

A photograph of two pangolins in a nest. One pangolin is curled up on top of another, which is facing right. The pangolins have thick, overlapping scales that range in color from light tan to dark brown. They are surrounded by dry, yellowish-brown grass and twigs. The lighting is soft, highlighting the texture of the scales.

Pangolin Conservation & Research Foundation

The Pangolin Conservation and Research Foundation

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Aim: We work to ensure a sustainable future for pangolin through community engagement, capacity building conservation, research, awareness and education, and developing guidelines in southern Africa.

Registered section 21 non-profit based in Namibia with projects in Botswana, Zambia, and South Africa. 501c3 registered in the USA.



A close-up photograph of a pangolin, showing its characteristic overlapping scales. The pangolin is positioned on a mound of brown soil, and its head is lowered towards the ground. The background is a soft, out-of-focus landscape with a blue sky and greenery.

Objectives

- Supporting communities and sustainable livelihoods
 - Pangolin rangers
- Applied conservation research to inform management, guidelines and planning
 - Resident pangolins
 - Confiscated pangolins
 - Genetic traceability
- Empowering local students
 - Scholarship fund
- Education
 - Educational materials
 - School outreach
 - Fund a book for kids in communities
- Awareness raising
 - Using art and merchandise to spread awareness and support local artisans
 - Social media, public talks, articles and publications

Current & Future projects

- NUST
 - Natalie Barry - Honors Thesis
 - Tobias Kambongi - Honors Thesis
 - Kelsey Prediger - MSc Thesis
- Lund University
 - Carina Martens & Sophie Bersterman Msc Thesis
- “Home range overlap and social dynamics of ground pangolin (*Smutsia temminckii*)”
- “A study on the survival of rehabilitated pangolins confiscated from wildlife traffickers”
- 2022 NUST:
 - MSC Electrical Fencing
 - MSc Prosecutions & illegal wildlife trade
 - Honours Camera trapping feasibility
 - Honours Electrical fencing in the Kalahari: Farmer perspectives





Understanding the transboundary ecology, survival, and genetics of the Temminck's pangolin in KAZA to reduce trafficking



A study on the survival of rehabilitated pangolins
confiscated from wildlife traffickers

A close-up photograph of a pangolin's head and scales, with the text "Temminck's ground pangolin" and "*Smutsia temminckii*" overlaid in white. The pangolin is shown in profile, facing right, with its head lowered towards the ground. The scales are dark brown and have a distinct, overlapping pattern. The background is a blurred, natural outdoor setting with earthy tones.

Temminck's ground pangolin
Smutsia temminckii

Description

IUCN STATUS: Vulnerable*

(*Data deficient: population unknown)

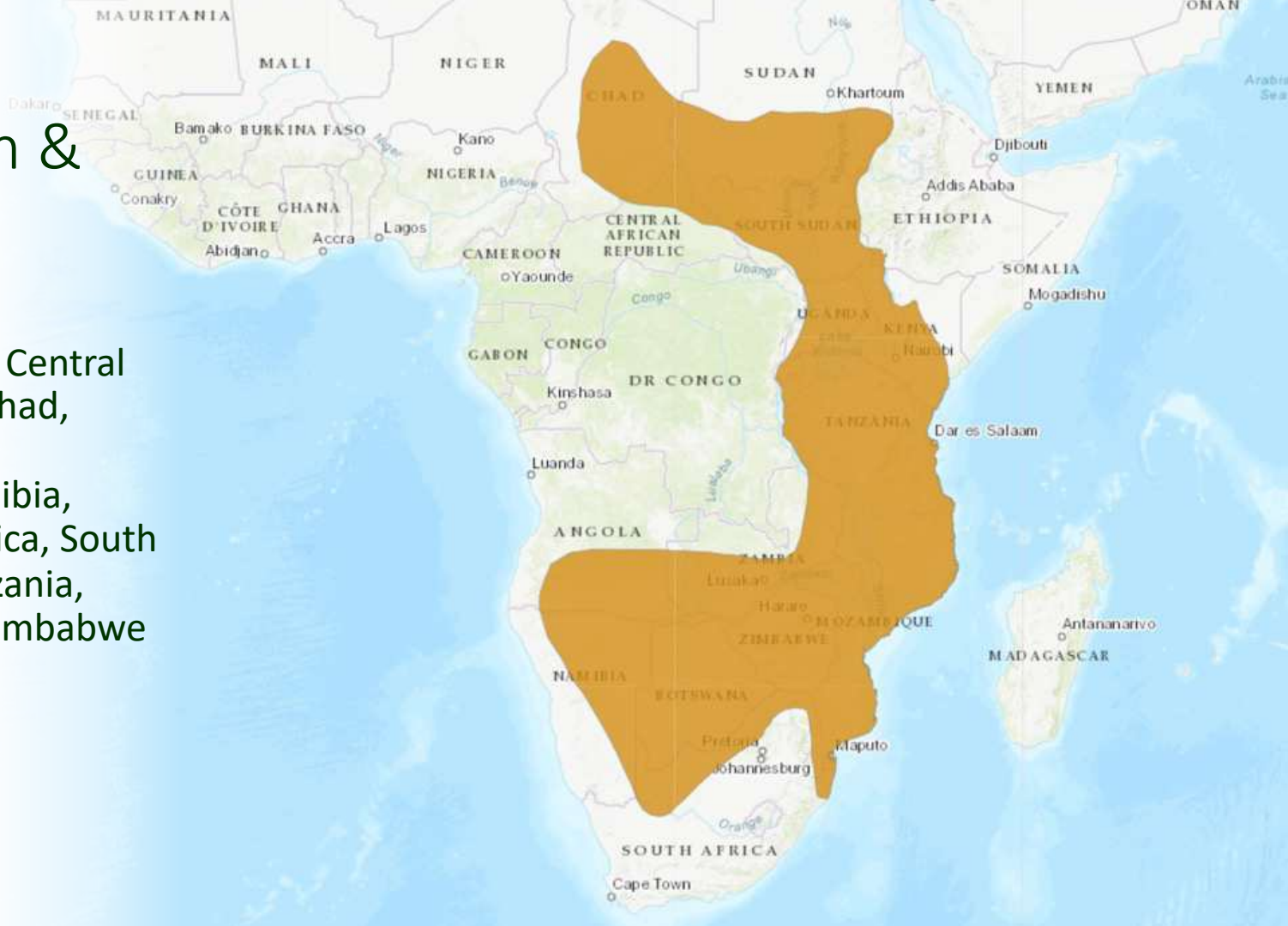
CITES STATUS: Appendix I

- Second largest species of pangolin in Africa
- Terrestrial
- Nocturnal
- Adults weigh 8-15 kg
- Males are larger than females
- Lifespan up to 15+ years
- Only African species adapted to arid environment
- Not dependent on water sources but will if available
- Take mud and dung baths



Distribution & Habitat

RANGE: Botswana, Central African Republic, Chad, Kenya, Malawi, Mozambique, Namibia, Rwanda, South Africa, South Sudan, Sudan, Tanzania, Uganda, Zambia, Zimbabwe



Habitat

- More than 250 mm annual rainfall
- Savanna
- Scrub,
- Broadleaf woodlands
- Grasslands
- Bushveld
- Rocky hills and mountains
- Sandveld



Ecology

- Prey on predominantly ants and secondly termites
- Foraging activity depending on season, weather
- Males home range (15-50 km²) usually bigger than females (2-10 km²) with a polygynous mating system overlapping multiple females
- Nocturnal, find refuge in burrows and caves during the day and forage on the ground at night
- Very few natural predators & threats



Reproduction

- One pup is born per year after a gestation period of 105-140 days
- Weight about 300-400 grams
- Pup rides on the mother's back
- They usually begin to leave the burrow at 2 months, weaned between 4-8 months, and
- Independence and dispersal from natal range around 10-12 months





Population

- Population estimates are lacking across their range
- More research on ecology to be conducted
- Current resident research projects in Kenya, Namibia, South Africa



Major threats to ground pangolin

- Trafficking & Poaching for illegal use
- Electrical fencing
 - 1 electrocution death per every 11 km of fencing annually
- Climate change and drought
 - Over 50% of study individuals died in 2019
- Vehicle accidents
- Habitat fragmentation & human interference



Pangolin poaching: Why?

- Africa
 - Bushmeat
 - Medicinal beliefs
 - Pangolin are known as “the doctor” in some cultures
 - Scales and different body parts have different uses
 - Traditional and spiritual beliefs
 - Bad omen- seen during times of drought Scales are good luck charms
- Asia
 - Traditional Chinese Medicine (TCM)
 - Scales and body parts are believed to cure hundreds of ailments
 - 2017-2019: 96,000kg of scales seized in Malaysia, Singapore, and Vietnam alone
 - Delicacy in Vietnam and China
 - Consumption is viewed as a status symbol and to show wealth in restaurant setting



Assessing local knowledge on the use, and trade of pangolins and their parts in Namibia

Honours of Natural Resource Management, April 2023

Tobias Kambongi (216007135)
Supervisors; Dr T. Nzuma (NUST),
Ms. K. Prediger (Pangolin Conservation and Research Foundation)



Aim of the study

The study aims to understand why people kill pangolins and other species at risk, and how the reasons and beliefs vary across ethnic groups in Namibia.

Study objectives

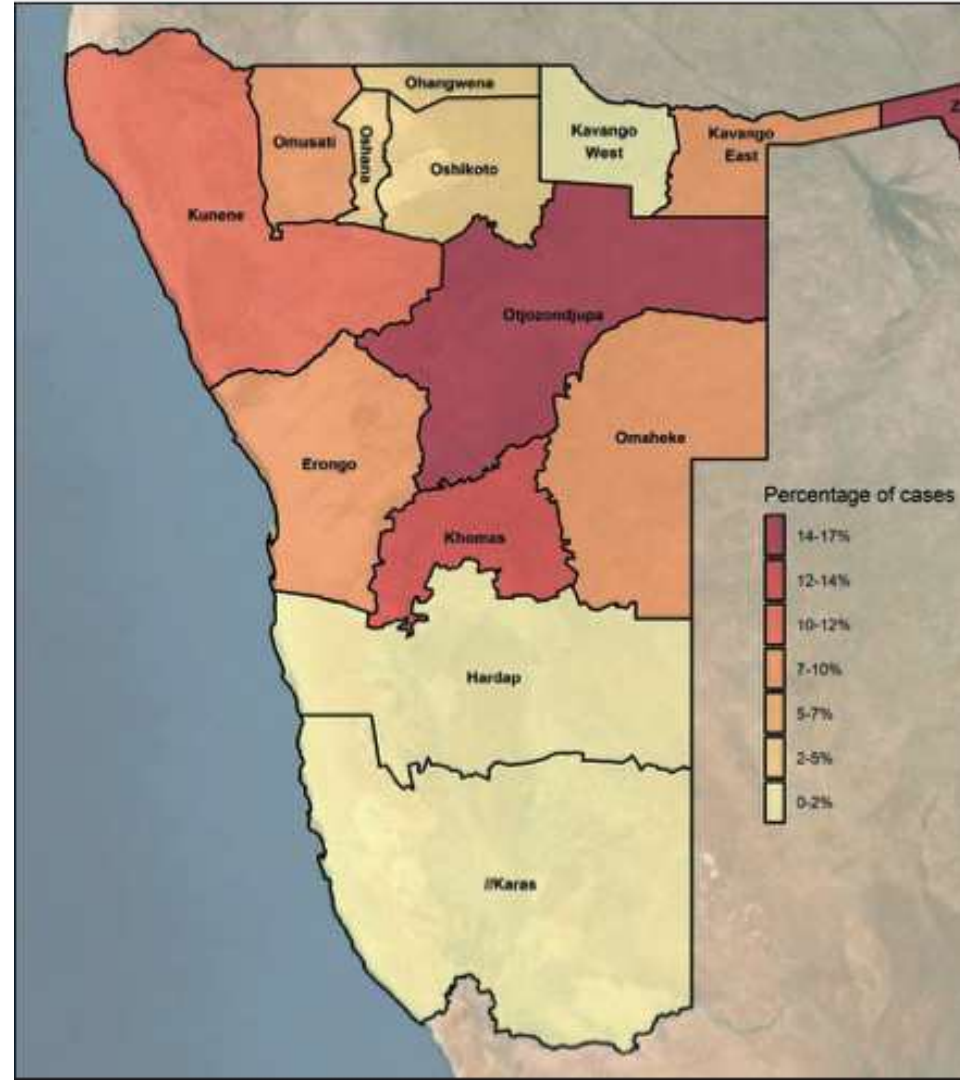
- **To determine knowledge and use differences** within and between ethnic groups and geographic regions
- **To determine the influence of culture and belief systems** on conservation of pangolins



Methodology

Study area

- Research was conducted in Namibia. Namibia is the driest country in sub-Saharan Africa with a yearly average rainfall of 100 mm in the south, 400 mm in the central regions, and around 600 mm in the northeast.
- Regions were focused on based upon the highest pangolin related crimes and ethnic groups of those geographic locations were then interviewed



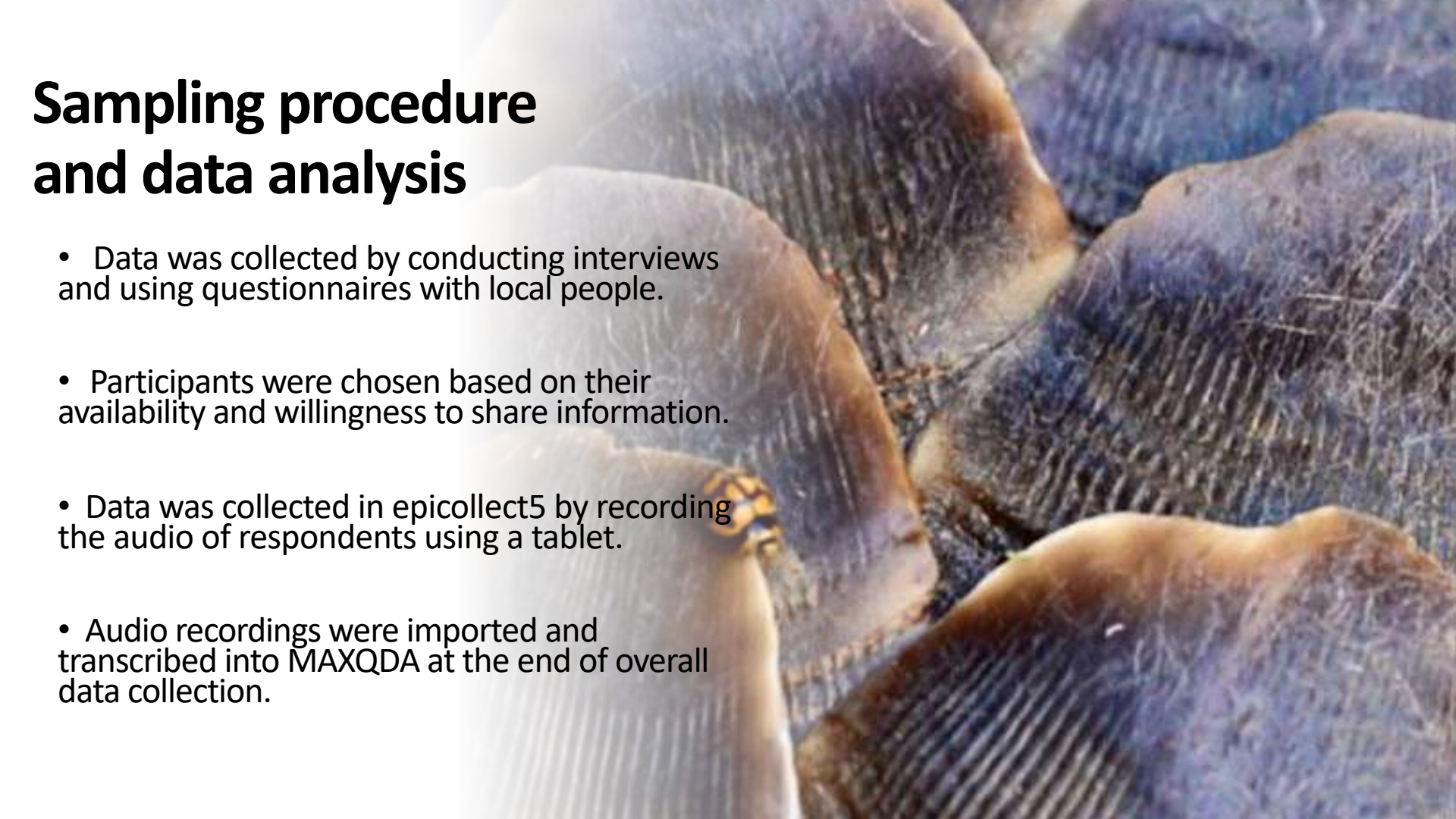
A close-up photograph of pangolin scales, showing their characteristic overlapping, diamond-shaped structure. The scales are a mix of brown and greyish-blue colors, with some showing a lighter, almost white, central area. The texture is highly detailed, with visible ridges and grooves between the scales.

Primary research questions

- What are the justifications for hunting pangolins?
- How are pangolins used locally?
- How are beliefs, uses, and knowledge about pangolins different within and across cultural groups?
- How can we put wildlife poaching to an end and promote species conservation?

Sampling procedure and data analysis

- Data was collected by conducting interviews and using questionnaires with local people.
- Participants were chosen based on their availability and willingness to share information.
- Data was collected in epicollect5 by recording the audio of respondents using a tablet.
- Audio recordings were imported and transcribed into MAXQDA at the end of overall data collection.



Sampling procedure and data analysis

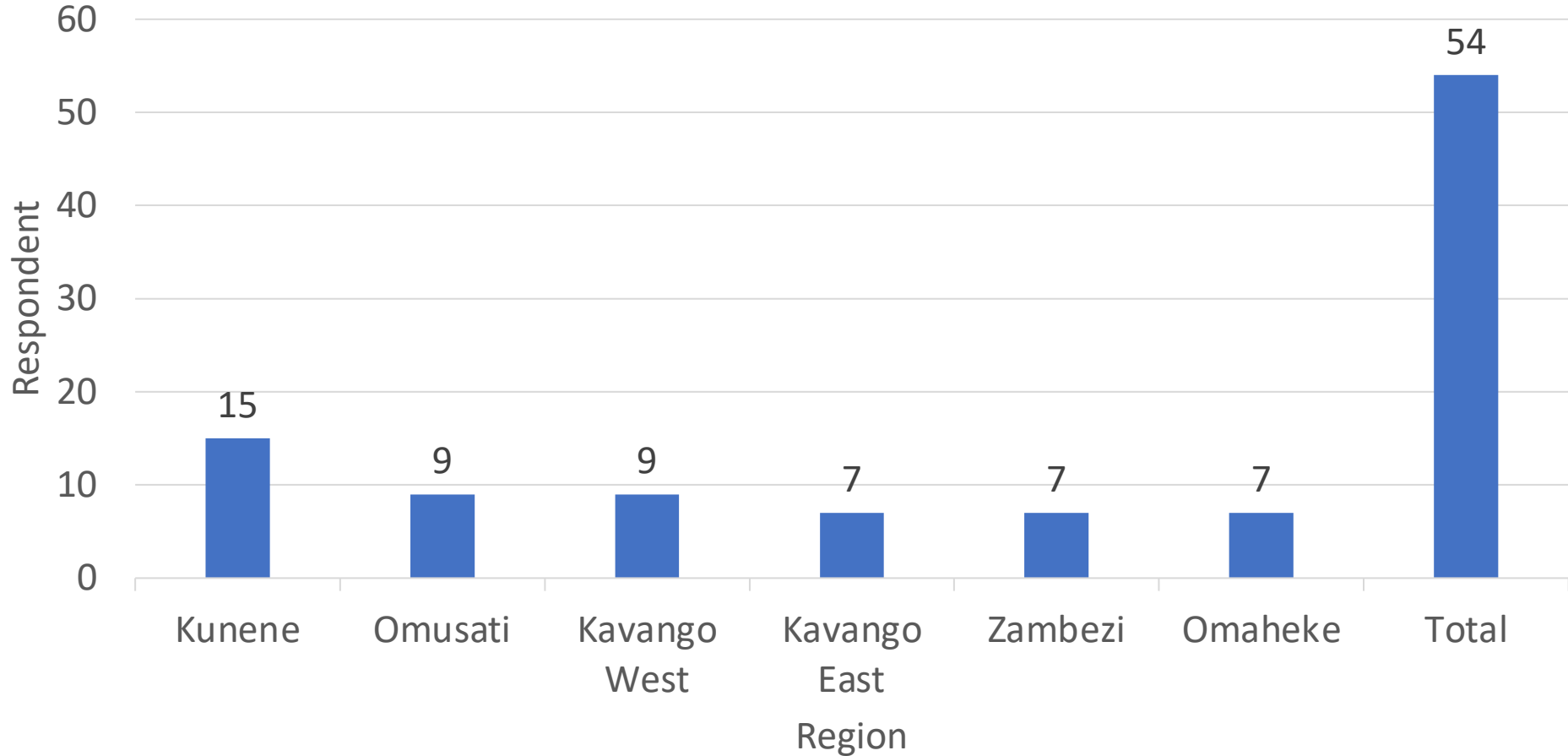
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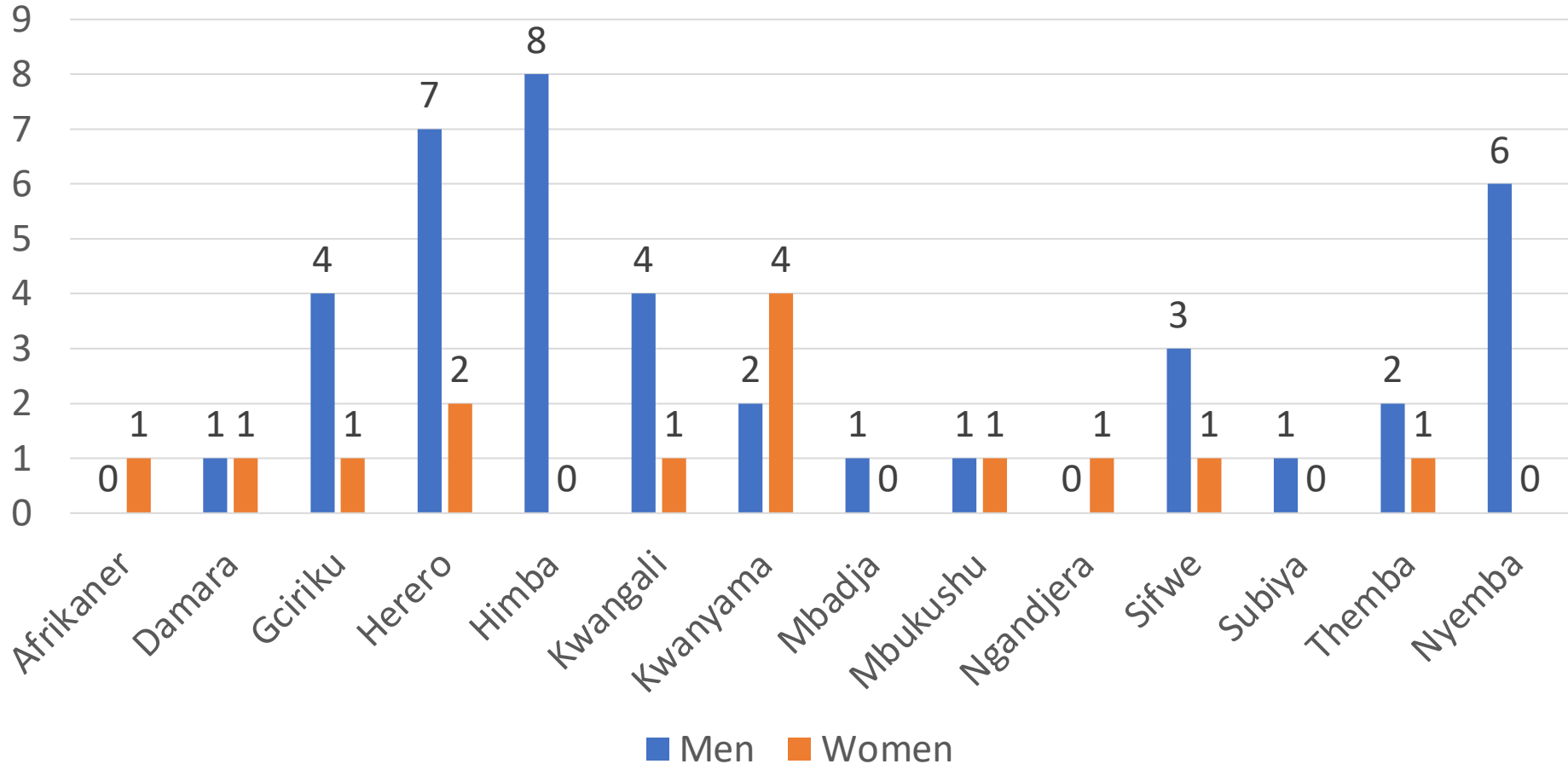
Results

- 54 people from the chosen tribal communities were interviewed in total.
- 40 men (74.1%) and 14 women (25.9%) of various ages were interviewed.
- Male respondents were more open to share information and seemed more knowledgeable about the species.
- Respondents were also assessed on their knowledge of conservation.

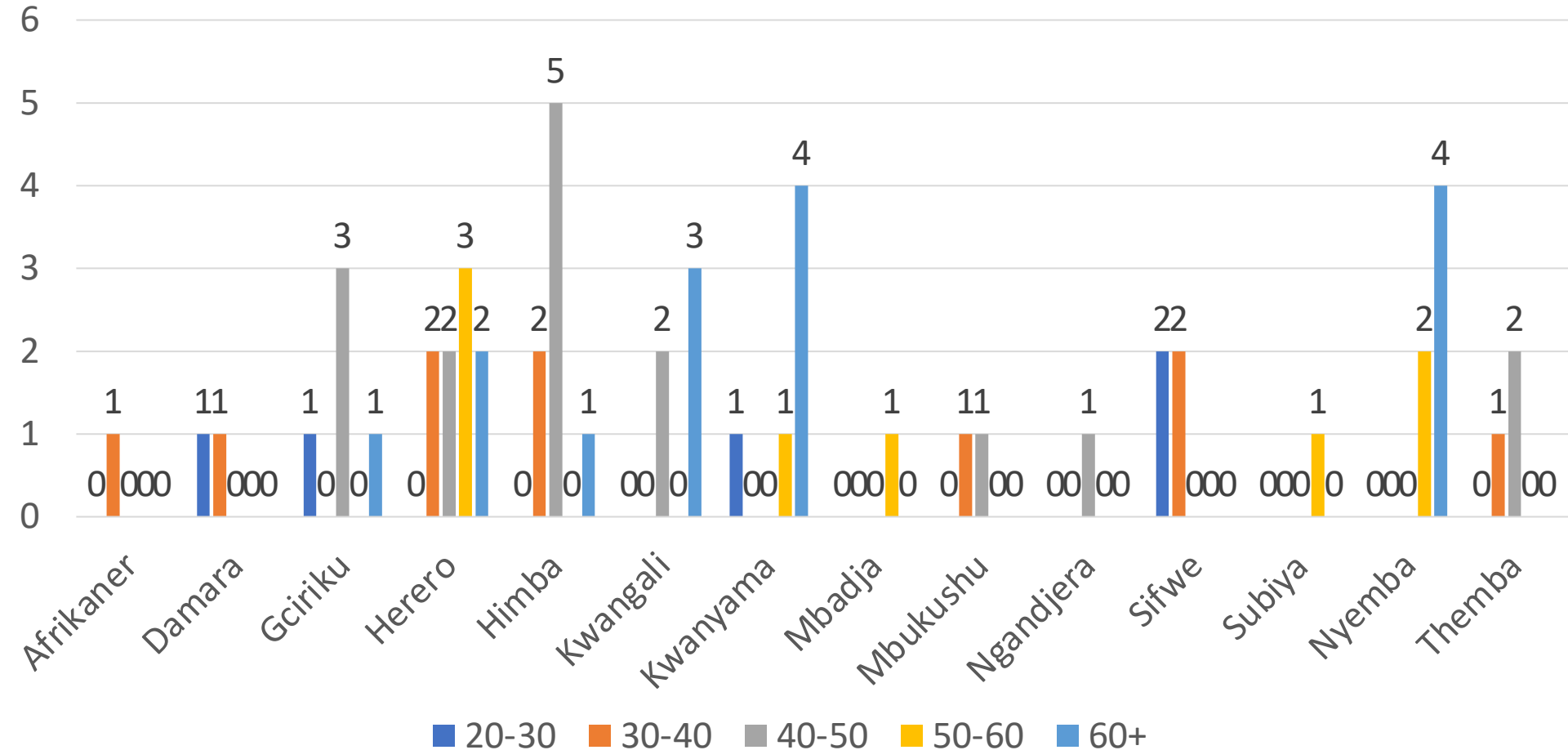
Respondents per Region



Number of Respondents per Tribe



Ages of Respondents per Tribe



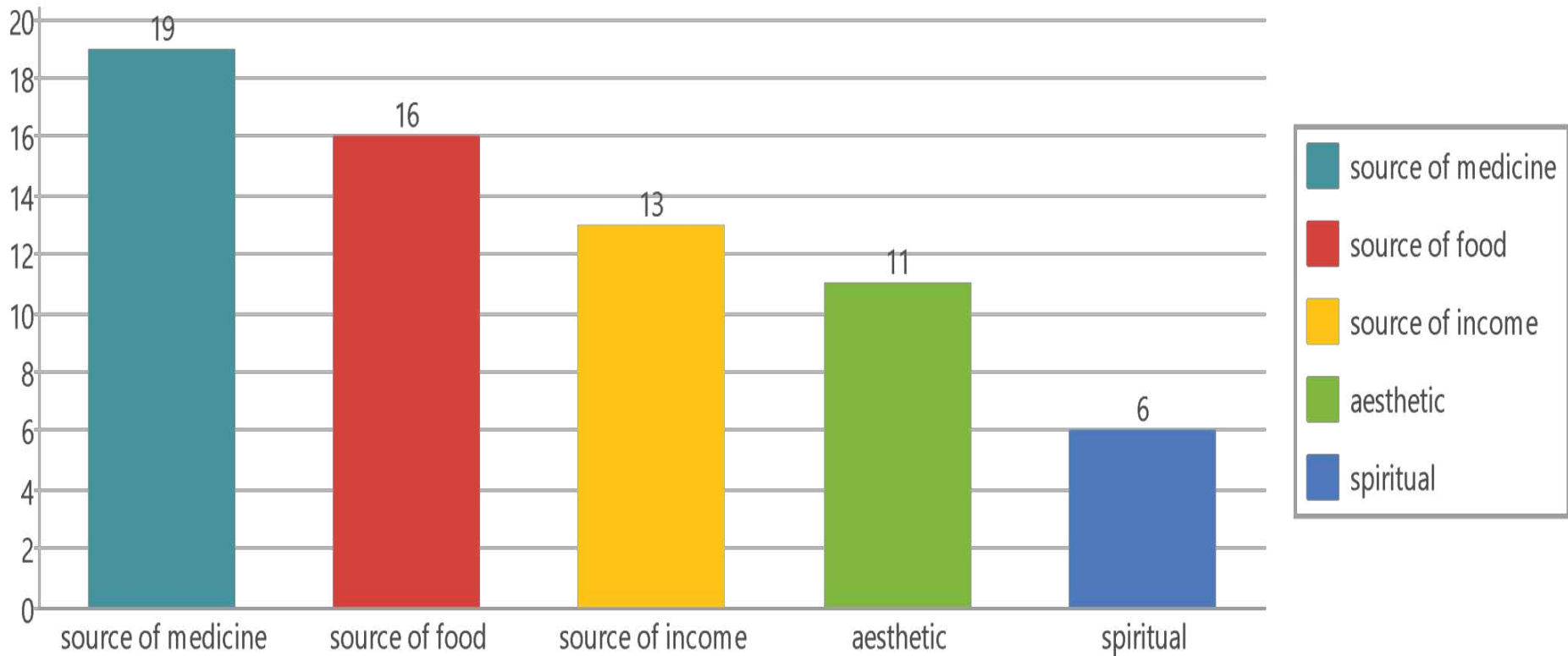


Perceived value of pangolins

- Respondents were asked about how their tribes value pangolins
- They were presented with different types of values of pangolins

Comparison of how pangolins are valued

Values of pangolins





Research Findings

- Communities reported using pangolins mostly for medicines, then followed by food
- Spiritual was reported to be the least
- Pangolins are traded for money on black markets



Cultural Perceptions

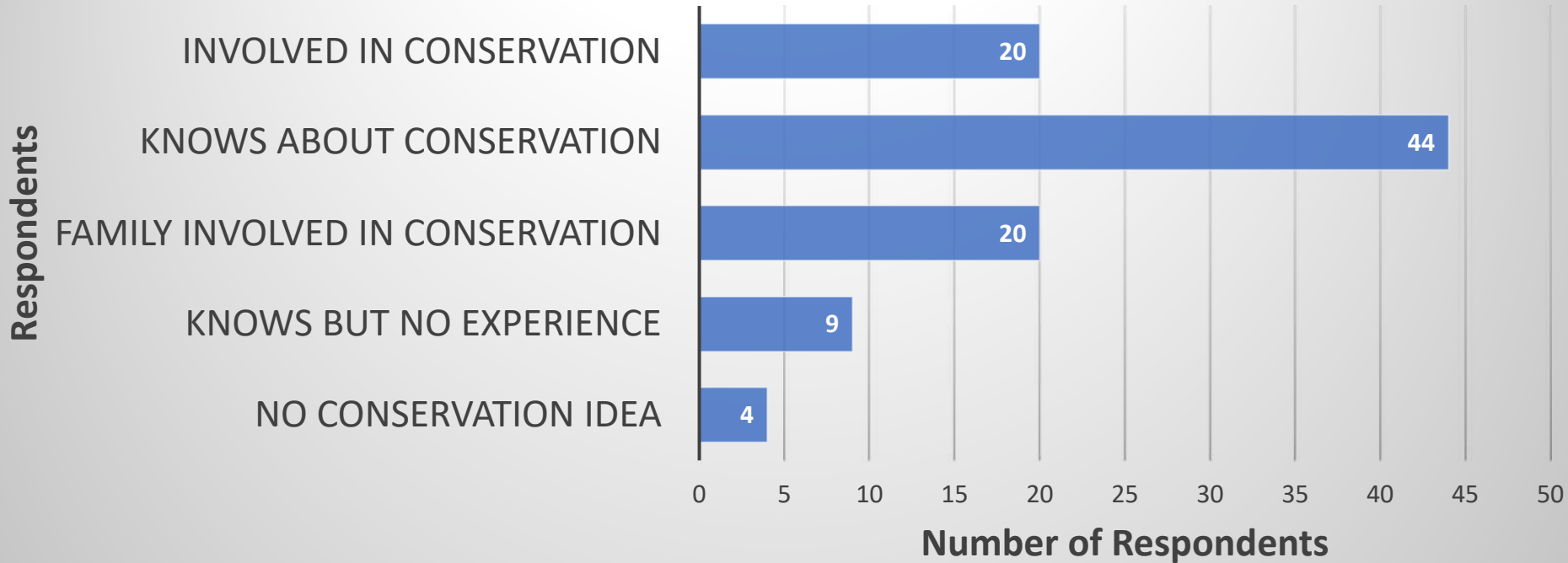
- Pangolin is widely believed to bring good luck in all cultures
- Pangolin scales are used to protect from bad winds.
- Scales are used to heal heart disease, nose bleeding, chicken pox etc.
- Pangolin scales are used to instill powers in children, also in love charms.
- Pangolin foretells a bad omen if found crying (Subiya culture).



Conservation Knowledge

- Respondents were also assessed on their understanding of conservation.

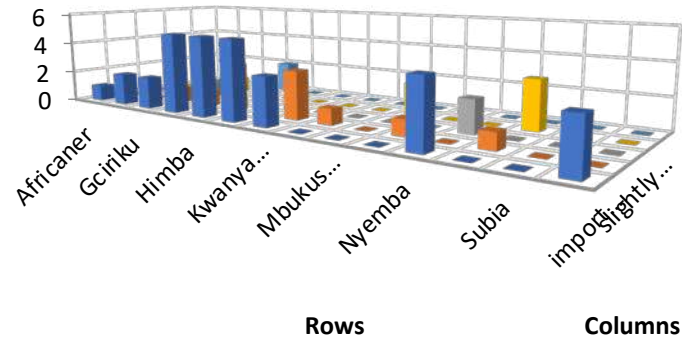
Conservation Knowledge of Respondents



Objective 1: To determine knowledge and use differences within and between ethnic groups and geographic regions.

- The Kwangali, Himba and Herero ranked high in acknowledging the importance of conserving pangolins
- Chi square results show that knowledge on the importance of conserving pangolins is significantly associated by Ethnic background $\chi^2(52)= 75.96$, $p=0.0168$

3D view of the contingency table for knowledge on the importance of conserving pangolins by ethnic background

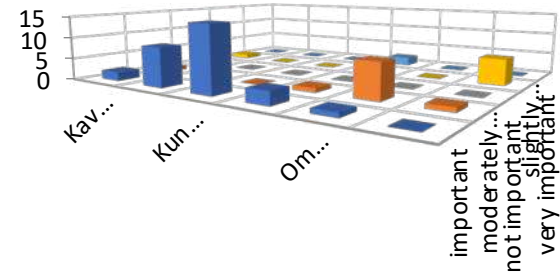


Chi-square (Observed value)	75.9616
Chi-square (Critical value)	69.8322
DF	52
p-value	0.0168
alpha	0.05

Objective 1: To determine knowledge and use differences within and between ethnic groups and geographic regions.

- Respondents in Kunene (15 -important) ranked high in acknowledging the importance of conserving pangolins, followed by Kavango West (9 – important).
- Chi square results show that knowledge on the importance of conserving pangolins is significantly associated by Region $\chi^2(20) = 104.97, p < 0.0001$

3D view of the contingency table for knowledge on the importance of conserving pangolins by region



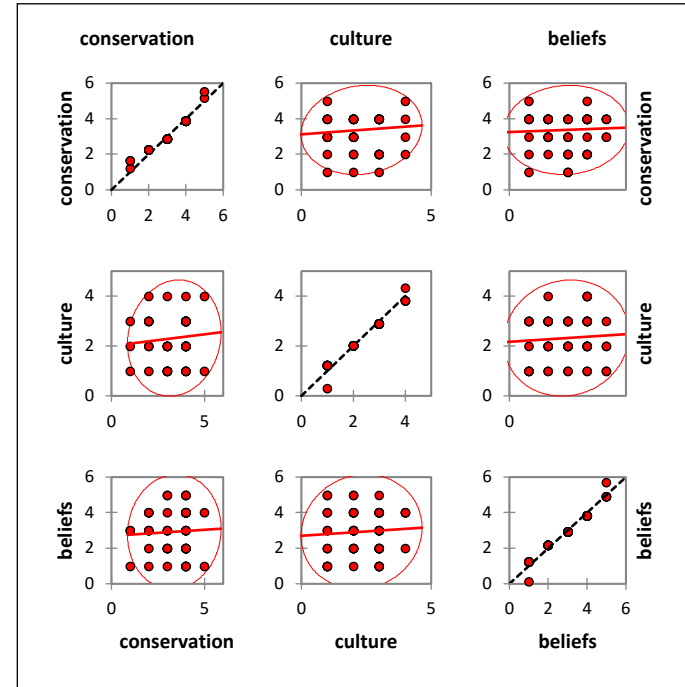
Rows

Columns

Chi-square (Observed value)	104.9701
Chi-square (Critical value)	31.4104
DF	20
p-value	< 0.0001
alpha	0.05

Objective 2: To determine the influence of culture and belief systems on conservation of pangolins.

- The Spearman rank correlation analysis was used to determine the culture, beliefs on conservations of pangolins.
- No statistically significant ($P > 0.05$) relationships were found between the 3 variables.
- However, the 3 variables showed positive relationships or influence on each other.
- This means conservation value increases as cultural value and beliefs increase. However, this relationship was statistically weak.



Coefficients of determination (R^2):

Variables	Conservation	Culture	Beliefs
Conservation	1	0.0100	0.0029
Culture	0.0100	1	0.0050
Beliefs	0.0029	0.0050	1



Conclusions

- Traditional use of animals depends on the perceived value of that animal, type of culture, and its beliefs.
- These findings are in line with recent studies pointing to the importance of pangolins for food and medicine.
- We have to work with people to understand their conservation needs in order to develop strategies for animal conservation (Baiyewu, 2018).



Recommendations

- Ethnozoological studies is needed to increase our knowledge of the cultural, economic, social, and traditional roles played by animals
- To conduct further research including other endangered species
- We have to work with people to understand their conservation needs in order to develop strategies for animal conservation
- Launch awareness campaigns tailored to each group's beliefs in order to reduce wildlife killing



Literature Review

- Over one million pangolins killed over a decade leading up to 2014 (Heath & Coulson, 1997).
- Ethnozoological survey of traditional uses of *Smutsia temminck* in South Africa (Kotze et al., 2018).
- Local knowledge and cultural use of pangolins in Cameroon (Mouafo et al., 2021).
- Ecology of pangolins in Namibia (Prediger, 2021), and nothing on the beliefs, use and trade.



References

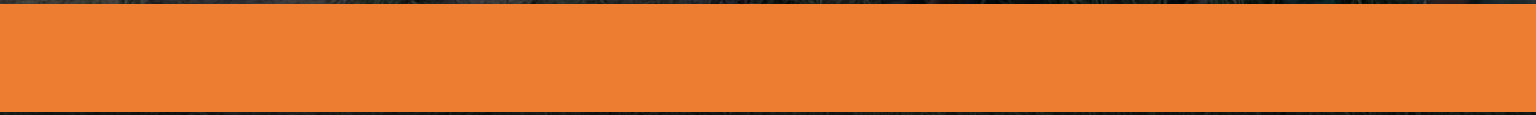
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- MEFT & MHAISS. (2020). Combatting Wildlife Crime in Namibia Annual Report 2020. 40.
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Engaging indigenous communities to save a species:
Nyae Nyae Pangolin Project



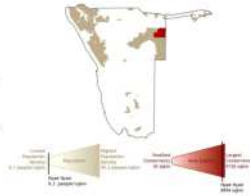
Nyae Nyae Conservancy

Meaning 'place without mountains, but rocky'
Ju/'hoansi Tribe: **the place to which you belong**

Beliefs center around protecting pangolins



- Legend**
- Settlement
 - ▲ Place of Interest
 - Border post
 - Conservancy office
 - School
 - Health facility
 - Joint Venture Lodge
 - Lodge/Campsite
 - ✚ Air field



Nyae Nyae Pangolin Project

Protect and understand pangolins in the Nyae Nyae conservancy while supporting communities through jobs and income generation



Supporting communities

- Employment: 30 full & part time rangers
- Outreach: 22 villages (out of 40)
- Awareness
- Clothes & Food drives for communities
- Additional jobs through tourism and film crew support
- Supporting local artisans





Pangolin rangers



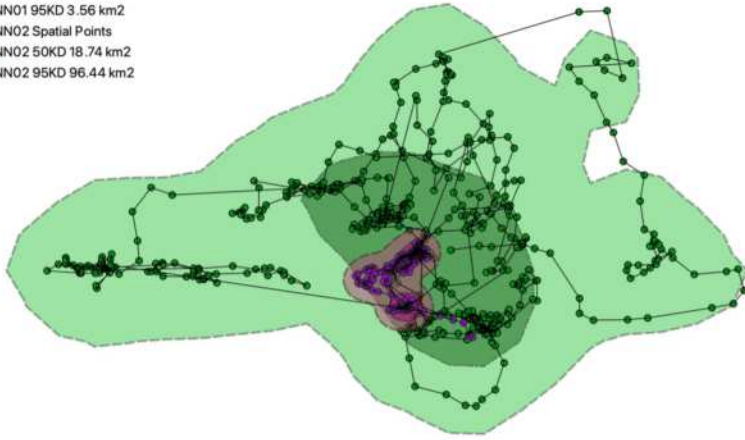
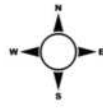
Applied Research

- Tagged 8 pangolins, 4 in 2023 alone
- Identified over 30 resident pangolins since July 2022
- First pup mortality for the area, honey badger predation
- First pangolins to be researched in semi-wetland system and open conservancy amongst villages



Legend

- NN01 Spatial Points
- NN01 50KD 0.71 km²
- NN01 95KD 3.56 km²
- NN02 Spatial Points
- NN02 50KD 18.74 km²
- NN02 95KD 96.44 km²



Applied Research

- Largest male home range identified
- First camera trapping in the area contributes to species presence
- First bat activity at burrows in Namibia
- New camera trap records, benefitting other species conservation

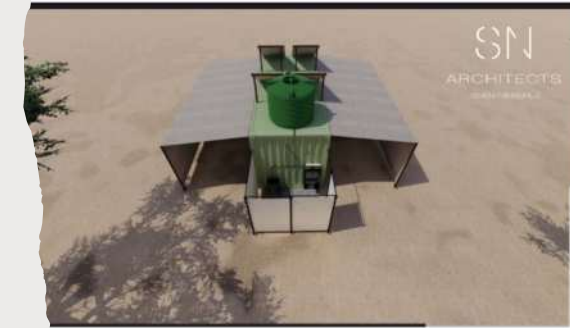


Applied
Research

- NN07 and NN08 tagged in the past 7 days!

Research Centre: The Future

- Build long term research center for pangolin research to host local and international students and professional exchanges to build baseline data for wild pangolins
- Setup network for wildlife monitoring, including other species
- Employ 40 permanent pangolin rangers to cover half of the villages



Research Centre: The Future





Research Centre Progress