

A close-up photograph of a lion's face, looking directly at the camera. The lion has a blue collar around its neck. The background is dark and out of focus.

ONGAVA RESEARCH CENTRE

ANNUAL
REPORT
2024

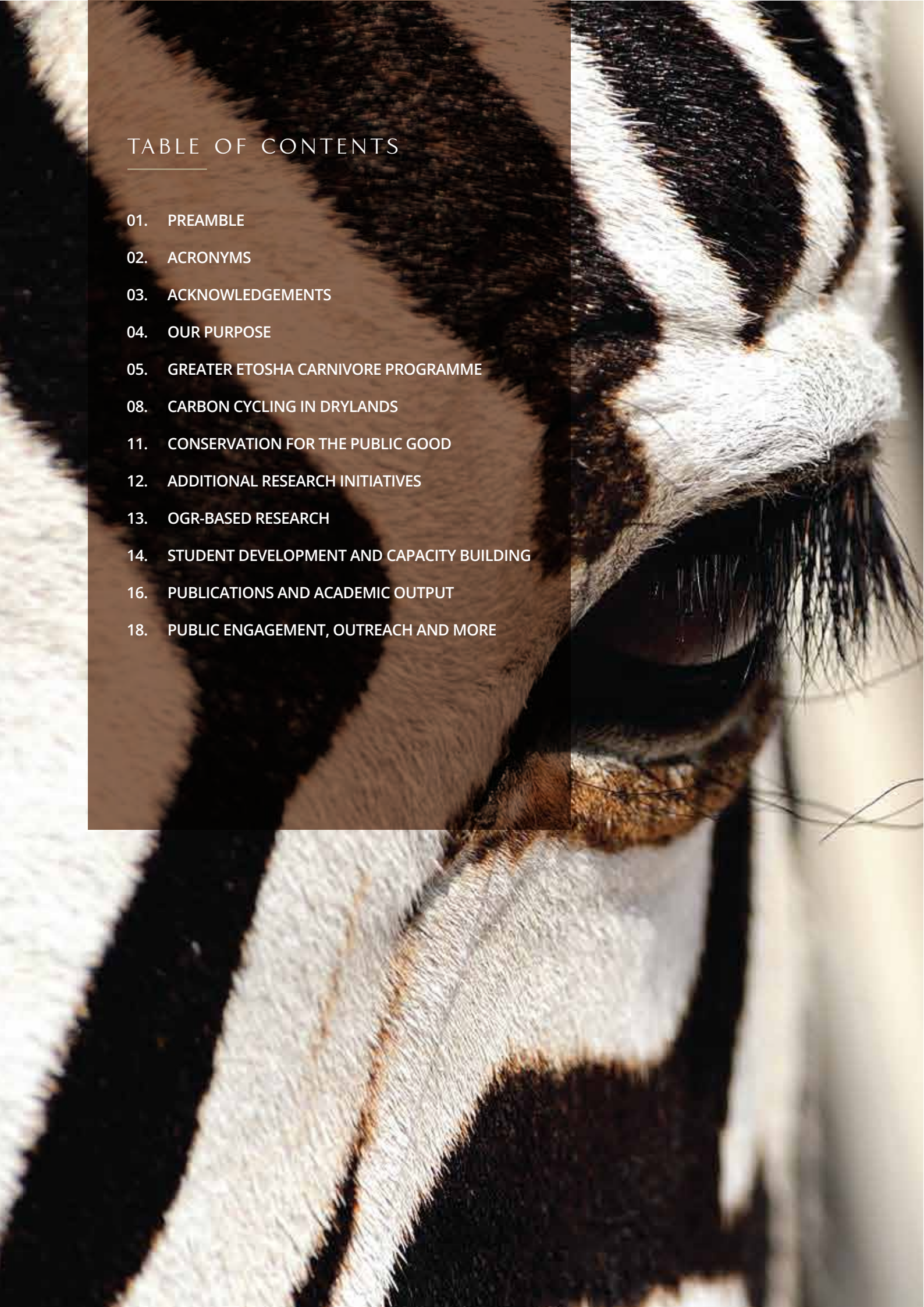
A close-up photograph of a zebra's head and neck, showing its characteristic black and white stripes. The zebra's eye is visible, looking downwards. A semi-transparent dark brown rectangular box is overlaid on the left side of the image, containing the table of contents text.

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PREAMBLE

The Ongava Research Centre (ORC) is pleased to present its Annual Report for 2024. This report outlines our key activities and achievements over the past year, reflecting our continued commitment to advancing scientific research, supporting biodiversity conservation, and promoting sustainable development in the Ongava Game Reserve and surrounding landscapes. We thank our staff, partners, and supporters for their contributions and invite you to review the progress made during this important year.

ROLF BECKER

Executive Director
20 May 2025

EXECUTIVE SUMMARY

In 2024, ORC continued to develop as a platform for dryland ecological research and conservation in Namibia. With a structured, theme-driven approach, ORC focused its efforts on three main research areas: the Greater Etosha Carnivore Programme (GECP), Carbon Cycling in Drylands, and Conservation for the Public Good.

Through the GECP, ORC coordinated collaborative studies on carnivore ecology and human-wildlife interactions across the Greater Etosha Landscape. Key activities included GPS collaring of lions and spotted hyaenas, a large-scale playback survey, camera trap monitoring, and research into fence-crossing behaviour and non-lethal deterrents. Additional studies addressed carnivore diets, gut microbiomes, habitat use, and coexistence with people. A citizen science initiative gathered photographic data on cheetahs and leopards to support species identification and population estimates. The Carbon Cycling programme expanded work on above- and below-ground carbon storage, vegetation dynamics, and soil microbial activity. Research highlighted the potential of indigenous succulents for climate-smart agriculture, with ongoing biogas trials and restoration-focused studies. ORC also contributed unique data to the international Soil Ecology and Carbon Observation (SECO) network, which aims to resolve current and future carbon dynamics of the dry tropics.

Under the theme of Conservation for the Public Good, ORC initiated projects on conservation and socio-ecological outcomes. Passive acoustic monitoring of bird communities in different land use settings added a new dimension to ecosystem assessment.



Seventeen postgraduate students, including nine Namibians, were supported in 2024. ORC's collaborations with national and international partners produced several scientific publications and presentations, while strengthening research capacity in Namibia. Public engagement efforts included a new website, upgraded displays at the Discovery Centre, and a growing seminar series. ORC also hosted its first international writing symposium, aimed at producing a high-level synthesis on African dryland ecology for publication.

Looking ahead to 2025, ORC will continue to deepen its research, expand student involvement, and support science-based conservation in Namibia's drylands.

ACRONYMS

CAM	Crassulacean Acid Metabolism
EI	Etosha Ecological Institute
ENP	Etosha National Park
GEL	Greater Etosha Landscape
GECP	Greater Etosha Carnivore Programme
MEFT	Ministry of Environment, Forestry and Tourism
NCE	Namibian Chamber of Environment
NJE	Namibian Journal of Environment
NUST	Namibia University of Science and Technology
OGR	Ongava Game Reserve
ORC	Ongava Research Centre
SECO	Soil Ecology and Carbon Observation
UGA	University of Georgia
UNAM	University of Namibia



ACKNOWLEDGEMENTS



We extend our heartfelt gratitude to John McFadden and Lisa Kabnick, as well as to the Ongava Game Reserve (OGR), for their generous financial contributions. Your support is indispensable to the operation of the Ongava Research Centre (ORC); without it our work would not be possible.

Additional funding has been gratefully received from Paul Maritz, the Namibian Chamber of Environment (NCE), Nedbank's Go Green Fund, the University of Edinburgh, and the University of Georgia (UGA). ORC further extends its sincere thanks to all partners, collaborators, and donors whose support was instrumental to our progress throughout 2024. We are especially grateful to the Ministry of Environment, Forestry and Tourism (MEFT) of Namibia, the Etosha Ecological Institute (EEI), the Namibia University of Science and Technology (NUST), the University of Namibia (UNAM), the University of Edinburgh, and the UGA for their ongoing collaboration. We also wish to thank OGR, the NCE, Wilderness, and the African Wildlife Conservation Trust for their continued partnership. Our appreciation further extends to the Leibniz Institute for Zoo and Wildlife Research, and other institutions and individuals who have contributed to our mission.

OUR PURPOSE

ORC was established to promote knowledge production and dissemination in the realms of conservation and ecology.

OUR STRATEGIC OBJECTIVES

1 Advancing knowledge of dryland ecosystem functioning and management.

2 Empowering young Namibian scientists by building local capacity through training and research opportunities.

In line with this mission, ORC has undergone significant transformation over the last two years, shifting its focus from stand-alone research projects to addressing critical aspects of dryland ecology. Understanding the unique dynamics of drylands is essential to developing effective management strategies for dryland ecosystems. Currently, ORC's research is organised under three broad themes, each encompassing multiple projects designed to answer specific questions: Greater Etosha Carnivore Programme (GECP); Carbon Cycling in Drylands; Conservation for the Public Good. Each of these primary themes includes several smaller, focused research projects with defined objectives.

BOARD OF DIRECTORS

Mr. Tony Christopher (South Africa) | Chairperson

Dr. Chris Brown (Namibia)

Dr. Michelle Gadd (USA)

Mr. John McFadden (USA)

Dr. Martin Hipondoka (Namibia)

Dr. John Mendelson (Namibia)

PERSONNEL

Executive Director: Dr. Rolf Becker

Scientist: Dr. Stéphanie Périquet-Pearce

Scientist and Liaison Officer: Dr. Frowin Becker

Technician: Simeon Naholo

Maintenance Manager: Fillipus Manase

Administrative Coordinator: Elizabeth Shangano

Hospitality Coordinator: Hileni Mupopiwa

General Worker: Albertu Alfeus

Additionally, ORC employed two short-term field technicians/research assistants and prospective postgraduate students, Victoria Mulyuu and Mburaje Keja, to support ongoing PhD projects and general activities.

RESEARCH FELLOWS

Dr. Rebecca Dannock (Australia)

Prof. Vera De Cauwer (Namibia)

Dr. John Mendelson (Namibia)

Dr. Jeff Muntifering (Namibia)

Dr. Ken Stratford (South Africa)

Prof. Heather Throop (USA)

Prof. Theo Wassenaar (Namibia)

RESEARCH ASSOCIATES

Prof. James Beasley (USA)

Etosha Ecological Institute (Namibia)

Dr. Martin Hipondoka (Namibia)

Prof. Ralph Kühn (Germany)

Mr. Kenneth Uiseb (Namibia)

Prof. Barbara van Asch (South Africa)

Dr. Cornelis van der Waal (Namibia)

The Walter Family (USA)

GREATER ETOSHA CARNIVORE PROGRAMME



The GECP aims to establish collaborative partnerships among researchers studying the social and ecological aspects of carnivores across the Greater Etosha Landscape (GEL). This multidisciplinary initiative takes a holistic approach to match the complexity of the landscape and its carnivore diversity. Projects range from studying behaviour, genetics, diseases, and ecological relationships of specific carnivore species to exploring predator-prey dynamics and human-carnivore interactions beyond park boundaries to promote coexistence. ORC's main role in this major programme concerns its administrative and logistic coordination, research direction and sample storage. Herewith some of the highlights of ORC-led activities in 2024. Partners include the EEI (Namibia), MEFT (Namibia), UGA (USA), Leibniz Institute for Zoo and Wildlife Research (Germany), University of Ljubljana (Slovenia), NUST (Namibia), UNAM (Namibia), and the Namibian Lion Trust (Namibia).

COLLARING AND BIOLOGICAL SAMPLING

In 2024, the ORC-UGA team conducted four collaring exercises in Etosha National Park (ENP), deploying satellite radio collars on five lions and 13 spotted hyaenas, bringing the total active lion collars to six and spotted hyaena collars to 13 as some of the collars previously deployed reach the end of their battery life and dropped off the animals.

The team collected biological samples from 19 individuals (five lions and 14 spotted hyaenas), including hairs, whiskers, faeces, ectoparasites, and blood, which were processed at the ORC laboratory.

PLAYBACK SURVEY OF CARNIVORES IN THE GREATER ETOSHA LANDSCAPE

Over 6 nights in September 2024, ORC coordinated 6 teams composed of our partners in the GECP to conduct a large-scale playback survey in the GEL. Other stakeholders in the GEL, such as the Onguma and Etosha Heights game reserves, joined our effort and conducted the survey on their properties. This survey was designed as an improved follow-up on surveys conducted in 2010, 2014 and 2018 in Etosha to estimate lion population size in the park. We refined the methodology and expanded our monitoring to spotted hyaenas and black-backed jackals. We surveyed 112 stations across the GEL, including 20 outside of ENP and counted 96 lions, 183 spotted hyaenas and 252 black-backed jackals. Brown hyaenas, cheetahs and leopards were also observed during the survey. The survey received financial support from the NCE, Wilderness and the African Wildlife Conservation Trust. We are grateful for their kind support.

ANTHROPOGENIC MORTALITY RISK OF LIONS AND SPOTTED HYAENAS

The Human-Carnivore Coexistence Project examines human-caused mortality risks for lions, a significant factor in global carnivore population declines. Using data from the Greater Etosha Landscape (GEL), we analyse various factors influencing human-lion conflicts and create a mortality risk map.

ETOSHA CAMERA TRAP GRID

The full grid composed of 81 camera traps has been functional since the end of January 2022. The grid is serviced roughly every 6-7 weeks, requiring about 6 full days of fieldwork and 2,500 km of driving.

In 2024 alone, a total of approximately 3,128,000 images were recorded by the camera grid. These images will be utilised to understand the spatio-temporal distribution of predators and their prey, model the occupancy of medium and small carnivore species, and contribute to our leopard and cheetah's citizen science survey in 2024-2025. Additionally, they will be used in collaboration with other research teams focusing on specific species such as giraffes or zebras for population size and dynamic monitoring.

CITIZEN SCIENCE SURVEY OF LEOPARDS AND CHEETAHS IN ETOSHA NATIONAL PARK

In 2022–2023, ORC ran pilot citizen science surveys on cheetahs and leopards in ENP, and in June 2024 launched a full survey led by MSc student Mburaje Keja, who collects and analyses visitor-submitted photos, social media content, and camera trap data.



FENCES, LAND USE AND WILDLIFE CROSSINGS

Initiated in 2022, the Etosha Fence Project monitored 84 wildlife fence breaks across five sites representing three land use types: game reserves (Onguma and Ongava), communal conservancies (King Nehale and Ehi-Rovipuka), and a livestock farm (Stillerus), using 47 camera traps until April 2024. The study aimed to understand how land use, fence structure, and environmental factors affect wildlife movement between Etosha National Park (ENP) and surrounding landscapes.



Carnivores crossed most often during the wet season near game reserves, with electrified fences significantly reducing crossings by large and medium carnivores. Ungulates crossed mainly during the hot dry season into game reserves, with larger species preferring large, unmeshed breaks, while smaller ungulates and burrowing species were unaffected by fence structure. These findings support more informed, site-specific management strategies, and a manuscript is in preparation for 2025.

SCENT REPELLENT STUDY

Building on findings from the Etosha Fence Project, Brennan Peterson-Wood's MSc study tested the effectiveness of a leopard urine-derived chemical scent in deterring carnivores from crossing 40 fence breaks across three land use types during the 2024 dry season. Early results show that land use influenced the chemical's effectiveness, with cheetah and spotted hyaena showing the greatest reduction in crossings, highlighting the potential of this low-cost, non-lethal method for carnivore management in southern Africa.

CARNIVORE RESOURCE SELECTION IN AN ARID ENVIRONMENT

Lions and spotted hyaenas in Etosha National Park strongly select habitats near water, particularly in the dry season when prey are concentrated at waterholes. Using GPS data from 49 individuals collared between 2016 and 2021, Maddie Melton found that water availability influenced movements more than vegetation. Hyaenas preferred woody areas during the day and open areas at night, while the time of day had little effect on lions. These findings support conservation planning in arid regions facing climate change and human pressure. Further analyses and two manuscripts are in progress.

CARNIVORE DIETS ACROSS THE GEL

To enhance our understanding of carnivore diets across different habitats in the GEL, including the ENP, other protected areas, farmlands, and community conservancies, we had collected close to 300 carnivore scat samples by the end of 2023. These have been shipped to the USA and have undergone DNA metabarcoding analyses to identify the prey species they contain and confirm the predator species. Currently, the University of Northern Michigan master's student, Laura Peirson, is completing taxonomic classification of the prey species.

COVARIATION IN MAMMALIAN MICROBIOMES

In collaboration with Werner Kilian, Jim Beasley, and Diana Lafferty, we are investigating the gut microbiome of Etosha's mammals to understand how environmental conditions, species identity, and foraging strategies influence microbial diversity. Faecal samples were collected from a range of herbivores across Etosha's rainfall gradient, and additional samples are being gathered from GPS-collared carnivores. Two master's students from the University of Northern Michigan, Rylee Jensen and Laura Peirson, are assisting with this work. While carnivore analyses continue, two manuscripts on herbivore microbiomes are in preparation, focusing on interspecific variation and the influence of phylogeny on gut microbial diversity.



CARBON CYCLING IN DRYLANDS



Carbon cycling, the movement of carbon through the atmosphere, biosphere, lithosphere, and hydrosphere, is fundamental to regulating Earth's climate and sustaining life. Drylands, which cover more than 40 percent of the Earth's land surface, play a significant but often overlooked role in global carbon dynamics due to their low but extensive biomass, episodic rainfall, and complex soil-plant interactions. Despite their importance, carbon cycling in drylands remains underexplored, leaving major gaps in our understanding of how these systems contribute to carbon storage and respond to environmental change. ORC is well positioned to advance research in this field. Its setting within a relatively undisturbed arid savanna ecosystem provides a valuable natural laboratory for studying carbon fluxes in vegetation, soils, and microbial communities. By generating empirical data in this context, ORC can help fill critical knowledge gaps and support the development of more accurate climate models and more effective land management and restoration strategies.

Collaborators include NUST (Namibia), University of Edinburgh (UK), Arizona State University (USA), University of Pretoria (South Africa), and Oxford University (UK), who work with staff and ORC associated students to drive this initiative forward.

INDIGENOUS SUCCULENT CULTIVATION FOR CLIMATE MITIGATION

In 2024, ORC-supported research which explored the potential of indigenous succulent species in Namibia as a sustainable and climate-resilient alternative for carbon capture. Unlike conventional bioenergy crops which often demand high water and land inputs and compete with food production-native succulents thrive in arid environments with minimal ecological impact.

Namibia's arid to semi-arid climate, vast uncultivated lands, and prevalence of native Crassulacean Acid Metabolism (CAM) plant species make it an ideal landscape to pioneer succulent-based agronomy.

However, despite their ecological promise, little is currently known about the agronomy or photosynthetic performance of local CAM species. Most native species remain untested for cultivation viability.

A comparative study assessed rooting and growth success across indigenous and non-indigenous succulent species. Among indigenous species, *Kleinia longiflora* showed the highest vertical growth, while *Euphorbia mauritanica* exhibited the greatest horizontal expansion. However, species like *Portulacaria afra* and *Euphorbia tirucalli*, though used internationally suffered significant frost damage, highlighting climatic limitations for some non-native species.

Overall, the research underlines Namibia's strong potential to develop a climate-adaptive, low-impact agronomy centred on native succulents. Further investigations will focus on optimizing propagation methods and understanding growth dynamics under projected warming scenarios.

CLIMATE-SMART INNOVATION FOR ARID AGRICULTURE

In 2024, ORC and its partners advanced the Succulent Bio-Economy Project, which explores the untapped potential of Namibia's indigenous, hyper-water-efficient succulent plants as a foundation for climate-smart agriculture. These species offer a promising pathway for restoring degraded rangelands, sequestering carbon, producing renewable energy via biogas, and serving as alternative livestock fodder. A commercial small-scale biogas unit was procured and installed at NUST in Windhoek to demonstrate biogas production from succulent biomass.

This 'proof of concept' marks a critical step toward evaluating the viability of large-scale domestic use in Namibia. The project, led between April and July 2024 by Absalom Shitalangaho, an MSc student at NUST, also highlights the challenge of managing invasive non-native cacti. These species, often difficult to eradicate due to their rooting ability, can instead be repurposed as input for bio-digesters. Namibia's native succulents (naturally drought-adapted) and non-invasive present a sustainable alternative, positioning the country at the forefront of innovative, low-impact land-use models. Demonstration sessions are available for interested stakeholders and partners.

OTHER ONGOING PROJECTS CONTRIBUTING TO THE CARBON SEQUESTRATION THEME

In addition to its core research programmes, ORC supports a number of complementary projects that collectively enhance understanding of carbon sequestration processes in dryland ecosystems. These projects address a range of biological, ecological, and environmental factors influencing carbon storage, with the aim of generating applied knowledge to support land management, ecosystem restoration, and climate change mitigation.

ABOVE- AND BELOW-GROUND CARBON SEQUESTRATION IN PLANT BIOMASS

This project quantifies the carbon stored in the above-ground parts of plants, such as stems and leaves, as well as in the root systems below the soil surface. These measurements provide a baseline for assessing the role of vegetation in long-term carbon storage and ecosystem resilience under changing environmental conditions.

MONITORING LEAF PHENOLOGY USING REMOTE CAMERAS TO ASSESS ENVIRONMENTAL IMPACTS

Using time-lapse remote cameras, this project tracks seasonal changes in leaf development and shedding. The data help evaluate how environmental fluctuations, including rainfall and temperature variation, influence plant growth cycles and associated carbon uptake.

CONDUCTING REGENERATION STUDIES OF TREE SPECIES ON OGR

This study investigates the natural regeneration of woody species across different habitats and soil types. The findings support efforts to maintain or restore tree populations, which are essential for sustaining biomass and improving the long-term carbon balance of the reserve.

QUANTIFYING CARBON SEQUESTRATION IN SELECTED TREE SPECIES

By estimating species-specific rates of carbon accumulation, this project evaluates the potential of various indigenous tree species to contribute to climate change mitigation. The results inform priority setting for conservation, reforestation, and land-use planning.

DETERMINING WOOD DENSITY IN INDIGENOUS TREE SPECIES

Wood density is a key parameter for estimating biomass and carbon content. This project involves sampling and measuring the wood of local species to refine biomass estimation models suited to the conditions of southern African drylands.

EXAMINING LITTER DEGRADATION CONTRIBUTIONS TO CARBON CYCLING

This project explores how decomposing plant litter contributes to the cycling of carbon in soil. By measuring decomposition rates and examining influencing factors, the study improves understanding of organic matter dynamics and nutrient availability.

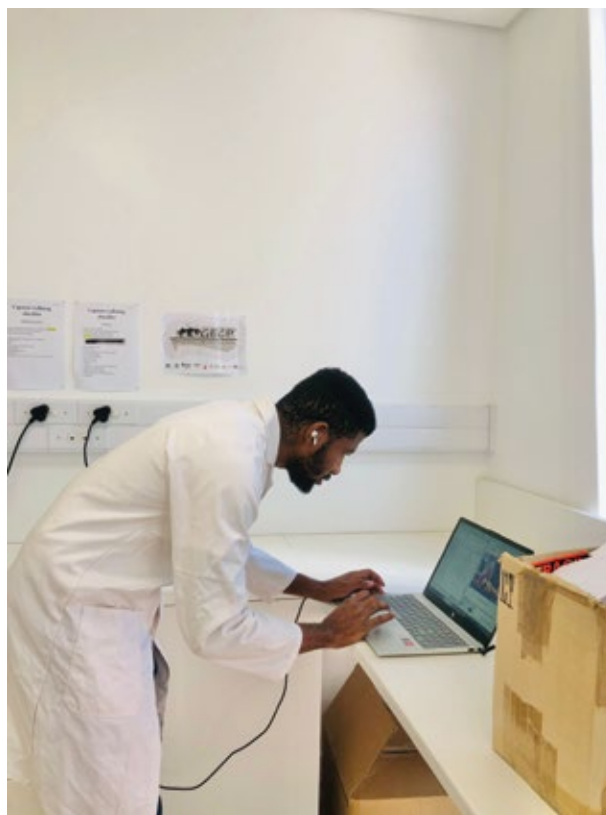
IDENTIFYING NEW CAM-PHOTOSYNTHESIS SPECIES IN NAMIBIAN SUCCULENTS

This project identifies additional species that use CAM, a photosynthetic adaptation that enhances water-use efficiency. It seeks to improve understanding of how succulent plants contribute to carbon fixation in arid environments and their potential applications in climate-resilient restoration.

ANALYSING SOIL MICROBIAL COMMUNITY COMPOSITIONS IN DRYLAND ECOSYSTEMS

This study characterises the microbial diversity and functional profiles in soils across OGR. Microbes play a critical role in organic matter breakdown and nutrient cycling, and the project aims to clarify how they influence carbon dynamics in dryland soils.

ORC is also an active participant in the Soil Ecology and Carbon Observation (SECO) Project, an international research initiative that investigates soil carbon processes across diverse ecosystems worldwide. ORC contributes unique data from arid and semi-arid landscapes that are often underrepresented in global carbon assessments. This collaboration underscores the Centre's scientific relevance and reinforces its role in addressing pressing ecological challenges through rigorous, globally connected research.



CONSERVATION FOR THE PUBLIC GOOD



In early 2024, ORC launched a pilot study looking at conservation and land ownership equality on privately owned farmland in Namibia. This study represents the trigger for a larger project assessing how the link between conservation and public welfare is conceptualised on freehold land in Namibia. This socio-ecological project is set to be launched in late 2025 and will be carried out with partners from the University of Leeds and UNAM. In June, Dr. Frowin Becker had the opportunity to present the pilot study at the conference of the Political Ecology Network (POLLEN) in Dodoma, Tanzania.

BIRDS AND LAND-USE STUDY

From August to November 2024, field work was conducted for a pilot project on bird functional traits and land use, and how this can be used as an ecological monitoring tool.

This involved deploying acoustic recorders across three different land use types: Ongava Game Reserve (private game reserve), Farm Burgershof (transitional), and Farm Vierling (mixed land use). In collaboration with Dr. Connor Wood from Cornell University's K. Lisa Centre for Conservation Bioacoustics, the study aims to use common bird species to investigate ecosystem responses to varying land use types. As part of the African Bioacoustics Community (ABC), Dr. Frowin Becker was invited to the ABC's conference in Cape Town, South Africa to join a panel on career development in bioacoustics on the African continent.

ADDITIONAL RESEARCH INITIATIVES

In addition to its core research programmes, ORC supports a range of independent and collaborative projects that expand the Centre's contribution to biodiversity science, ecological monitoring, and conservation management. These initiatives are conducted both on OGR and in broader regional contexts, often in collaboration with academic partners and postgraduate researchers.

REVIEW OF HIGHLAND ENDEMICIS OF ANGOLA AND NAMIBIA

This long-term project seeks to improve knowledge of plant and animal species endemic to the highlands of southwestern Africa. The project includes field surveys, taxonomic reviews, and habitat assessments to support conservation planning in these understudied but biologically important regions.

ROCK HYRAX VOCALISATIONS

This research investigates the population dynamics, dietary preferences, and vocal behaviour of the rock hyrax (*Procavia capensis*) in Namibia's highlands. The study integrates DNA analysis and acoustic monitoring to explore evolutionary relationships and social structure within and between populations.

MOPANE WORMS AND MACROTERMES TERMITES

This collaborative initiative with Stellenbosch University focuses on the genetic diversity and ecological functions of mopane worms and *Macrotermes* termites, two key invertebrate taxa in savanna ecosystems. The project highlights their significance in food webs and nutrient cycling. Since 2021, ORC has collaborated with Dr. Barbara van Asch of Stellenbosch University on insect biodiversity studies, starting with mopane worms and expanding into termite research on OGR. The mopane worm study, led by PhD candidate Zwannda Nethavhani, found no genetic depletion in Namibian populations of *Gonimbrasia belina* and *Gyanisa maja*, unlike those in Botswana and South Africa.

The termite study, led by Dr. Damien Gergonne, identified four distinct *Macrotermes* lineages, including two previously undocumented species endemic to Namibia, with a notable reduction in range compared to 1970s records. These findings contribute to the conservation and management of ecologically and economically important insect species.



OGR-BASED RESEARCH

96-HOUR CAMERA TRAP WATERHOLE SURVEY

A comprehensive waterhole camera trap survey was conducted between 16 and 28 September 2024. Forty-one cameras were deployed at 11 active waterholes, yielding a dataset of 360,765 images. All images have been classified to species level using the online Trap Tagger platform (<https://traptagger.co.uk>) and added to ORC's long-term monitoring database for future analysis.

LONG-TERM STUDY OF THE CHEETAH POPULATION

Since 2009, ORC has maintained a long-term dataset of camera trap images that includes valuable information on carnivores. MSc student Erica Jordan (Nottingham Trent University, UK) used these data to focus on cheetahs (*Acinonyx jubatus*), identifying individuals via the African Carnivore Wildbook platform (<https://africancarnivore.wildbook.org>). Her thesis was completed in 2024, and further analysis is planned in 2025, with the intention of publishing the results in a peer-reviewed journal.



EFFECTS OF ARTIFICIAL LIGHTS ON ANIMAL BEHAVIOUR AT WATERHOLES

Following difficulties in obtaining reliable video footage from OGR's video surveillance infrastructure in 2023, the experimental study on artificial lighting effects was relocated to a property owned by the African Wildlife Conservation Trust. In 2024, the experiment proceeded successfully with the addition of two solar-powered light stations. Data collection has been completed and is currently being processed as part of Jessy Patterson's PhD research. Results will provide insights into how artificial lighting influences wildlife behaviour at night.

STUDENT DEVELOPMENT AND CAPACITY BUILDING

Despite its small team, ORC's success is made possible by strategic partnerships with national and international collaborators, as well as post-graduate students. A concerted effort has been made to create opportunities for Namibian students and early-career scientists to participate in and lead ORC projects. Residencies are structured to allow students to conduct full-time research while receiving guidance from both local and international supervisors. In addition to academic training, ORC emphasises staff development through valid driver's license acquisition for all staff, short courses in basic vehicle maintenance, firefighting, and first aid.

ORC has an impressive cohort of 17 students, including nine PhD candidates (four Namibian and five international) and eight Master's students (seven Namibian and two international)

PHD STUDENTS

Angombe, Aune (Namibia)
Fendinat, Paulina (Namibia)
Jones, Alice (UK)
Jordan, Erica (UK)
Melton, Madeline (USA)
Naftal, Leena (Namibia)
Naupu, Paulina (Namibia)
Nghalipo, Elise (Namibia)
Patterson, Jessica (USA)

MASTER'S STUDENTS

Amupolo, Hilma (Namibia)
Borger, Saskia (South Africa)
Katanga, Lovisa (Namibia)
Keja, Mburaje (Namibia)
Ndjimba, Josef Toivois (Namibia)
PetersonWood, Brennan (USA)
Tuwilika, Dineinge Milika (Namibia)
Shangano, Elizabeth (Namibia)

PHD PROJECTS

Angombe, Aune
Affiliation: NUST
Project: Facultative Crassulacean Acid Metabolism (CAM) photosynthetic adaptation in Southern African species as a novel agricultural production system in drier climates
Supervisors: Prof. Vera De Cauwer, Prof. Andrew Smith (Oxford), Dr. Rolf Becker (ORC)

Fendinat, Paulina

Affiliation: NUST

Project: The physiological response of the desert plant *Welwitschia mirabilis* and *Colophospermum mopane* in the context of climate change.
Supervisors: Prof. Theo Wassenaar (NUST), Prof. Heather Throop (Arizona State), Dr. Rolf Becker (ORC)

Jones, Alice

Affiliation: University of Edinburgh

Project: SECO, title to be finalised
Supervisors: Prof. Kyle Dexter (University of Edinburgh), Prof. Vera De Cauwer (NUST)

Naftal, Leena

Affiliation: NUST

Project: SECO, title to be finalised
Supervisors: Prof. Vera De Cauwer (NUST), Prof. Kyle Dexter (Edinburgh), Dr. Rolf Becker (ORC)

Naupu, Paulina

Affiliation: NUST

Appraisal of drought tolerant indigenous plant species for restoration
Supervisors: Prof. Theo Wassenaar (NUST), Dr. Rolf Becker (ORC), Prof. Ezekeil Kwembeya (UNAM), Prof. Andrew Smith (University of Oxford)

Nghalipo, Elise

Affiliation: NUST

Project: Plant influences on soil biogeochemistry and taxonomic and functional diversity of soil microbial communities in a hyper-arid desert
Supervisors: Dr. Rolf Becker (ORC), Prof. Heather Throop (University of Arizona), Prof. Don Cowan (University of Pretoria)

Patterson Jessica

Affiliation: UGA

An assessment of anthropogenic impacts on wildlife ecology in sub-Saharan Africa.
Supervisors: Prof. Jim Beasley (UGA), Dr. Stéphanie Périquet-Pearce (ORC)

MASTER'S PROJECTS

Amupolo, Hilma

Affiliation: NUST

Project: Regeneration of endangered dryland forest species

Supervisor: Prof. Vera De Cauwer (NUST)

Borger, Saskia

Affiliation: Technical University of Munich (TUM)

Project: Behavioural dynamics of the African Elephant (*Loxodonta africana*) in North-East Namibia using Model-Based Suitability, Connectivity, Movement and Genetic Analysis.

Supervisors: Prof. Ralph Kühn (TUM), Dr. Piet Beytell (MEFT), Mr. Kenneth Uiseb (MEFT), Mr. William Versfeld (ORC)

Melton, Madeline

Affiliation: UGA

Drivers of wildlife movement and resource selection at the interface of Etosha National Park and the surrounding human-dominated landscape

Supervisors: Prof. Jim Beasley (UGA), Dr. Stéphanie Périquet-Pearce (ORC)

Ndjimba, Josef Toivois

Affiliation: NUST

Project: Assessing human-carnivore interactions along the northern periphery of Etosha National Park, Namibia

Supervisors: Prof. Jim Beasley (UGA), Dr. Meed Mbidzo (NUST)

PetersonWood, Brennan

Affiliation: UGA

Project: Drivers of human-carnivore conflict in Etosha National Park in Namibia, and various deterrence tools.

Supervisors: Prof. Jim Beasley (UGA), Dr. Stéphanie Périquet-Pearce (ORC)

Shatipamba, Filemon

Affiliation: UNAM

Project: Assessing the dynamics of woodland regeneration in the Ogongo area between 1991 and 2023.

Supervisors: Dr. John Mendelsohn (ORC), Dr. Eliakim Hamunyela (UNAM)

Tuwilika, Dineinge Milika

Affiliation: UNAM

Project: Assessing the impact of livelihood transitions on the use of natural resources in the Cuvelai Basin, Namibia

Supervisors: Dr. John Mendelsohn (ORC), Dr. Eliakim Hamunyela (UNAM)



PUBLICATIONS AND ACADEMIC OUTPUT

PAPERS PUBLISHED IN 2024

Adam, C.G.W., Naholo, S., Mendelsohn, J.M., & Stratford, K. (2024). Drinking and bathing behaviour of raptors in an arid, warm environment: Insights from a long-term camera trapping study in Namibia. *Namibian Journal of Environment* 9A: 18-29.

Becker, F.K., Boyes, R.S., Wittmer, H.U., Inman, V., & Marsland, S. (2024). Landscape-wide pulse events predict trait-based responses among wetland birds in perennial channels of a dryland wetland. *Ecological Applications* 34(2): e2931.

De Cauwer, V., Colace, M.-P., Mendelsohn, J., Antonio, T. & Van Der Waal, C. (2024). A rangeland management-oriented approach to map dry savanna - Woodland mosaics. *International Journal of Applied Earth Observation and Geoinformation* 134: 104193.

Lessa, T., Alves-Martins, F., Martinez-Arribas, J., Correia, R. A., Mendelsohn, J., Fabiano, E. C., Angombe, S. T., Malhado, A. C. M., & Ladle, R. J. (2024). Quantifying spatial ignorance in the effort to collect terrestrial fauna in Namibia, Africa. *Ecological Indicators* 158: 111490.

Patterson J. R., Ndlovu N., Beasley J.C., & Périquet S. (2024) Effects of human presence on African mammal waterhole attendance and temporal activity patterns. *Journal of Zoology* 325: 210-223.

Van Jaarsveld, E., Swanepoel, W., Paton, A., Becker, R., & De Cauwer, V. (2024). *Coleus serracafemaensis* (Lamiaceae), a New Succulent Species from Southwest Angola. *Haseltonia*, 31(1): 34-42.

CONFERENCE PRESENTATIONS

Becker, F.K. A free hold on land? Conservation as a determinant of land (in)equality on privately owned farmland: A case study from Namibia. Political Ecology Network Conference, Dodoma, June 2024.

De Cauwer, V., Becker, R. Angobe, A., Brown, C., Strohbach, B., Shitalangaho, A., Wassenaar, T. & Smith, A. Demonstration of small-scale Biogas generation from succulents. Kalkveld Mega-Agri Day, 13 April 2024.

De Cauwer, V., Becker, R., Angobe, A., Brown, C., Katanga, L., Knox, N., Naupu, P., Strohbach, B., Shitalangaho, A., Wassenaar, T. & Smith, A. Cultivation of indigenous succulents in Namibia. Kalkveld Mega-Agri Day, 13 April 2024.

Heydinger, J., Patterson, J., Cloete, C., Périquet-Pearce, S. & Beasley, J. Clarifying the effects of moonlight on lion activity patterns. Southern African Wildlife and Management Association Conference, Windhoek, October 2024.

Keja, M., Périquet-Pearce, S., Hauptfleisch, M. & Beasley, J. A citizen science survey of cheetahs and leopards in Etosha National Park. Southern African Wildlife and Management Association Conference, Windhoek, October 2024.

Melton, M., Périquet-Pearce, S., Kilian, W., Cloete, C. & Beasley, J. Effects of land use and fence structure on wildlife crossings behaviour between a protected area and human-dominated landscape. Southern African Wildlife and Management Association Conference, Windhoek, October 2024.

Naha, D., Périquet-Pearce, S., Kilian, W., Kupferman, C., Hoth-Hanssen, T. & Beasley, J. Fencing affects movement patterns of two large carnivores in Southern Africa. Southern African Wildlife and Management Association Conference, Windhoek, October 2024.

Neser, T., Mngqatsa N., Craig, A., Lemasson, A., Hausberger, M. & Versfeld, W. Are there geographical variations in the loud calls of rock hyraxes in north-western Namibia? The 4th African Bioacoustics Community Conference, Cape Town, South Africa, 1-6 September 2024.

PUBLIC ENGAGEMENT, OUTREACH AND MORE

DISCOVERY CENTRE AND ONLINE PRESENCE

In June 2024, ORC launched a new website featuring an improved aesthetic and a card-friendly donation portal for seamless contributions. The website has been integrated with other promotional materials, including a new brochure.

The Discovery Centre was enhanced with interchangeable student research posters illustrating ongoing work, and three panels of the permanent display were redesigned to better showcase long-term projects. One panel now includes general information and a link to donate to ORC. The centre's social media presence has grown throughout 2024, with plans for further expansion in 2025.

EDUCATIONAL VISITS

For the second consecutive year, ORC hosted undergraduate student groups from Colby College and Dartmouth College. While the Colby College cohort spent one day at the centre, the Dartmouth College group participated in a four-day structured program that included participatory sessions and presentations by resident and collaborating researchers. These visits were facilitated by ORC associate, Dr Jeff Muntifering (Save the Rhino Trust)

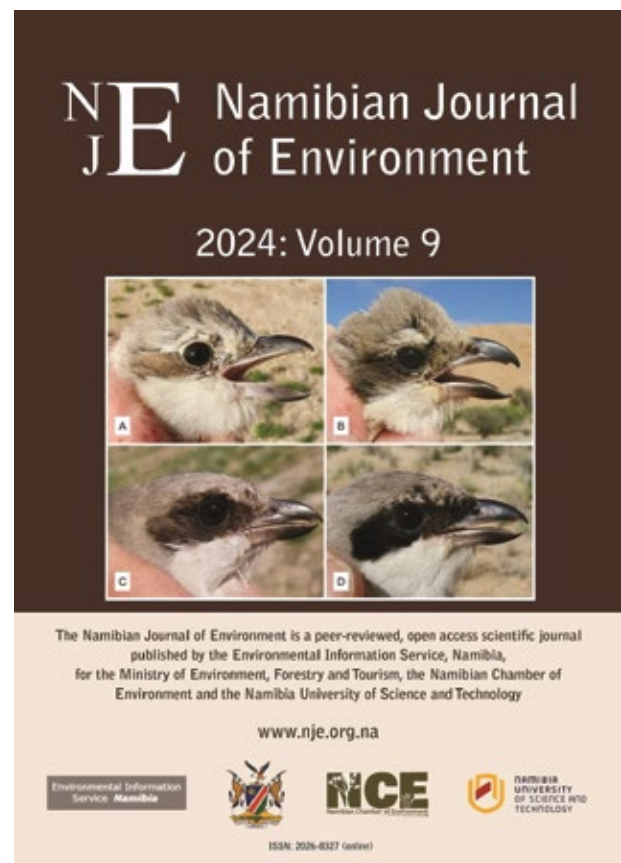
These visits have proven to be excellent opportunities for student engagement, with plans to facilitate similar interactions with Namibian post-graduate students in the coming years.

SEMINAR SERIES

Launched in 2023, ORC's Seminar Series continued into 2024, featuring a wide range of expertise. These seminars provide a platform for associated and resident researchers to share their work publicly. Guest speakers throughout the year included Dr. Giorgio Miescher (University of Basel), Prof. Selma Lendelvo (University of Namibia), Prof. Kate Parr (University of Liverpool), and Prof. Sian Sullivan (Bath Spa University), with topics ranging from termites' ecological roles to the history of the 'Red Line'. All seminars, with presenter consent, are made available on ORC's YouTube channel.

NAMIBIAN JOURNAL OF ENVIRONMENT

As the editorial driving force behind the Namibian Journal of Environment (NJE), ORC team oversaw the publication of the journal's ninth volume, which included a paper authored entirely by ORC-affiliated researchers on the bathing and drinking behaviours of raptors on OGR. In 2025, the NJE will celebrate the publication of Volume 10, a significant milestone for both the journal and Namibian environmental research. ORC remain committed to offering a platform that showcases high-quality environmental research in Namibia.



FIRST ORC WRITING SYMPOSIUM

In December 2024, ORC hosted its inaugural Writing Symposium at the AAO based facility, bringing together a distinguished group of global experts in dryland ecology. The primary aim of the symposium was to produce a high-impact review article on the drivers of dryland ecology in Africa. Over the course of six intensive days (2–7 December), the participants engaged in rigorous discussion and collaborative writing focused on synthesising the current state of knowledge and identifying critical gaps in research.

This was a high-calibre assembly: the 13 invited delegates collectively account for over 2,000 peer-reviewed publications and nearly half a million citations, reflecting their significant scholarly contributions to the fields of ecology, biogeochemistry, plant science, and conservation.

Delegates:

Dr. Pedro Lebre (University of Pretoria)
Prof. Dave Richardson (Stellenbosch University)
Prof. Barend Erasmus (University of Pretoria)
Prof. Noah Fierer (University of Colorado Boulder)
Prof. Guy Midgley (Stellenbosch University)
Prof. Don Cowan (University of Pretoria)
Prof. Richard Bardgett (Lancaster University)
Prof. Heather Throop (Arizona State University)
Prof. Theo Wassenaar (NUST)
Prof. Vera De Cauwer (NUST)
Dr. Rolf Becker (ORC)

The symposium was made possible through the generous support of OGR, which kindly donated accommodation for all delegates. The gathering proved to be exceptionally productive. Discussions centred on the key biophysical and social drivers of change in African drylands, particularly under the dual pressures of accelerating climate change and growing human populations. Participants collaboratively framed an authoritative manuscript that is already at an advanced stage. The resulting paper is being prepared for submission to Nature Reviews, where it is intended to appear as a high-profile perspective piece. The symposium marks a milestone in ORC's efforts to promote science-led conservation and to provide leadership in the global discourse on dryland ecosystem resilience.



ORC is evolving into a functioning hub for dryland ecology research, integrating scientific collaboration with capacity-building for Namibian scientists. By shifting to a structured, theme-driven research approach, ORC addresses critical research and conservation challenges while ensuring its findings contribute to the scientific progress. With a growing network of postgraduate students and international partnerships, ORC is fostering the next generation of conservation leaders. Through cutting-edge research and training, ORC aims to be at the forefront of dryland ecosystem management in Namibia, shaping sustainable conservation strategies for Namibia's future.



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TO SUPPORT OUR RESEARCH
AND STUDENTS, VISIT THE
DONATION PORTAL ON OUR
WEBSITE. WE ARE GRATEFUL
FOR CONTRIBUTIONS OF
ALL SIZES.

