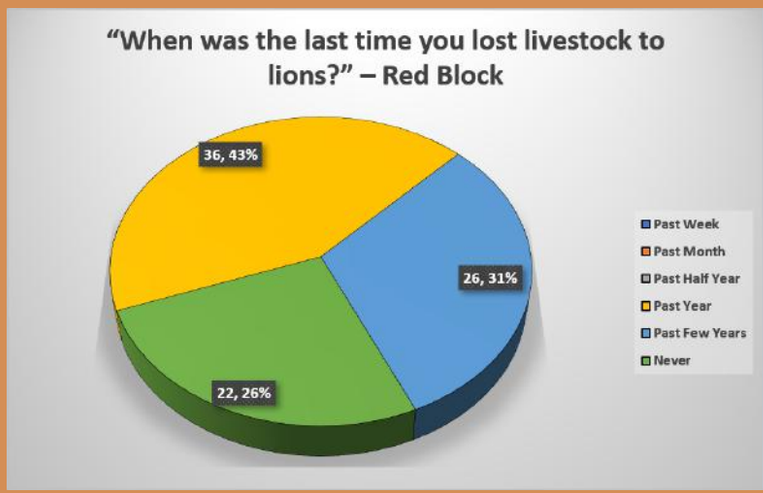
RED BLOCK RESULTS

RED BLOCK (cont.)

Lions

When asked, how common are lions in your conservancy, 48% (n = 41) stated lions were either "very common" or "common" in their conservancy, 32% (n = 27) stated lions were "rare," while 20% (n = 17) stated lions were not present in their conservancy. When asked when they last lost livestock to lions, no respondents stated they had lost livestock to lions within the past half year or less, 74% (n = 62) stated they had lost livestock to lions in the past year or few years, while 26% (n = 22) stated they had never lost livestock to lions.

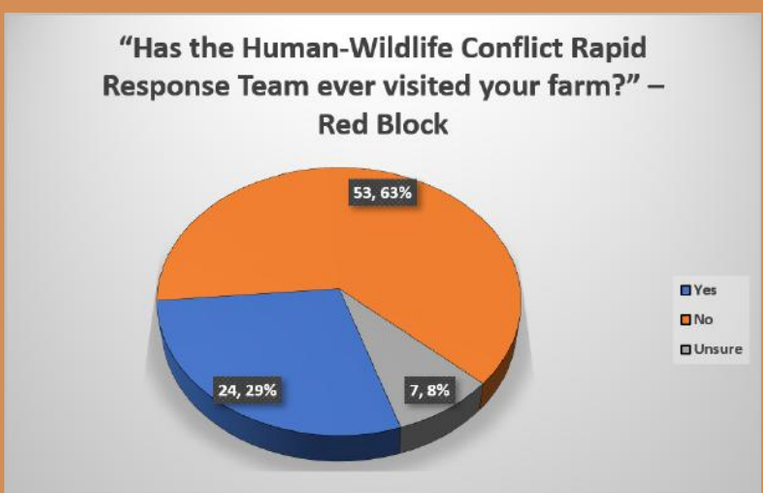


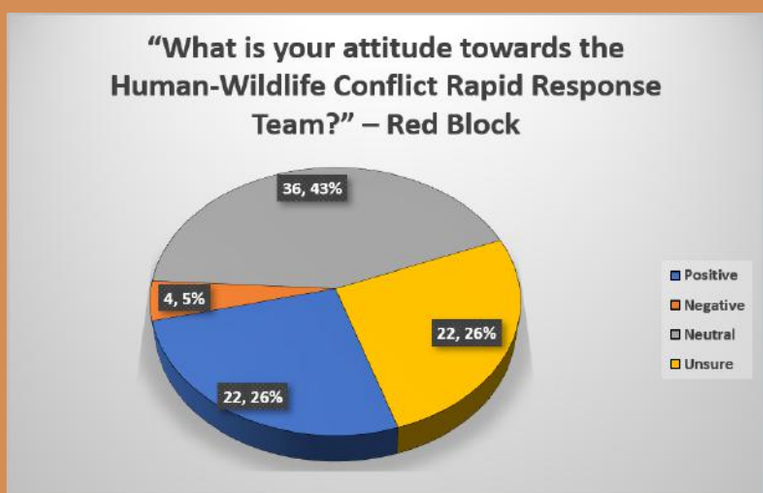


Human-Lion Conflict Interventions

HWC Rapid Response Teams

When asked whether they had heard of the Human-Wildlife Conflict Rapid Response Teams, 42% (n = 35) replied affirmatively. When asked whether a HWC Rapid Response Team had visited their farm, 29% (n = 24) replied that they had, while 63% (n = 53) replied they had not. When asked about their attitude towards the HWC Rapid Response Teams, 26% (n = 22) characterized their attitude as positive, 5% (n = 4) characterized their attitude as negative, 43% (n = 36) characterized their attitude as neutral, while 26% (n = 22) stated they were unsure - primarily because they do not know about the HWC Rapid Response Teams.



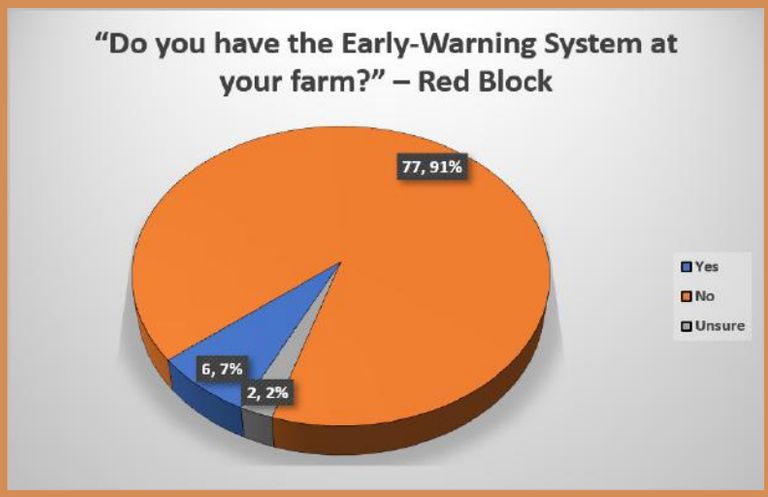


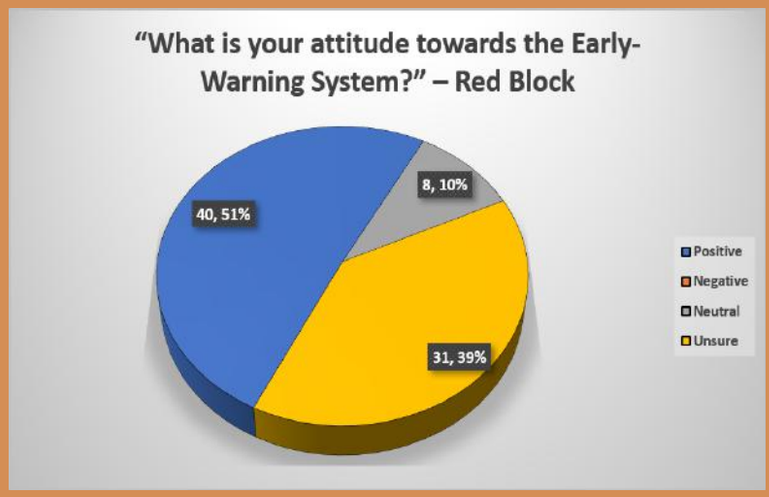
RED BLOCK RESULTS

RED BLOCK (cont.)

Early-Warning System

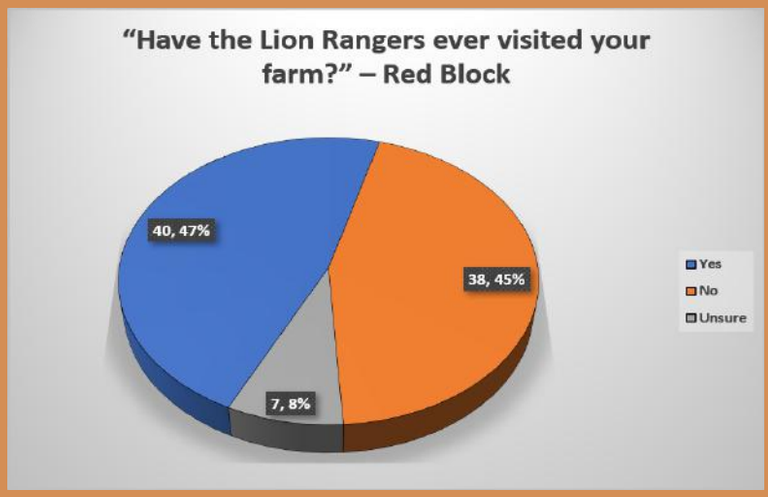
When asked whether they had heard of the Early-Warning System, 44% (n = 37) replied affirmatively. When asked whether they have an Early-Warning System tower at their farm, 7% (n = 6) replied affirmatively, while 91% (n = 77) replied they do not. When asked about their attitude towards the Early-Warning System, 51% (n = 40) characterized their attitude as positive, no respondents characterized their attitude as negative, 10% (n = 8) characterized their attitude as neutral, while 39% (n = 31) stated they were unsure - primarily because they do not know about the Early-Warning System.

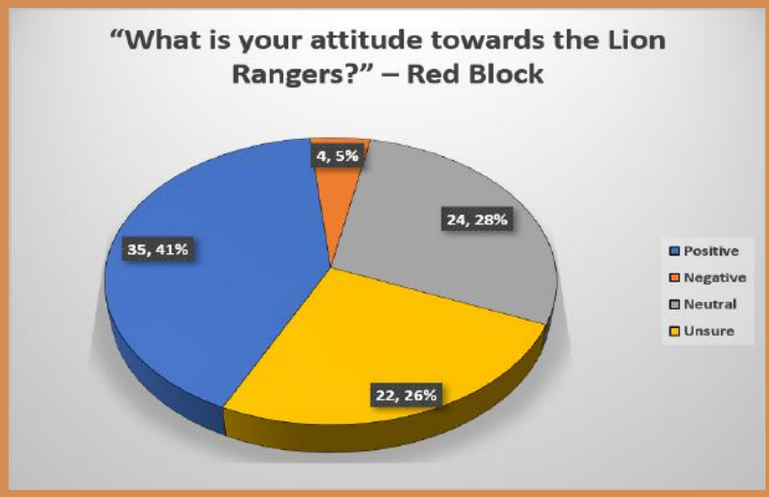




Lion Rangers

When asked whether they had heard of the Lion Rangers, 74% (n = 63) replied affirmatively. When asked whether the Lion Rangers had ever visited their farm, 47% (n = 40) replied affirmatively, while 45% (n = 38) replied that they have not. When asked about their attitude towards the Lion Rangers, 41% (n = 35) characterized their attitude as positive, 5% (n = 4) characterized their attitude as negative, 28% (n = 24) characterized their attitude as neutral, while 26% (n = 22) stated they were unsure - primarily because they do not know about the Lion Rangers.



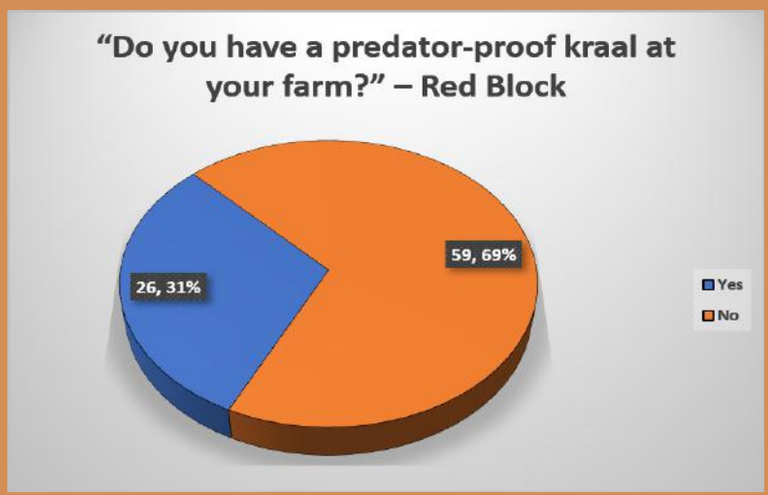


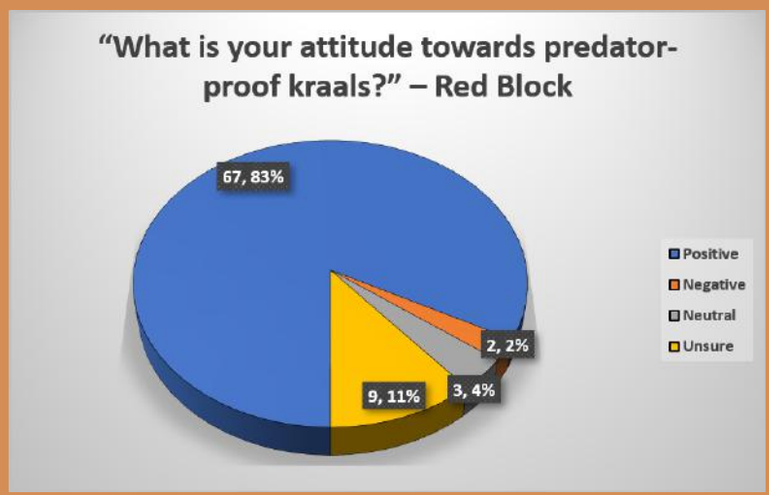
RED BLOCK RESULTS

RED BLOCK (cont.)

Predator-Proof Kraals

When asked whether they had heard of predator-proof kraals, 81% (n = 69) replied affirmatively. When asked whether they have a predator-proof kraal at their farm, 31% (n = 26) replied affirmatively, while 69% (n = 59) replied that they do not. When asked about their attitude towards predator-proof kraals, 83% (n = 67) characterized their attitude as positive, 2% (n = 2) characterized their attitude as negative, 4% (n = 3) characterized their attitude as neutral, and 11% (n = 9) stated they were unsure.





Welwitschia mirabilis, Torra Conservancy
Photo: A. Wattamaniuk.

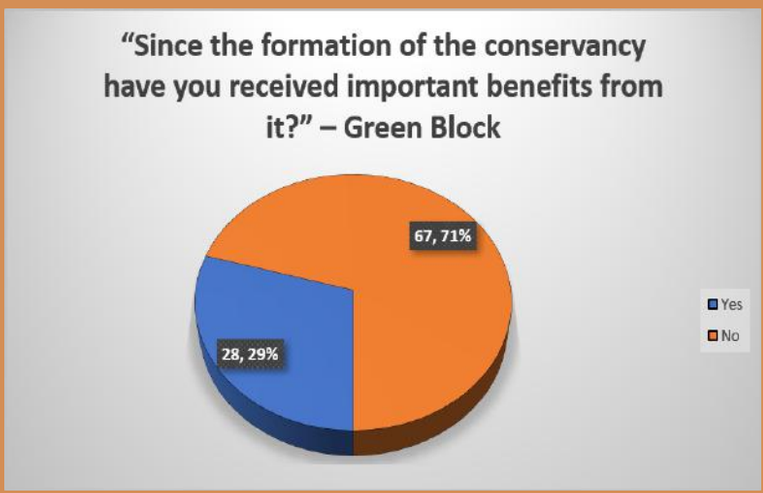
GREEN BLOCK RESULTS

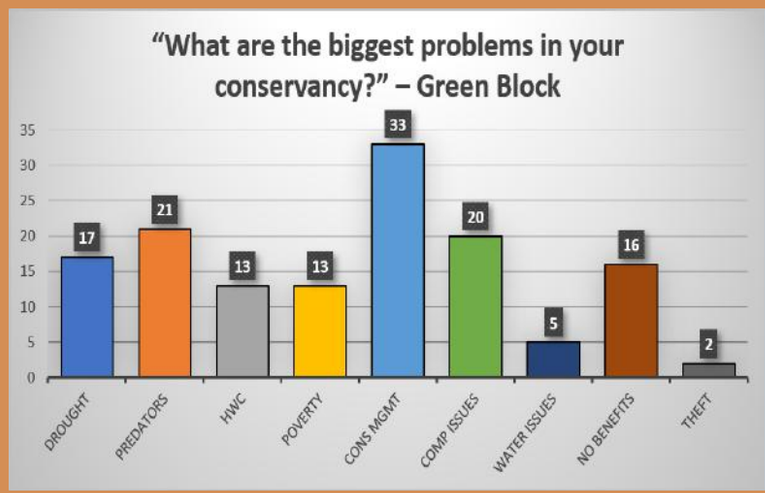
GREEN BLOCK

The Green Block consists of ≠Khoadi-//Hôas (1998) and Torra (1998) conservancies. In total these conservancies cover 6,857 km² and consist of 5,372 people. Both of these conservancies were among the 'first four' conservancies gazetted by the Namibian government. The Torra Conservancy borders the Palmwag and Etendeka Tourism Concessions and has long been recognized as a core part of the desert-adapted lions' range. ≠Khoadi-//Hôas borders the Hobatere and Etendeka Tourism Concession. Major drainage lines in these conservancies include the Klip, Koigab, and Huab ephemeral rivers. Both of these conservancies are south of the Veterinary Control Fence.

Conservancy

When asked whether they have ever received important benefits from their conservancy, 29% (n = 28) replied affirmatively, while 71% (n = 67) say they have not. When asked to identify the biggest problems in their conservancy, the most consistently identified problems were the conservancy management (36%; n = 33), predators (23%; n = 21), issues receiving livestock compensation (22%; n = 20), drought (19%; n = 17), and not receiving benefits from the conservancy (18%; n = 16).





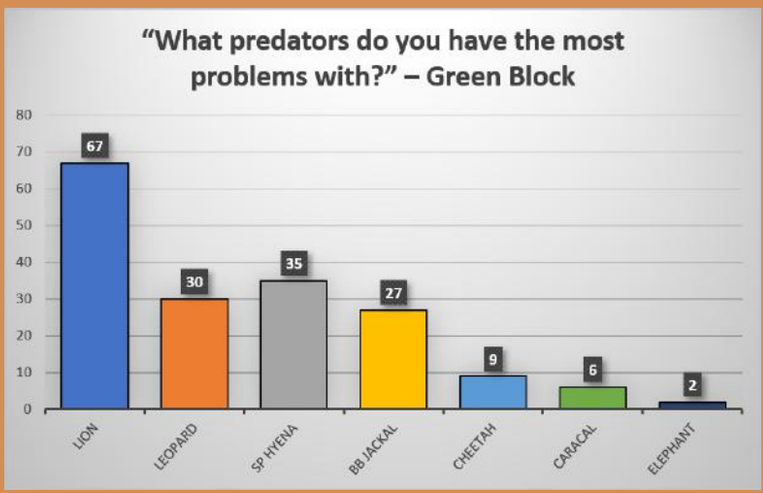
Rapid Response Teams, ≠Khoadi-//Hôas Conservancy

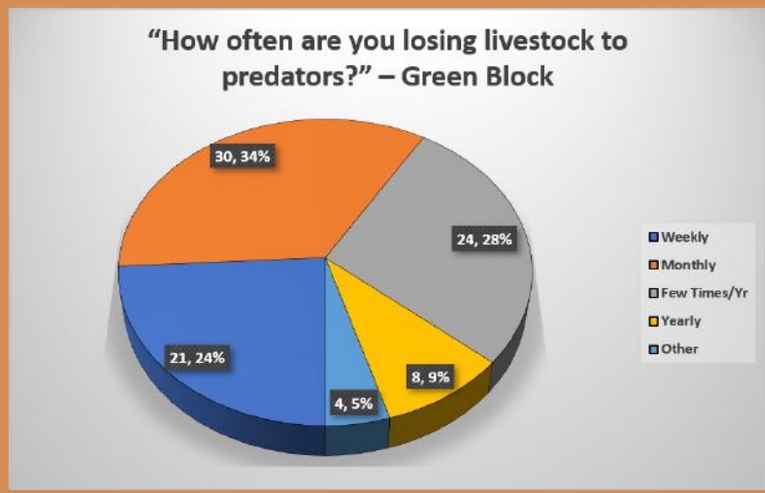
GREEN BLOCK RESULTS

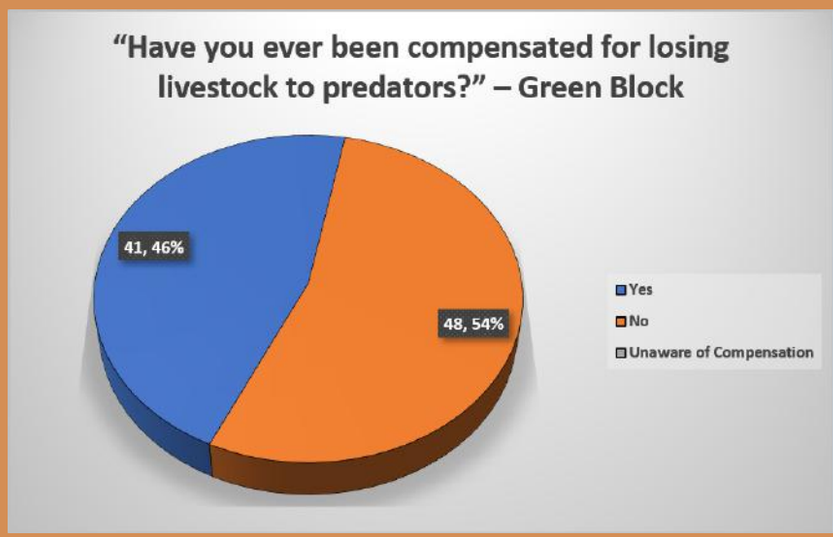
GREEN BLOCK (cont.)

Predator Problems

When asked which predators do you have the most problems with, the most commonly given responses were lions (71%; n = 67), spotted hyena (37%; n = 35), leopard (32%; n = 30), and black-backed jackal (29%; n = 27). For this question only the top three most problematic predators were recorded per respondent. When asked, how often are you losing livestock to predators, 58% (n = 51) of respondents answered either "weekly" or "monthly." When asked have you ever been compensated for losing livestock to predators, 46% (n = 41) of respondents answered that yes they have, while 54% (n = 48) answered they have never been compensated.





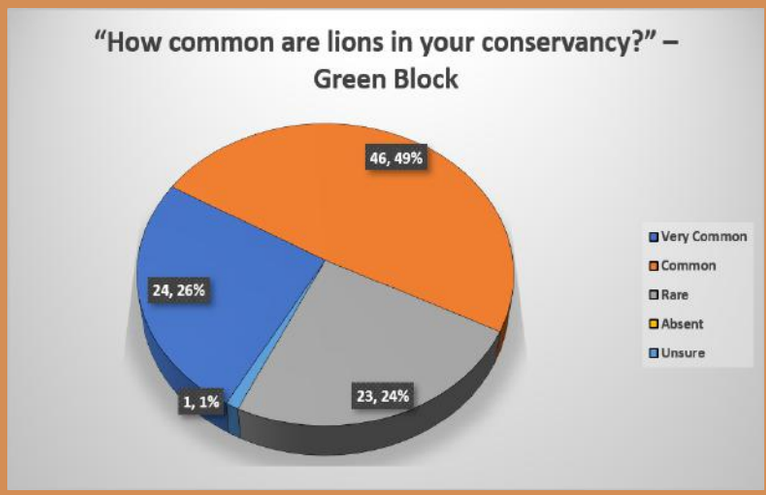


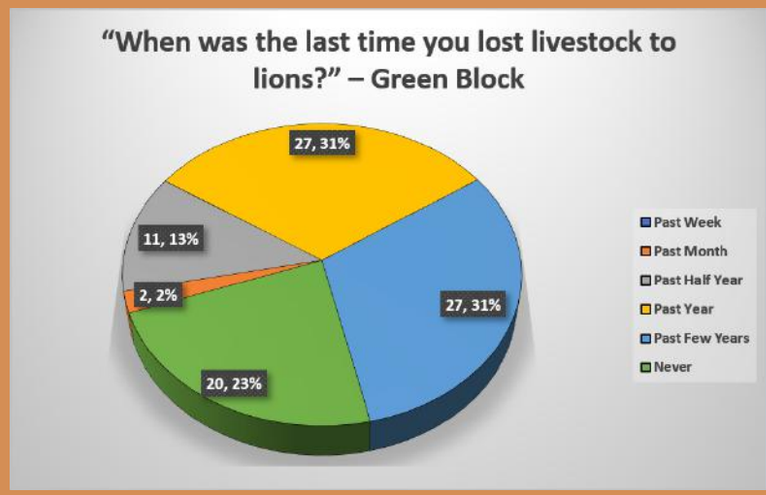
GREEN BLOCK RESULTS

GREEN BLOCK (cont.)

Lions

When asked, how common are lions in your conservancy, 75% (n = 70) stated lions were either "very common" or "common" in their conservancy, 24% (n = 23) stated lions were "rare," while no respondents stated lions were not present in their conservancy. When asked when they last lost livestock to lions, 15% (n = 13) stated they had lost livestock to lions within the past half year or less, 62% (n = 54) stated they had lost livestock to lions in the past year or few years, while 23% (n = 20) stated they had never lost livestock to lions.

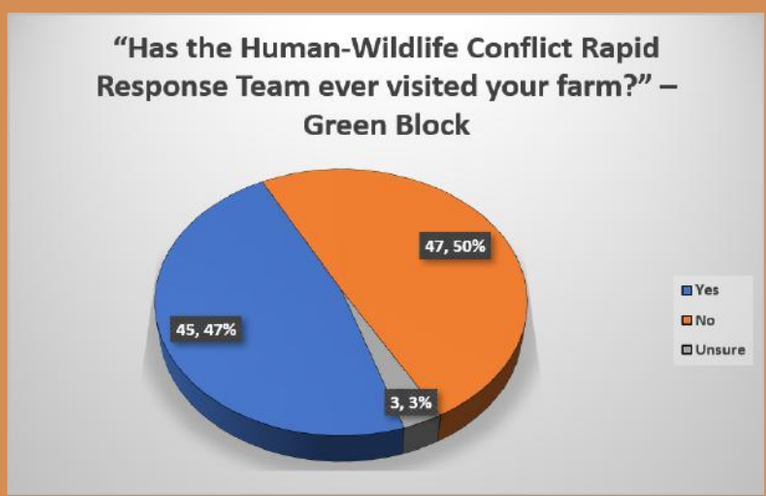


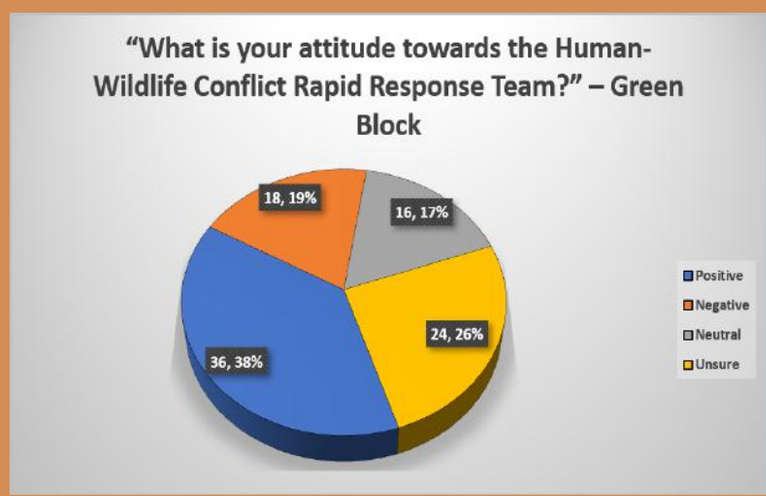


Human-Lion Conflict Interventions

HWC Rapid Response Teams

When asked whether they had heard of the Human-Wildlife Conflict Rapid Response Teams, 80% (n = 76) replied affirmatively. When asked whether a HWC Rapid Response Team had visited their farm, 47% (n = 45) replied that they had, while 50% (n = 47) replied they had not. When asked about their attitude towards the HWC Rapid Response Teams, 38% (n = 36) characterized their attitude as positive, 19% (n = 18) characterized their attitude as negative, 17% (n = 16) characterized their attitude as neutral, while 26% (n = 24) stated they were unsure.



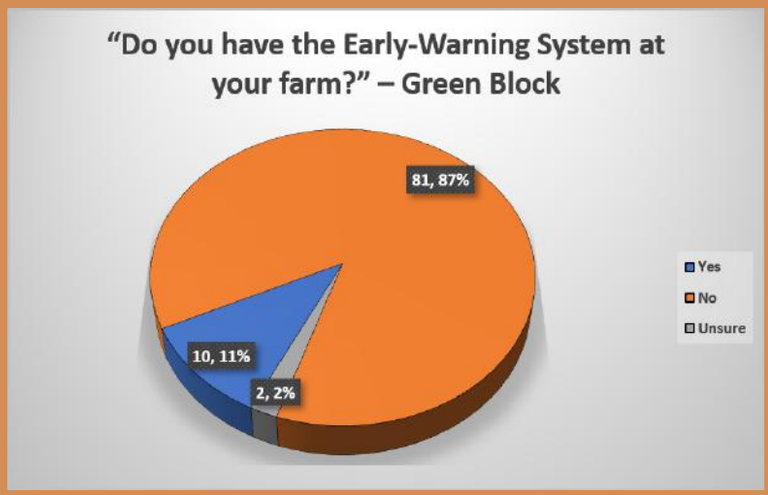


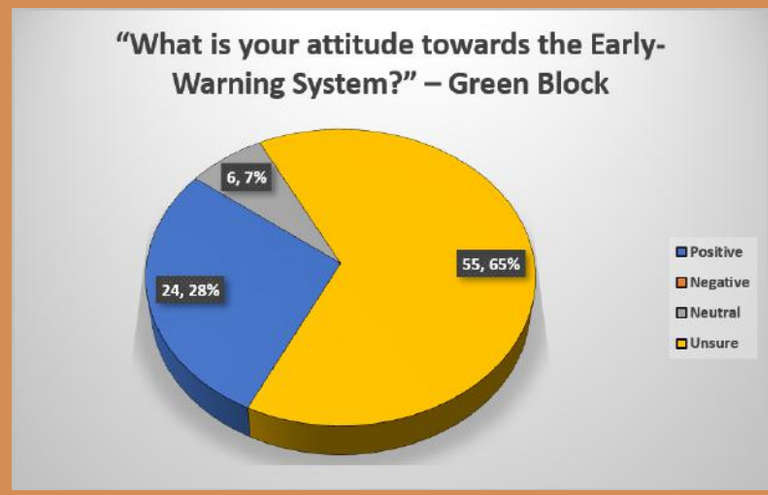
GREEN BLOCK RESULTS

GREEN BLOCK (cont.)

Early-Warning System

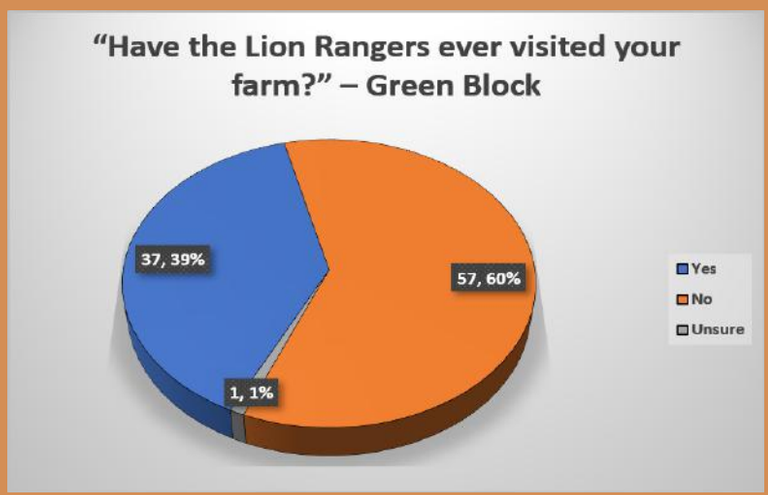
When asked whether they had heard of the Early-Warning System, 44% (n = 41) replied affirmatively. When asked whether they have an Early-Warning System tower at their farm, 11% (n = 10) replied affirmatively, while 87% (n = 81) replied they do not. When asked about their attitude towards the Early-Warning System, 28% (n = 24) characterized their attitude as positive, no respondents characterized their attitude as negative, 7% (n = 6) characterized their attitude as neutral, while 65% (n = 55) stated they were unsure - primarily because they do not know about the Early-Warning System.

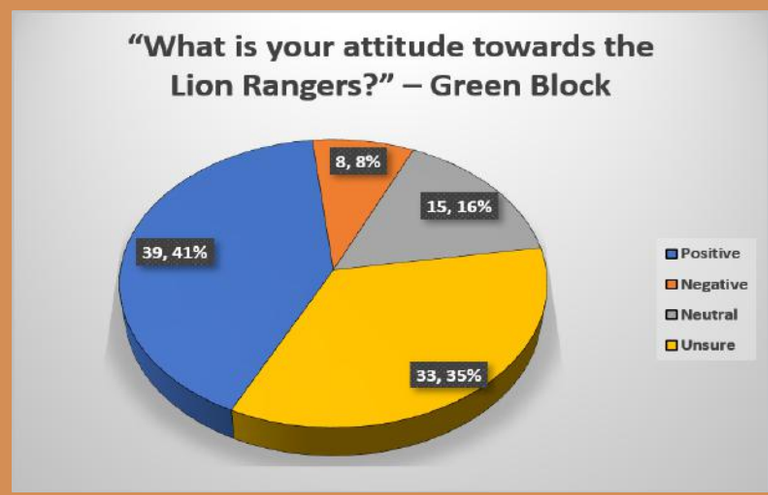




Lion Rangers

When asked whether they had heard of the Lion Rangers, 75% (n = 71) replied affirmatively. When asked whether the Lion Rangers had ever visited their farm, 39% (n = 37) replied affirmatively, while 60% (n = 57) replied that they have not. When asked about their attitude towards the Lion Rangers, 41% (n = 39) characterized their attitude as positive, 8% (n = 8) characterized their attitude as negative, 16% (n = 15) characterized their attitude as neutral, while 35% (n = 33) stated they were unsure - primarily because they do not know about the Lion Rangers.



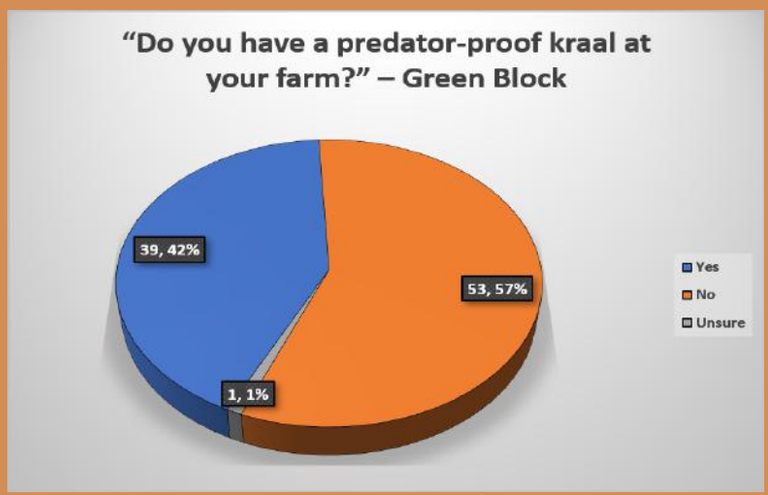


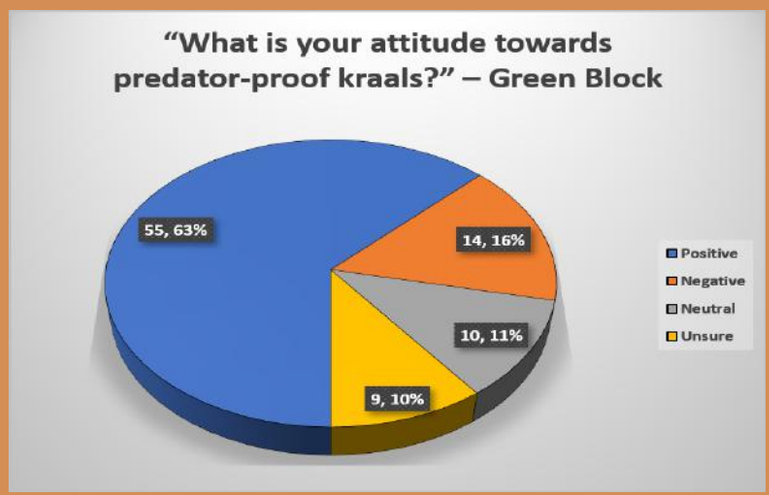
GREEN BLOCK RESULTS

GREEN BLOCK (cont.)

Predator-Proof Kraals

When asked whether they had heard of predator-proof kraals, 91% (n = 85) replied affirmatively. When asked whether they have a predator-proof kraal at their farm, 42% (n = 39) replied affirmatively, while 57% (n = 53) replied that they do not. When asked about their attitude towards predator-proof kraals, 63% (n = 55) characterized their attitude as positive, 16% (n = 14) characterized their attitude as negative, 11% (n = 10) characterized their attitude as neutral, and 10% (n = 9) stated they were unsure.





Desert-adapted lioness, Sesfontein Conservancy

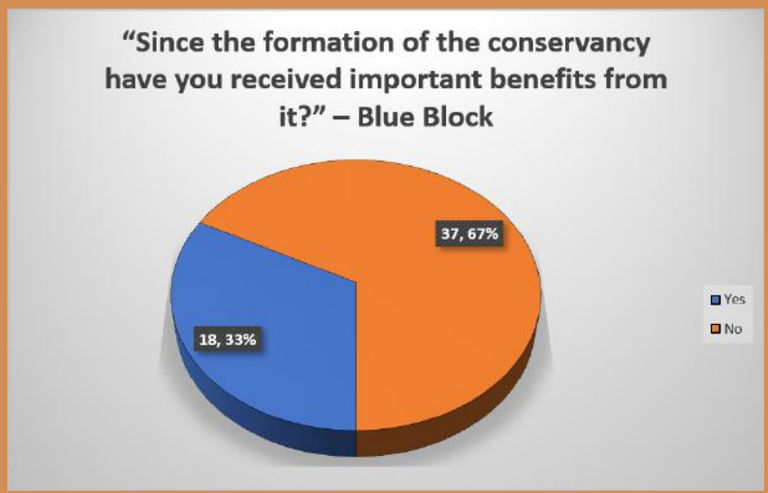
BLUE BLOCK RESULTS

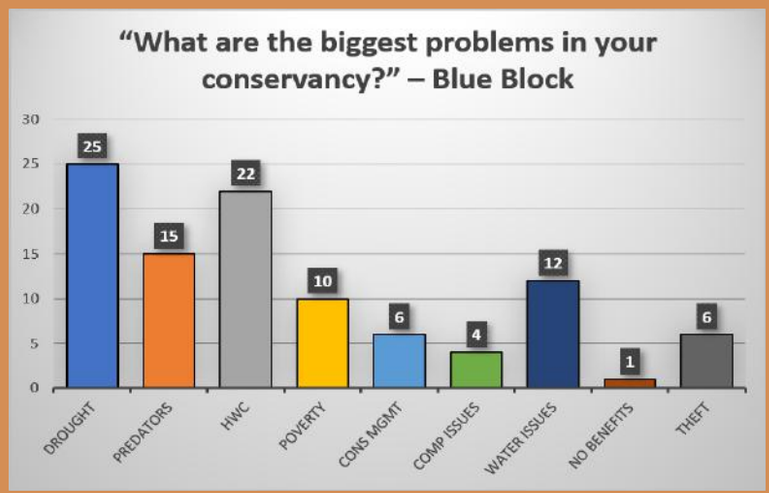
BLUE BLOCK

The Blue Block consists of the Doro !Nawas (1999), Sorris Sorris (2001), and Tsiseb (2001) conservancies. In total these conservancies cover 14,181 km² and consist of 4,607 people. While vagrant lions move through these three conservancies, they are only considered to be satellite (rather than core) lion range conservancies, with the exception of the area's major drainage line, the Ugab ephemeral river, which previously maintained a small number of resident lions. Each of these conservancies is south of the Veterinary Control Fence and Tsiseb (falling south of the Ugab) is within the Erongo Region.

Conservancy

When asked whether they have ever received important benefits from their conservancy, 33% (n = 18) replied affirmatively, while 67% (n = 37) say they have not. When asked to identify the biggest problems in their conservancy, the most consistently identified problems were drought (45%; n = 25), HWC (40%; n = 22) predators (27%; n = 15), inadequate access to water infrastructure (22%; n = 12), and poverty (18%; n = 10).





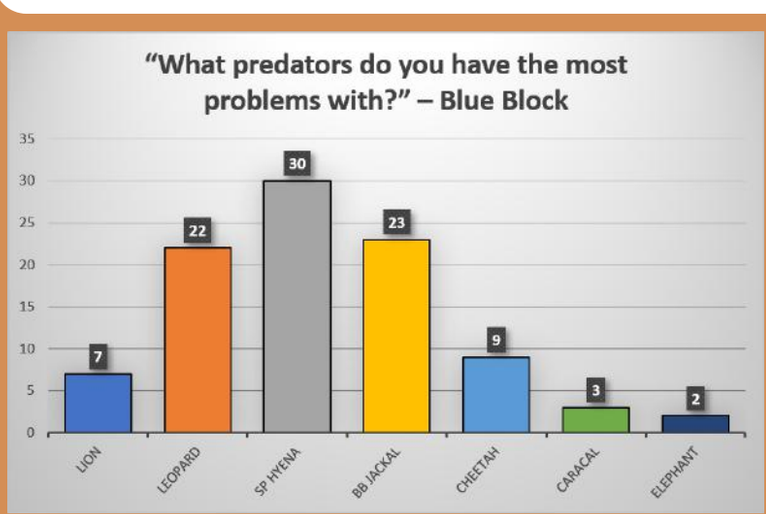
Black-faced impala, Ehi-rovipuka Conservancy

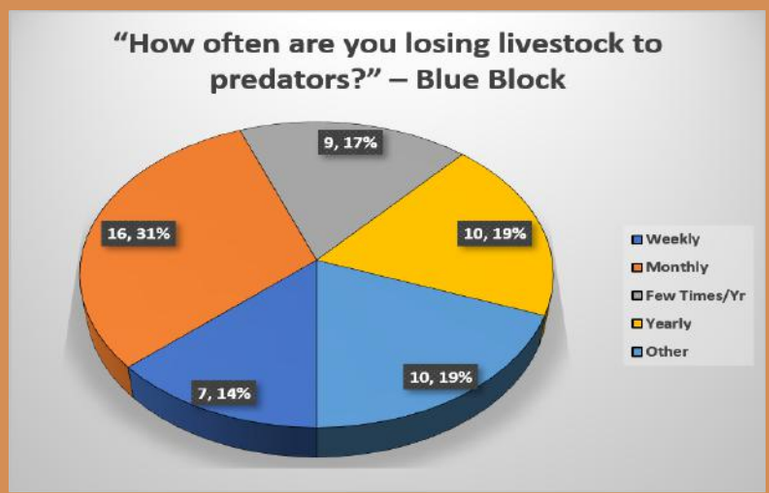
BLUE BLOCK RESULTS

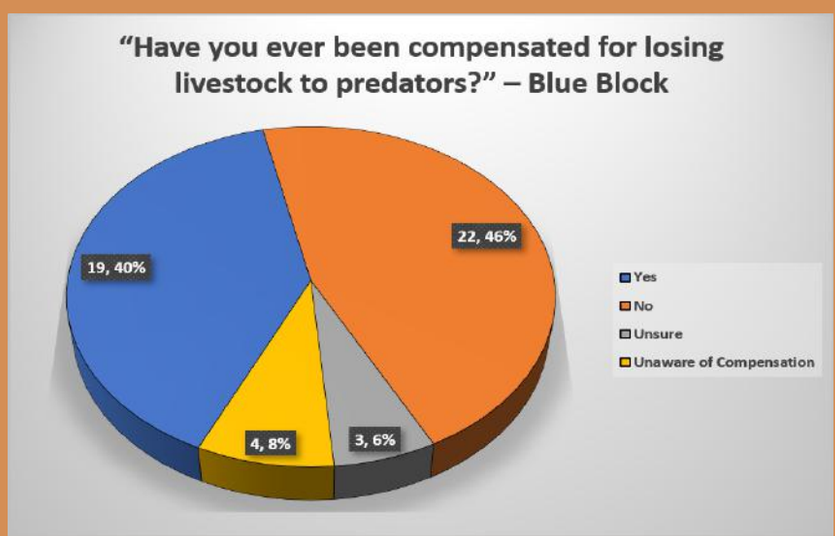
BLUE BLOCK (cont.)

Predator Problems

When asked which predators do you have the most problems with, the most commonly given responses were spotted hyena (59%; n = 30), black-backed jackal (45%; n = 23), and leopard (43%; n = 22). For this questions only the top three most problematic predators were recorded per respondent. When asked, how often are you losing livestock to predators, 44% (n = 23) of respondents answered either "weekly" or "monthly." When asked have you ever been compensated for losing livestock to predators, 40% (n = 19) of respondents answered that yes they have, 46% (n = 22) answered they have never been compensated, 6% (n = 3) said they are unsure, and 8% (n = 4) stated that they were unaware of the livestock compensation program.





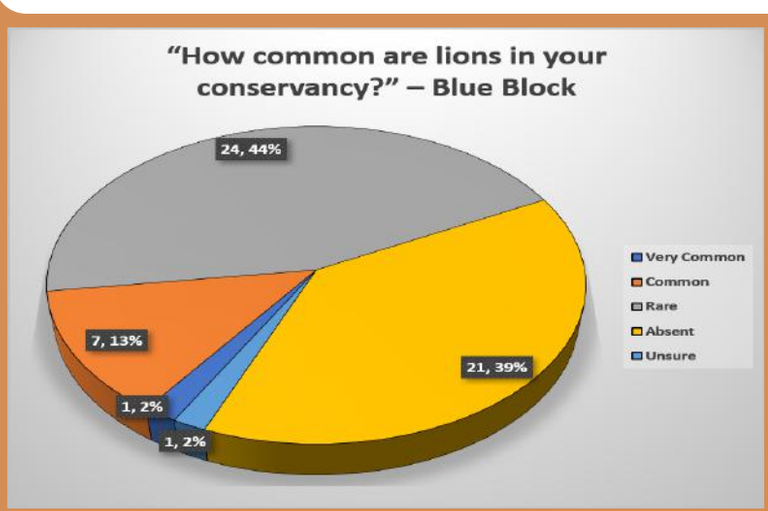


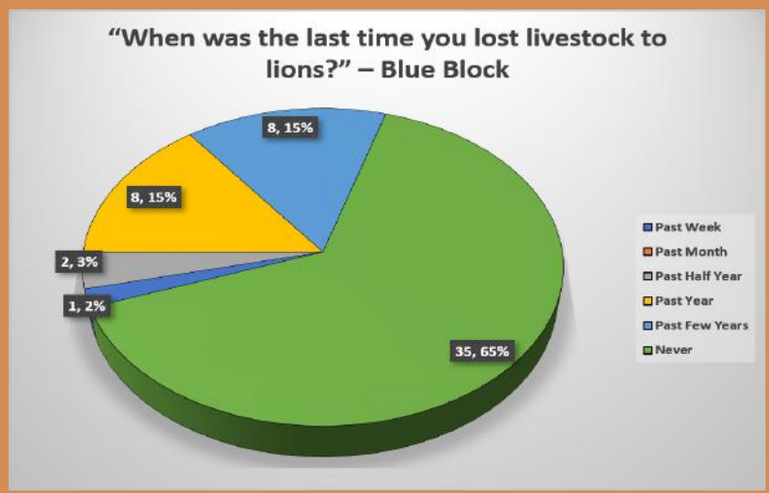
BLUE BLOCK RESULTS

BLUE BLOCK (cont.)

Lions

When asked, how common are lions in your conservancy, 15% (n = 8) stated lions were either "very common" or "common" in their conservancy, 44% (n = 24) stated lions were "rare," while 39% (n = 21) stated lions were not present in their conservancy. When asked when they last lost livestock to lions, 5% (n = 3) stated they had lost livestock to lions within the past half year or less, 30% (n = 16) stated they had lost livestock to lions in the past year or few years, while 65% (n = 35) stated they have never lost livestock to lions.

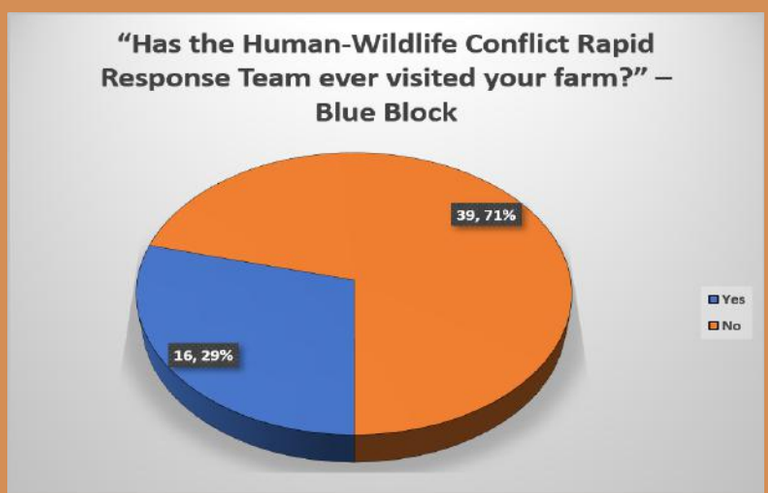


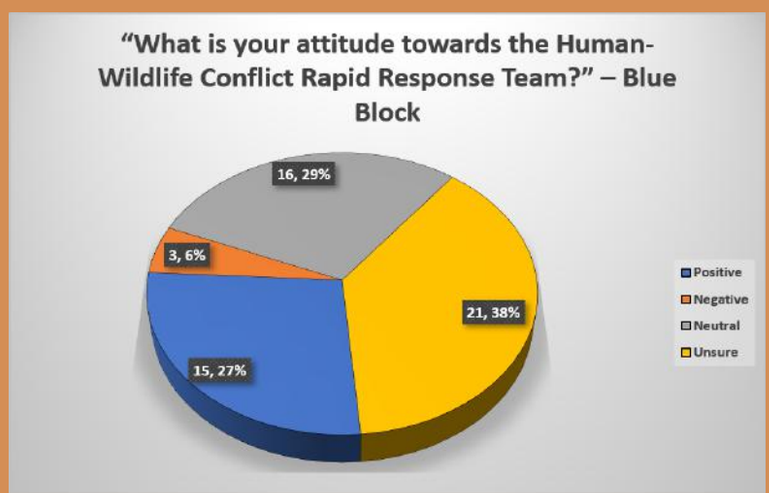


Human-Lion Conflict Interventions

HWC Rapid Response Teams

When asked whether they had heard of the Human-Wildlife Conflict Rapid Response Teams, 44% (n = 24) replied affirmatively. When asked whether a HWC Rapid Response Team had visited their farm, 29% (n = 16) replied that they had, while 71% (n = 39) replied they had not. When asked about their attitude towards the HWC Rapid Response Teams, 27% (n = 15) characterized their attitude as positive, 6% (n = 3) characterized their attitude as negative, 29% (n = 16) characterized their attitude as neutral, while 38% (n = 21) stated they were unsure - primarily because they do not know about the HWC Rapid Response Teams.



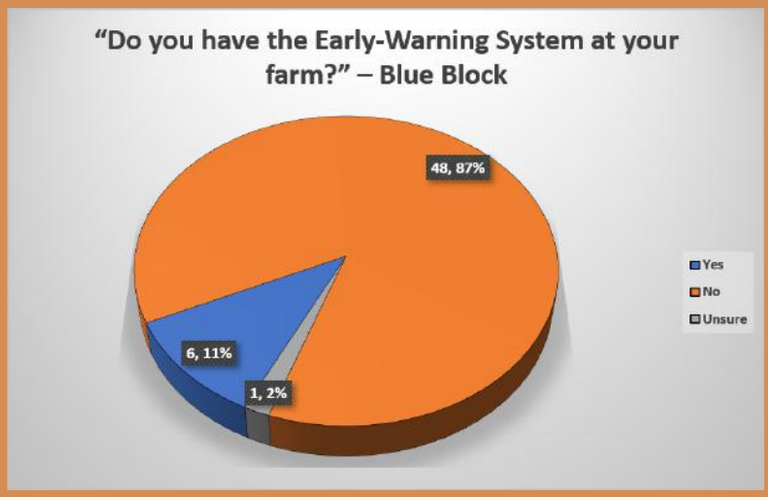


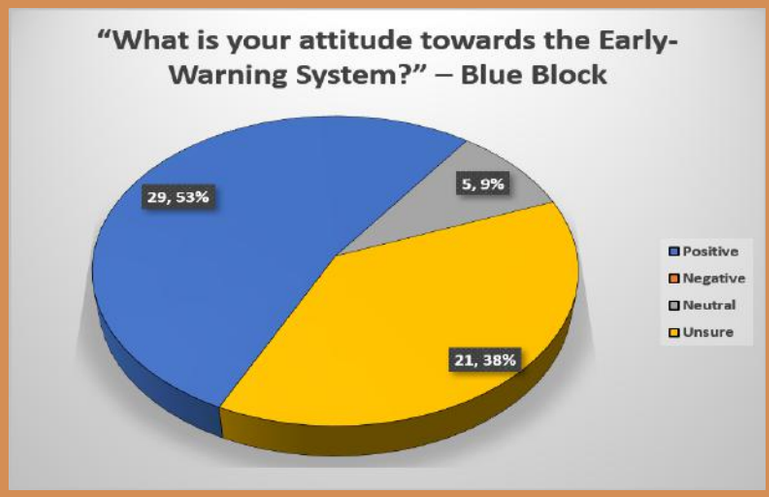
BLUE BLOCK RESULTS

BLUE BLOCK (cont.)

Early-Warning System

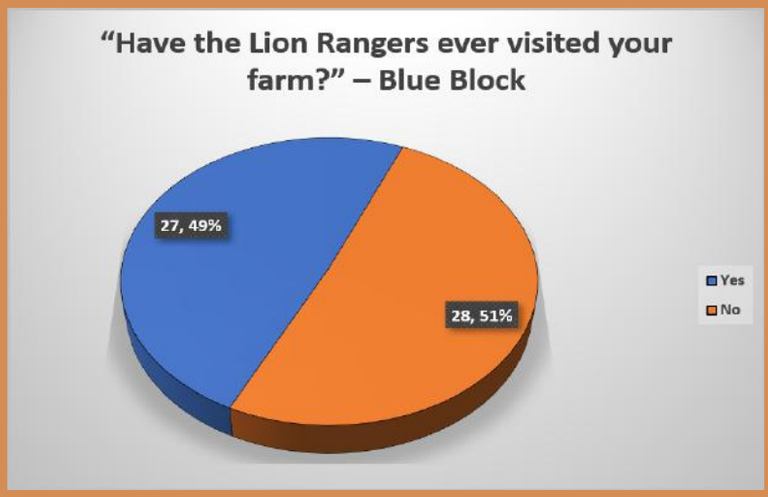
When asked whether they had heard of the Early-Warning System, 47% (n = 26) replied affirmatively. When asked whether they have an Early-Warning System tower at their farm, 11% (n = 6) replied affirmatively, while 87% (n = 48) replied they do not. When asked about their attitude towards the Early-Warning System, 53% (n = 29) characterized their attitude as positive, no respondents characterized their attitude as negative, 9% (n = 5) characterized their attitude as neutral, while 38% (n = 21) stated they were unsure - primarily because they do not know about the Early-Warning System.

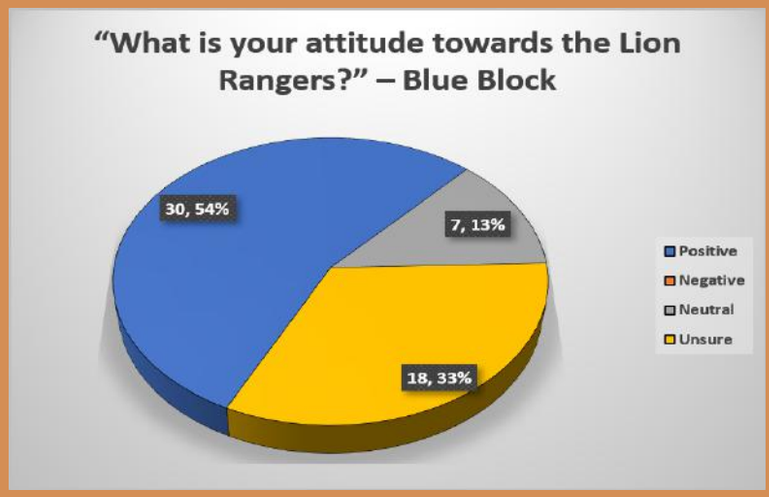




Lion Rangers

When asked whether they had heard of the Lion Rangers, 65% (n = 36) replied affirmatively. When asked whether the Lion Rangers had ever visited their farm, 49% (n = 27) replied affirmatively, while 51% (n = 28) replied that they have not. When asked about their attitude towards the Lion Rangers, 54% (n = 30) characterized their attitude as positive, no respondents characterized their attitude as negative, 13% (n = 7) characterized their attitude as neutral, while 33% (n = 18) stated they were unsure - primarily because they do not know about the Lion Rangers.



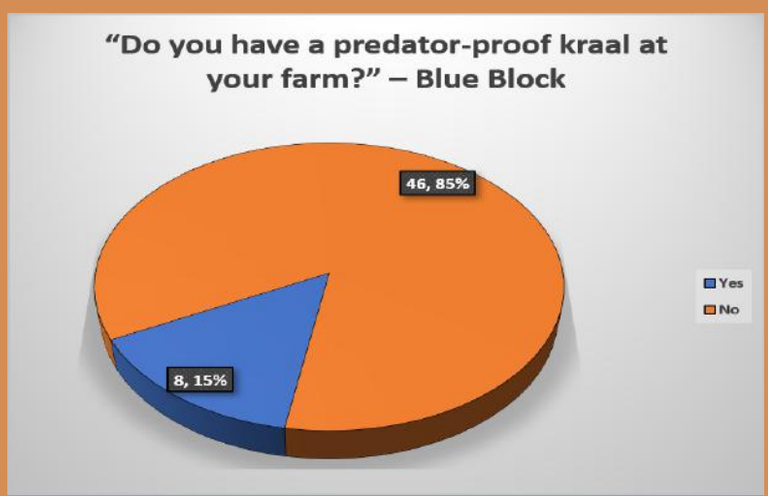


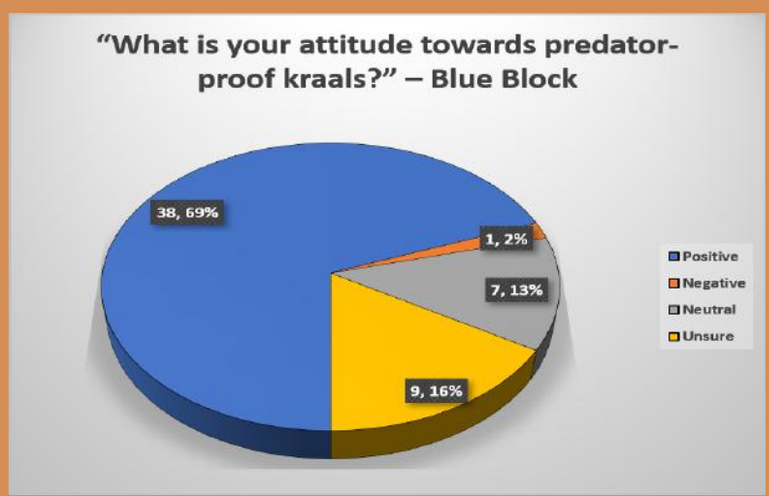
BLUE BLOCK RESULTS

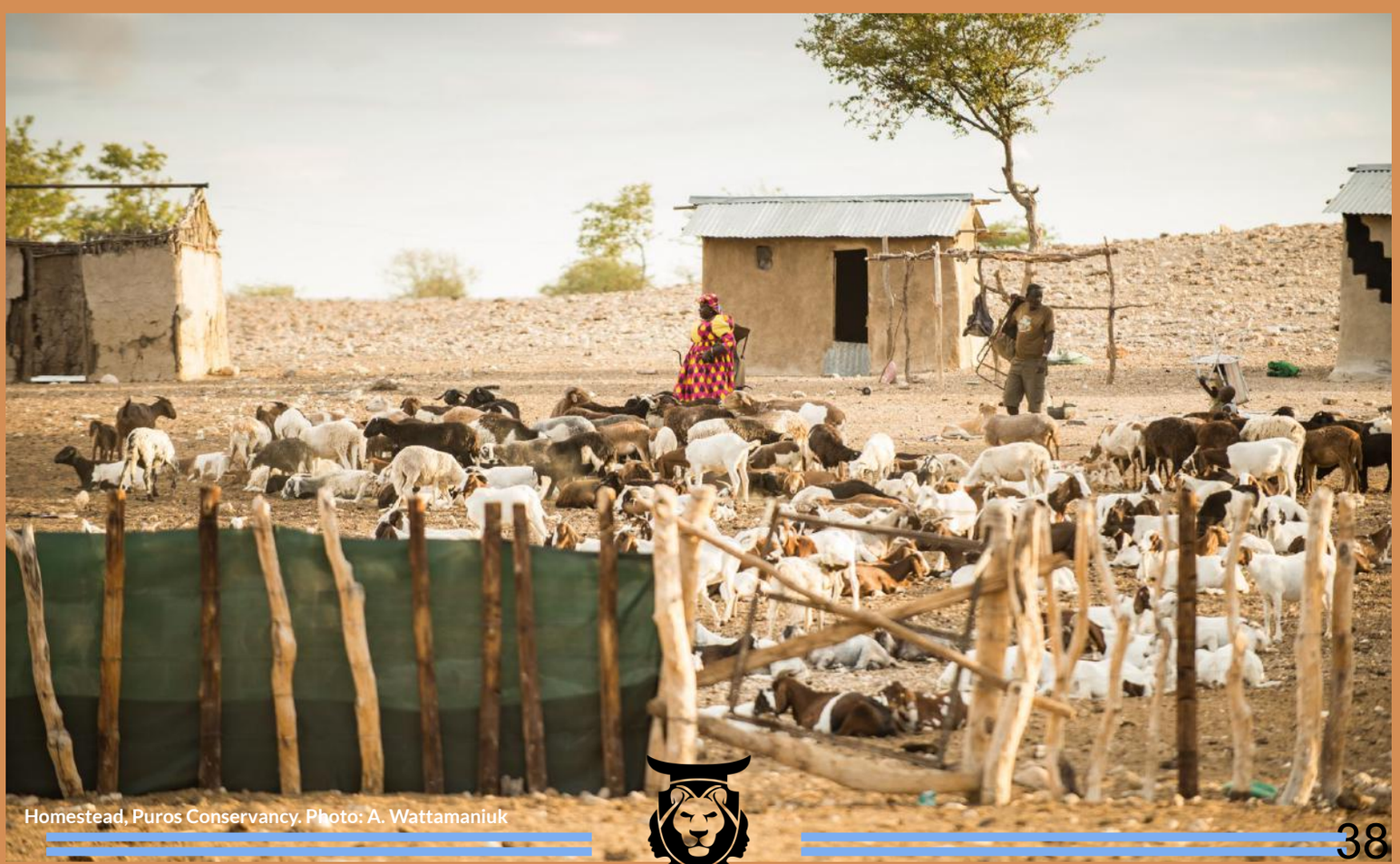
BLUE BLOCK (cont.)

Predator-Proof Kraals

When asked whether they had heard of predator-proof kraals, 76% (n = 42) replied affirmatively. When asked whether they have a predator-proof kraal at their farm, 15% (n = 8) replied affirmatively, while 85% (n = 46) replied that they do not. When asked about their attitude towards predator-proof kraals, 69% (n = 38) characterized their attitude as positive, one respondent characterized their attitude as negative, 13% (n = 7) characterized their attitude as neutral, and 16% (n = 9) stated they were unsure.







Homestead, Puros Conservancy. Photo: A. Wattamaniuk

Reference List

Goelst C, Moeller M, Kilian W. 2018. Etosha National Park Carnivore Monitoring Project Update, Unofficial Report. Re: Lions GPS-Satellite Monitoring, 2018 Lion Population Call-Up Survey. Report prepared for Etosha Ecological Institute.

(GRN) Government of the Republic of Namibia. 2016. *National Policy on Conservation and Management of Large Carnivores in Namibia*. Windhoek: Namibia Ministry of Environment and Tourism.

GRN. 2017. Human Lion Conflict Management Plan for North West Namibia. Windhoek: Namibia Ministry of Environment and Tourism.

Heydinger J. 2020. Humans, Livestock, and Lions in Northwest Namibia. PhD thesis. University of Minnesota/Macquarie University.

Heydinger J, Packer C, Tsaneb J. 2019. Desert-adapted lions on communal land: Surveying the costs incurred by, and perspectives of communal-area livestock owners in northwest Namibia. *Biological Conservation* 236: 496-504.

Report prepared by John Heydinger

Lion Rangers and MEFT staff patrolling for lions, Omatendeka Conservancy
Photo: M. Brassine