The 15th TAWIRI International Scientific Conference

03rd – 05th December, 2025

ARUSHA INTERNATIONAL CONFERENCE CENTER (AICC),
ARUSHA-TANZANIA

CONFERENCE PROGRAMME

CONFERENCE THEME:

"Innovations in Wildlife Conservation and Sustainable Tourism: Navigating the Future in a Changing World"

Published by
Tanzania Wildlife Research Institute
Headquarter, Njiro Road, Plot No. 213, Block "A"
P. O. Box 661, **Arusha – Tanzania**

Tel. No: +255 734 094 646 **Fax:** +255 27 254 8240 **E-Mail:** barua@tawiri.or.tz,
Website: www.tawiri.or.tz

Layout, Design & Printing
TAWIRI - Wildlife Information Education and Public Relation Unit

Organising Committee of the 15th TAWIRI International Scientific Conference of 2025
(15th OC)

Photos by Per Harald Olsen and TAWIRI

TRIBUTE TO DR. JANE GOODALL

This tribute honors Dr. Jane Goodall for the extraordinary and groundbreaking research on Chimpanzees done in Gombe National Park, Western Tanzania. TAWIRI join the world to celebrate her as a pioneer in Primatology, as well as outstanding conservation scientific efforts, which revolutionized our understanding of primates, specifically Chimpanzee and our place in nature.

TAWIRI acknowledges that Goodall's Scientific work transformed Wildlife Conservation and Tourism development, at the same time placing Tanzania-through Gombe National Park at the forefront of global efforts in protecting Chimpanzee and their habitat.

Over Sixty years ago - Older than TAWIRI, Jane Goodall arrived on the shores of Lake Tanganyika, guided by curiosity, compassion and unshakable beliefs in the worth of every living being, but focused on Chimpanzee.

She makes a Scientific Impact by demonstrating that Chimpanzees, our **"closest relatives"** are not only capable of using tools, but also, they can modify the tools to suit their needs, and exhibit complex social and emotional lives, including joy, grief, compassion and even caring of each other to name a few. Further to that, Dr. Jane Goodall reveals that human is not separate from nature, rather an integral part and a key factor to conservation and tourism development.

As we celebrate the 15th International Scientific Conference, TAWIRI honors Dr. Jane Goodall Scientific achievements, courage and love for Tanzania's wilderness and pledge to continue collaboration with JGI in research.

Dr. Jane-Goodall's life reminds us that, compassion is the heart of science, understanding is the soul of conservation and our planet's future depends on our choice today.

Rest In Peace Dr. Jane Goodall

Dr. Eblate Mjingo
DIRECTORS GENERAL
Tanzania Wildlife Research Institute

SPONSORS FOR THE 15TH TAWIRI SCIENTIFIC CONFERENCE

03RD - 05TH DECEMBER 2025

KEYNOTE SPEAKERS

Dr. Eblate Mjingo

Topic: Harnessing Technology and Innovation to Advance Wildlife Conservation in Tanzania

Dr. Eblate E. Mjingo, is a distinguished veterinarian, Chief Researcher Officer and the Director General of the Tanzania Wildlife Research Institute (TAWIRI), standing at the forefront of conservation science for over 20 years. His works explores the intricate links between ecosystem health, human wildlife interactions, restoration ecology and, with a recent focus on the ground-breaking field of application of technology in conservation, including molecular and telemetry technologies in Tanzania. A key player in the re-introduction of African wild dogs and the reintroduction of black rhino sub-populations.

He has published over 40 papers in internationally recognized peer reviewed journals. Dr. Mjingo's research and leadership are directly shaping the future of the Tanzania's wildlife.

Prof. Neve Muboko

Topic: Sustainable Wildlife Hunting

Prof. Never Muboko is a conservation scientist with over 20 years of experience in wildlife and natural resource management. As Director of Scientific Services at the Zimbabwe Parks and Wildlife Management Authority (ZimParks), he oversees terrestrial and aquatic ecology, veterinary services, park planning, and community engagement. He leads five key domains: terrestrial ecology, aquatic ecology, veterinary services, park planning, and community engagement through the CAMPFIRE Programme and Extension & Interpretation Services. As a full Professor of Wildlife Conservation and Social Ecology, he has published extensively in internationally recognized journals, with over 115 academic publications to his name. Since 2012, he has supervised more than 37 undergraduate, MPhil, and DPhil research projects. His areas of expertise include human-wildlife conflict, community-based conservation, social ecology, and wildlife management. Prof. Muboko has held various leadership and technical roles, including: Former Chair of the Department of Wildlife Ecology and Conservation at Chinhoyi University of Technology, Project Manager for WWF's community empowerment programme, Editor for several international journals and Consultant on community conservation and natural resource governance initiatives. Facilitated the development and approval of several national conservation strategies and plans, including: Gonarezhou and Matusadona National Parks Management Plans, Zimbabwe Vulture Action Plan and Vulture Lead Action Plan, Fisheries and Aquaculture Strategy and Giraffe Conservation Strategy and Action Plan. Prof. Muboko's work bridges science, policy, and community engagement, making a significant impact on conservation efforts in Zimbabwe and the Southern African region.

Prof. Jav Dav

Topic: Sustainable tourism in the changing world

Professor Dev Jani holds a Ph.D. in Tourism Management from Dong-A University in South Korea, complementing his Master of Business Administration from the University of Dar es Salaam and a Bachelor of Science degree from Sokoine University of Agriculture. He is currently a Full Professor in the Department of Marketing at the University of Dar es Salaam Business School. Prof. Jani is a seasoned academic and researcher with a strong focus on **community-based tourism (CBT)**, particularly in relation to inclusive and sustainable development. His scholarly work critically examines how tourism can be harnessed to empower local communities, promote cultural heritage, and foster equitable economic growth. To date, Prof. Jani has authored **over 60 peer-reviewed articles** published in reputable international journals. His research contributions span a wide array of topics within tourism and marketing, often drawing on interdisciplinary approaches to address pressing global and regional challenges in sustainable tourism development. In addition to his academic work, Prof. Jani has been actively involved in **tourism consultancy projects**, both in Tanzania and internationally. His consultancy work has informed policy, strategy, and development programs in areas such as eco-tourism, tourism planning, destination marketing, and community engagement. Prof. Jani continues to play a vital role in shaping tourism scholarship and practice in Africa and beyond, mentoring emerging scholars and contributing to global conversations on sustainable tourism.

THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE, 03RD - 05TH DECEMBER, 2025

THEME: *"Innovations in Wildlife Conservation and Sustainable Tourism: Navigating the Future in a Changing World"*

GENERAL INFORMATION

Venue and Dates

The 15th TAWIRI International Scientific Conference takes place at the Arusha International Conference Centre (AICC), Arusha-Tanzania, along the East African Road, from 3rd – 5th December 2025.

Contact and Address

Tanzania Wildlife Research Institute
206 Njiro Road, 23113 Lemara, P.O. Box 661, Arusha.
Phone: + 255 27 2549571 /2548240
Fax: +255 (27) 2548240
Email: barua@tawiri.or.tz
Conference Email: tawiriconference2025@tawiri.or.tz
Website: http://www.tawiri.or.tz

Hospitality

Tanzanians are warm hearted, genuine, full of kindness, generosity and willing to help people and visitors. They take pride in their hospitality and are known for their warmth and friendly habit, often expressed through a traditional greeting of "Karibu" or "Welcome." This greeting is not just a formality but is extended with genuine enthusiasm and reflects the country's culture of hospitality.

Mobile Phone Policy

Delegates are advised to put their mobile phones either on silent mode or switched off during all Conference sessions.

Language

The official language of the Conference is English.

Conference registration hours

Tuesday:	02nd Dec. 2025:	11:00 – 17:00 hrs
Wednesday:	03rd Dec. 2025:	07:30 – 17:00 hrs
Thursday:	04th Dec. 2025:	07:30 – 17:00 hrs
Friday:	05th Dec. 2025:	07:30 – 13:00 hrs

Entry requirement for participants from outside Tanzania

A valid passport, three-month single-entry tourist visas are available at Tanzanian Embassies in your country. Visas can also be issued on arrival for citizens of some countries. For more information, please visit www.tanzaniatourism.go.tz for country specific information.

Lost and Found

For lost and found personal belongings, please contact the Information Desk at the registration area. However, participants are encouraged to keep their belongings safe.

Name badge

Your name badge is your entrance ticket to all sessions. Please, always remember to wear your name badge throughout the conference. Participants without name badges will be denied access to conference rooms/ sessions. If you lose your badge, a new one will be provided against proof of your original registration.

WiFi/Internet connections

Wi-Fi will be available to all delegates. Participants will be informed of Wi-Fi access points during the conference.

Lunch and Coffee Breaks

Lunch and coffee/tea is included in the registration fee and will be served daily in the conference area.

Registration and conference payment

All participants are required to register and receive their conference materials at the reception. Registration will start on **Tuesday 2nd December 2025 from 11:00 to 17:00hrs.** To avoid unnecessary delays on Wednesday 5th December 2025, all participants are requested to register a day before. Visit www.tawiri.or.tz and open the conference toolbar for registration and payments.

Dressing code

All participants are advised to wear conference uniforms provided during registration on the first day of the conference (3rd December 2025). Casual wear is recommended throughout the conference.

Important: All participants are reminded to pay participation/registration fees before conference dates to avoid inconveniences and to allow smooth preparation of their conference materials. Visit www.tawiri.or.tz, register and get a '**control number**' through for payment of registration fees.

Weather

The weather in Arusha during this time of the year is usually sunny with temperatures around 22-28°C. An umbrella might be useful as showers may occur.

Time Zone

The timezone in Arusha is GMT +3 Hours.

Banking

Banks and bureau de changes are available at the Airport and all major towns. Banks are open from Monday-Friday 8:30 to 15:00hrs and on Saturday from 8:30 to 13:30hrs. Several ATMs with multinational financial services are available in Arusha City, some are located near the conference venue-AICC.

Electricity current

The voltage in Tanzania is 220 volts AC 50Hz. Most of the sockets require a three-pin square plug.

Security

Tanzania is a safe country and politically stable, people are warm-hearted and generous, always eager to help visitors for their needs and get most of their stay in Tanzania. However, like in any other country reasonable precautions should be taken. Avoid walking alone at night and lock your valuables in your hotel safe. In case of any emergency, report to the nearest police station or call the Secretariat Mobile Number: +255 754 572 257.

Kilimanjaro International Airport

Kilimanjaro International Airport (KIA) is the main gateway for tourists in Tanzania, connecting the Northern Tanzania tourism circuit to the world. Is located 40 km from Arusha City, it takes about one hour to reach by car. Facilities available at the Airport include banks, curio shops, bars, and restaurants. Shuttle bus services to Arusha City and Moshi town run regularly. Taxis are also available at reasonable prices. Uber, Bolt and inDrive car services are also available. There is also Arusha Airport for people who will connect from Julius Nyerere International Airport (JNIA) in Dar es Salaam during the day. Arusha Airport is located about 6km from Arusha City Centre.

Accommodation

Arusha city is endowed with several accommodation facilities ranging from five-star hotels, lodges, guest houses to homestay. In case you need any assistance for booking kindly contact the Conference Organizing committee at conference2025@tawiri.or.tz or call the Secretariat Mobile Number: +255 754 572 257.

Safari booking and unique tourism experience in Tanzania

The conference venue is within reach of a number of tourist attractions. The Tanzania Association for Tour Operators (TATO) represents over 256 tour operators in Tanzania to facilitate tourism safaris. TATO aims at establishing and maintaining high quality and standards to visitors amongst its members. For safari and unique tourism experience in Tanzania kindly, contact TATO for more information. P.O. Box 6162, Arusha Tanzania; Tel: +255 2504188 Email:info@tatotz.org; sirili@tatotz.org. Visit Conference exhibition area to meet important tourism based enterprises i.e TANAPA, TAWA, NCAA, TFS Kenzan Tented camp and other Tour operators for Safari Booking.

Excursion and sight-seeing

Arusha is an active African city, a starting point for safaris in the northern tourism circuit to visit Serengeti, Arusha, Lake Manyara, and Tarangire National Parks as well as Ngorongoro Conservation Area, and Manyara wildlife park. As a destination for several safaris, there is a lot of attractions, to the Northeast lies the highest mountain in Africa, Mount Kilimanjaro (the roof of Africa), to the Western side, the ever-popular Serengeti National Park, a home to many wildlife species including rhinoceros, zebras, gazelles, elephants, leopards, lions, giraffes; with the most anticipated annual Great Migration, featuring millions of wildebeests crossing its plains.

Other unique attractions within Arusha are Lake Duluti, which is a volcanic crater lake found in Mount Meru's foothill with numerous butterflies, reptiles, and primates; making it an ideal place for bird-watching and nature walk and guided canoe with the magnificent view of Mount Kilimanjaro and Mount Meru in the background. Meserani Snake Park provides a unique experience, a guided tour and learning about the world's dangerous and polite snakes from Puff Adder, Egyptian Cobra to Green Mamba and Black Mamba, and many more species.

Another important attraction and unique place to visit is the Natural History Museum which was established in 1987 to curate, and research on Tanzanian archaeological, paleontological, and

paleoanthropological collections. The collections include Tanzanian birds and animals and the Olduvai Gorge, the Museum is located opposite the conference facility.

Cultural tourism centres located within the Arusha city forms an important product to tourist, visiting Mto wa Mbu, Ilkidinga, Mulala, and Ngiresi cultural heritage centres enriches visitors with more Tanzanian cultural values and a unique experience. Outside of Arusha, on the way to Moshi, you'll find the busy village of Usa River. This is a great place to take a tour and learn about Tanzanian village life and the vibrant culture in this area.

Masai Market at the heart of the City in Arusha, is a tourist area, a souvenir shopping area, you can buy great souvenirs, such as clothing, paintings, furniture, and jewelry at an affordable price.

Tanzanite is a beautiful blue/violet gemstone worldwide found only in Northern Tanzania. You can learn about the history of the stone in the museum at the Tanzanite Experience and buy certified jewellery.
Among the best-known tourist destinations in Arusha is the Cultural Heritage Centre, a vast magnificent property filled with larger-than-life sculptures that sells jewelry, handicrafts and fine art.

For those who wish to visit some of these attractions kindly visit the exhibition area in the conference area or you may contact the Secretariat at tawiriconference2025@tawiri.or.tz for assistance or call the Secretariat Mobile Number: +255 754 572257.

THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE, 03RD - 05TH DECEMBER, 2025

Message from the Director General, Tanzania Wildlife Research Institute (TAWIRI)

To our esteemed conference participants,

On behalf of TAWIRI Management and the entire TAWIRI family, I am honoured to welcome you distinguished delegates, researchers, policymakers, practitioners, and students, to Arusha, Tanzania, for our 15th International Scientific Conference.

For over two decades, this conference has served as a platform for scientific exchange in wildlife and natural resource management across Africa and globally. The knowledge disseminated is continuously used to shape the future of our biodiversity richness and its role in supporting people's livelihoods and contributing towards the country's economic growth. By focusing on critical issues including efficiency of protected areas, technological innovation and conservation as well as human wildlife interactions, the conference has ensured that these practical solutions are continually brought to the forefront. Each conference is guided by a theme that reflects current conservation realities and priorities. This year's theme is: **"Innovations in Wildlife Conservation and Sustainable Tourism: Navigating the Future in a Changing World."** It underscores the urgent need for adaptive strategies and collaborative approaches to address the evolving challenges facing biodiversity conservation, especially in the context of climate change, human wildlife conflicts, land-use dynamics, and socio-economic pressures. TAWIRI remains committed to generating and disseminating scientific knowledge that supports evidence-based decision-making and policy formulation. We believe that robust research is key to safeguarding Tanzania's rich biodiversity and ensuring its continued contribution to national development and community livelihoods. Over the next three days, you will have the unique opportunity to share research results, explore new technological solutions, and debate policy frameworks that will define the next generation of conservation strategies.

Organizing a conference of this magnitude requires substantial resources and collective effort. I take this opportunity to extend my heartfelt appreciation to all who have contributed to the success of this event. Special thanks go to the Ministry of Natural Resources and Tourism (MNRT), the Organizing Committee, Keynote speakers, presenters, sponsors, international partners, service providers, media representatives, and all participants. Your support and dedication have been instrumental in making this conference a reality.

I trust that this conference will be a profound experience for you one that fosters meaningful connections, inspires new ideas, and contributes to the advancement of sustainable wildlife conservation.On behalf of TAWIRI Management, I warmly welcome you and wish you a fruitful participation in the 15th TAWIRI International Scientific Conference.

Dr. Eblate E. Mjingo
DIRECTOR GENERAL

THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE,
03rd - 05TH DECEMBER, 2025

MESSAGE FROM THE ORGANIZING COMMITTEE

The Organizing Committee of the 15th TAWIRI International Scientific Conference extends a warm welcome to all participants to this year's conference, that is held under the theme **"Innovations in Wildlife Conservation and Sustainable Tourism: Navigating the Future in a Changing World."** This conference convenes a diverse assembly of scientists, policy makers, wildlife managers/conservationists, tourism professionals, development partners, and representatives from Non-Governmental and Civil Society Organizations from around the world. Together, we aim to share scientific findings, innovative ideas, and best practices that support evidence-based management of wildlife and natural resources.

The conference program features **keynote addresses, oral and poster presentations, symposia, seminars, workshops,** and **exhibitions** highlighting research and innovations that address contemporary challenges in wildlife conservation and sustainable tourism. Discussions will focus on emerging issues such as habitat loss, invasive plants, climate change, human-wildlife conflicts, land-use pressures, and the role of technology and community engagement in promoting conservation and sustainable livelihoods.

It is our firm belief that the insights and recommendations emerging from this conference will contribute significantly to shaping innovative strategies that strengthen biodiversity conservation while ensuring that communities benefit sustainably from natural resources. We sincerely appreciate your participation and commitment to advancing the future of wildlife conservation and sustainable tourism in our changing world. We are looking forward to a state of the art scientific interaction, networking as well as conference recommendations for informed wildlife management and decision making. .

"KARIBUNI SANA".

Organizing committee members;

1.	Dr. Julius Keyyu	Chairperson
2.	Ms. Angela Hezekiah	Vice-Chairperson
3.	Dr. Janemary Ntalwila	Secretary
4.	Ms. Alphoncina Mponzi	Deputy Secretary
5.	Mr. Mwita Machoke	Member
6.	Mr. Brian Maganga	Member
7.	Ms. Elizabeth Mwakosya	Member
8.	Mr. Petro Luvanda	Member
9.	CPA Danniel Wanna	Member

THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

DRAFT PROGRAMME FROM 03rd -05th DECEMBER 2025

TUESDAY- PARTICIPANTS REGISTRATION			
DATE	**TIME**	**Event/Activity**	**VENUE**
2/12/2025	11:00-17:00	Participants Registration	AICC Registration Desk

DAY ONE-WEDNESDAY					
DATE	**TIME**	**Event/Activity**			
3/12/2025	07:00-08:30	Participants Registration			Registration Desk
	08:30-09:00	House keeping and logistics			Simba Hall
	09:00-10:00	Arrival of the Guest of Honour and Exhibition Visitation			
	10:01-10:10	Introduction of delegates			
	10:11-10:30	Key Messages from Sponsors (Wildlife Division, Royal Conservation Ltd, UAG, Six Rivers-Africa, The Nature Conservancy)			
	10:31-11:10	**Plenary Presentation Paper 1:** **Dr. Eblate Mjingo:** Harnessing Technology and Innovation to Advance Wildlife Conservation in Tanzania			
	11:31-12:10	**OPENING CEREMONY**			
	12:11-12:30	**Presentation of Awards**			
	12:31-12:50	**GROUP PHOTO**			
	12:51-13:00	**LOGISTICS**			Simba Hall
	13:01-14:00	**LUNCH BREAK & POSTER PRESENTATION**			
	14:01-16:30	Parallel session 1 Simba Hall	Parallel session 2 Oldonyo Lengai	Parallel session 3 K 204 Hall	Parallel session 4 K 222 Hall
	16:31-18:00	Seminar 1 & Symposium 1: Simba Hall	Symposium 2 Oldonyo Lengai Hall	Seminar 2 & Seminar 3 K 204 Hall	Workshop 1 & Workshop 2 K 222 Hall
	19:00-21:00	**EVENING GATHERING AND NETWORKING**			
	END OF DAY ONE				

DAY TWO-THURSDAY					
DATE	**Time**	**SIMBA Hall**			
4/12/2025	8:30-9:15	**Plenary Presentation Paper 2** **Prof Neve Muboko:** Trophy hunting as a conservation and local community empowerment tool in the context of Southern Africa? Lessons and experiences from Zimbabwe			
	9:20-10:30	Parallel session 5 Simba Hall	Parallel session 6 Oldonyo Lengai	Parallel session 7 K 204 Hall	Parallel session 8 K 222 Hall
	11:01-11:20	**HEALTH BREAK**			
	11:21-13:00	Parallel session 9 Simba Hall	Parallel session 10 Oldonyo Lengai	Parallel session 11 K 204 Hall	Parallel session 12 K 222 Hall
	13:01-14:00	**LUNCH BREAK and POSTER PRESENTATION**			
	14:01-16:30	Parallel session 13 Simba Hall	Parallel session 14 Oldonyo Lengai	Parallel session 15 K 204 Hall	Parallel session 16 K 222 Hall
	16:30-17:00	**HEALTH BREAK & POSTER PRESENTATION**			
	17:01-18:00	Symposium 3, & workshop 3 Simba Hall	Symposium 4 & Seminar 4 Oldonyo Lengai	Symposium 5 & Seminar 5 K 204 Hall	Seminar 6 & Seminar 7 K 222 Hall
	END OF DAY 2				

DAY THREE FRIDAY -THURSDAY					
DATE	**Time**	**SIMBA Hall**			
5/12/2025	8:30-9:15	**Plenary Presentation:- Paper 3** **Prof. Jan Dev:** Sustainability in a Changing World: Cross-road or Highway for Wildlife Tourism?			
	9:20-10:30	Parallel session 17 Simba Hall	Parallel session 18 Oldonyo Lengai	Parallel session 19 K 204 Hall	Parallel session 20 K 222 Hall
	10:50-11:20	**HEALTH BREAK**			
	11:01-13:00	Parallel session 21 Simba Hall	Parallel session 22 Oldonyo Lengai	Parallel session 23 K 204 Hall	Parallel session 24 K 222 Hall
	13:01-14:00	**LUNCH LUNCH BREAK & POSTER PRESENTATION**			
	14:01-15:00	Parallel session 25 Simba Hall	Parallel session 26 Oldonyo Lengai	Parallel session 27 K 204 Hall	Parallel session 28 K 222 Hall
	15:31-16:00	**RESOLUTIONS and Message from DRCD: Simba Hall**			
	16:01-16:30	**CLOSING REMARKS**			

END OF THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

ASANTE SANA, SEE YOU IN 2027

DAILY PROGRAMME

PRE-CONFERENCE EVENTS TUESDAY 2nd DECEMBER 2025

Time	Activity	Venue	Responsible
14:00-17:00	Participants arriving & Registration	AICC – Registration Desk	Organizing Committee

DAY ONE WEDNESDAY 3rd DECEMBER 2025

EVENTS/PRESENTATIONS: SIMBA HALL			
S/N	**Time**	**Event/Paper**	**Responsible**
	08:00 –08:30	Participant Registration and exhibition Visitation	Organizing Committee
	08:30 – 9:00	Housekeeping and Logistics	Moderator
	09:00 - 10:00	Arrival of Guest of Honour and Exhibition Visitation	Organizing Committee
	10:00-10:10	Introduction of Delegates	Moderator
	10:11-10:30	Key Messages from Sponsors (Wildlife division, Royal Conservation Ltd, UAG, Six Rivers-Africa, The Nature Conservancy)	Sponsors
1.	10:31-11:10	**Plenary presentation Paper 1** **Chairperson:** Dr. Amani Ngusaru	
		Paper	**Presenter**
		Harnessing Technology and Innovation to Advance Wildlife Conservation in Tanzania	Dr. Eblate Mjingo
	11:11-12:10	**OPENING CEREMONY**	**Guest of Honour**
	12:11-12:30	**Awards – Presentation**	**Guest of Honour**
	12:31 -12:50	**GROUP PHOTO**	**Moderator**
	12:50 - 13:00	**LOGISTICS**	**Moderator**
	13:00 -14:00	**LUNCH BREAK & POSTER PRESENTATION**	

DAY ONE 3rd DEC. 2025: AFTERNOON-PARALLEL SESSION 1 SIMBA HALL

SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions

Chairperson: Dr. Simon Mduma

	Time	Paper	Presenter
2.	14:00-14:15	Transboundary movement and management of elephants at the northern Tanzania and southern Kenya borderland	Julius Keyyu
3.	14:16-14:30	Landscape genetics of lions *(Panthera leo)* in the multi-use Ngorongoro Conservation Area, Tanzania: insights from SNP genotyping and long-term monitoring	Ingela Jansson
4	14:31-14:45	Demographic drivers of population dynamics reveal subpopulation-specific conservation needs for giraffes in the Serengeti Ecosystem	George Lohay
5	14:46-15:00	Effects of grassland fragmentation and precipitation on Secretarybird *(Sagittarius serpentarius)* reproduction in the Serengeti ecosystem	Elena Ramella Levis
6	15:01-15:15	Monitoring of wildlife composition, abundance and diversity in relation to habitats in Msolwa sector Nyerere national park, Tanzania	Emmanuel Masenga
7	15:16-15:30	Restoring a meta-ecosystem: how to functionally reconnect Serengeti national park to lake Victoria	Vera Thijssen
8	15:31-15:45	Long-term changes in dung beetle community structure in the savanna grassland of the Serengeti ecosystem	Mecklina Mbundi
9	15:46-16:00	A theory of change for effective policy-level intervention in an action plan for conservation of lions in Tanzania.	Dennis K. Ikanda
10	16:01-16:15	Analysis of Changes in Elephant Population in Tarangire National Park, Northern Tanzania.	Agriphina Machaninga
	16:16-16:30	**QUESTIONS AND ANSWERS**	

	16:31-17:00	**Seminar 1:** How AI Can Empower Wise Decision **Chairperson: Dr.** Lilian Pintea	
		Paper	**Prsenter**
11		Beyond Dashboards: How AI Can Empower Wise Decision-Making in Wildlife Conservation	Angelika Barczak
	17:00-17:20	**HEALTH BREAK AND POSTER PRESENTATION**	
12	17:00-18:00	**Symposium 1: Organizers:** Grumeti Fund **Chairperson:** Dr. Devolent Mtui	
		Impact of conservation fencing on vegetation structure and woody encroachment	Victor Kakengi
		Impact of Conservation Fencing on Large Mammals in an African Savanna Ecosystem	Michael H. Kimaro
		Use of Solar Electric Fence as a Human Wildlife Conflinct Mitigation Tool	Michael H. Kimaro
		Impacts of Electric Fencing on the Movements of Migratory Wildebeest in the African Savannah Ecosystem	Michael H. Kimaro
		Impacts of electric fencing on land-use dynamics and agricultural security in western Serengeti	Michael H. Kimaro
		E N D O F D AY ONE	
EVENING SCIENTIFIC GATHERING AND NETWORKING			
	19:00-19:20	Key Messages (NCAA, FZS, NIC, JGI, Aga Khan University, TAFORI, TANAPA, TAWA & TFS)	Sponsors
	19:31-20:00	Award Presentations	TAWIRI
	20:01-21:30	Dinner and Networking	Moderator

DAY ONE 3RD DECEMBER 2025: AFTERNOON PARALLEL SESSION OLDONYO LENGAI HALL

SUB-THEME: Sustainable Tourism

Chairperson: Wilfred Marealle

S/N	Time	Paper	Presenter
13	14:00-14:15	Categorising domestic tourists in Tanzania's national parks: Types of tourists' theory approach	Kezia H. Mkwizu
14	14:16-14:30	Assessing Tourist Vehicles in Accommodating Tourists with Disabilities at Ngorongoro Conservation Area; Tour Guides' Perception	Juliana Maganga
15	14:31-14:45	'We are Here but not Here' : Coastal Residents' Perception of Tourism Impacts	Nelly Maliva
16	14:46-15:00	Ecological Impacts of Vehicle-Based Tourism at Wildebeest River Crossings in the Mara-Serengeti Ecosystem	Merikinoi Kimirei
17	15:01-15:15	Impact of Audio-Visual Content on Domestic Tourist Visit Intention: Case of Tanzania National Parks	Paul Pastory
18	15:16-15:30	Community Involvement in Conservation: Assessing Threats, Benefits, and Challenges to Visitation at Dar es Salaam Zoo, Tanzania	Naza Mmbaga
19	15:31-15:45	Factors influencing tourists' satisfaction: a case study of homestays in Tanzania	Selela Mwakalila
20	15:46-16:00	Important Drivers of Nature-Based Tourism Satisfaction in Northern Tanzania	Beatrice Kessy
21	16:01-16:15	Volunteer tourists' motives and satisfaction in Tanzania: ACase of South Korean Volunteer	Robert Suphian
22	16:01-16:15	Modernizing visitor experience through sustainable tourism innovations: A Case study of Serengeti National Park, Tanzania	Lengai, G. A
23	16:16-16:30	To be 'Awed' or 'Not to be': Exploring Western Tourists' Thematic Associations of Tanzania and Sustainable Tourism	Zaheer Munshi **(Zoom/online)**
	16:31-16:45	**QUESTIONS AND ANSWERS**	**Chairpersom**
	16:46–17:00	**HEALTH BREAK AND POSTER PRESENTATION**	

24

Symposium 2: Integrative approaches for restoring East Africa's Rangelands for sustainable and resilient futures

Organizers: The Nature Conservancy

Chairperson: Dr. Emmanuel Sulle

17:00-18:00	**Title**	**Presenter**
	Understanding and monitoring Rangeland Health	Philipo Lukumay
	Invasive species control as a strategy for restoring rangeland health in Northern Kenya	Doreen Chirchir
	Harnessing Livestock Markets to Restore and Sustain Rangelands	Francis Msollo
	Turning the Tide: Community-Based Invasive Species Control in Northern Tanzania	Warda Kanagwa
	Sustainable finance for supporting rangeland health: the role of carbon markets	Charles Massawe
	The sound of rangelands soils: using bio and eco-acoustics to monitor	Timothy Boucher

END OF DAY ONE

EVENING SCIENTIFIC GATHERING AND NETWORKING

19:00-19:20	Key Messages (NCAA, FZS, NIC, JGI, Aga Khan University, TAFORI, TANAPA, TAWA & TFS)
19:31-20:00	Award Presentations- TAWIRI
20:01-21:30	Dinner and Networking

DAY ONE 3rd DECEMBER 2025: AFTERNOON PARALLEL SESSION 3
K 204 Hall

SUB-THEME: Bee ecology and pollinators

Chairperson: Dr. Angela Mwakatobe

S/N	Time	Paper	Presenter
25	14:00-14:15	The First Detection and DNA Barcoding of Honey Bee Endoparasitoid Larvae (Tachinidae) in Tanzania	Christopher Mduda
26	14:16-14:30	Geospatial Analysis and impacts on insect pollinators of the invasive weed Astripomea hyoscyamoides Vatke var. Verscin in Central Tanzania's Dodoma Region	Faith Mpondo
27	14:31-14:45	Mapping Optimal Zones and Environmental Pressures for Bee ecology and pollinators: An Integrative Modelling Approach	Baraka Naftal
28	14:46-15:00	Impact of fire on ground-dwelling insects along Namalok Nature Reserve	Innocensia Tarimo
29	15:01-15:15	Effect of global climate change on insect populations, distribution, and its dynamics	Gabriel Mayengo
30	15:16-15:30	Occurrence of wild bees and their interaction with foraging plants along a livestock grazing gradient of northern Tanzania	Julius Lasway
31	15:31-15:45	Spatial and ecological drivers of bee diversity across Kilimanjaro's altitudinal and vegetation Zones.	Neema Kilimba
32	15:46-16:00	A review of species diversity, nesting biology and threats to African stingless bees (*Hymenoptera: Apidae: Meliponini*)	Sued Jafari Mussa
33	16:01-16:15	Assessment of the opportunities and challenges facing beekeeping activities at rau forest reserve, moshi urban area	Ellen Ponsian
34	16:16-16:30	Edible wild insects enhance food security and promote cultural heritage in the lake zone, Tanzania	Renatus Bwiki
	16:31- 16:40	**QUESTIONS AND ANSWERS**	Chairperson
	16:41–17:00	**HEALTH BREAK AND POSTER PRESENTATION**	
	17: 01-17:30	**Seminar 2:** Organizers BEEGREEN **Chairperson:** Julius Lasway	
35		**Title** The Apitourist's Guide to Tanzania – Apitourism, a new approach to the conservation of bees	**Presenter** Kathrin Krausa and Warren Steyn

		Seminar 3: Serengeti–Mara Wildebeest Migration at a Crossroads **Chairperson:** Dr. Simon Mduma	
36	17:31-18:00	Serengeti–Mara Wildebeest Migration at a Crossroads: Transboundary Collaboration as the Ultimate Solution	Noah Sitati
		E N D O F D AY ONE	

EVENING SCIENTIFIC GATHERING AND NETWORKING

19:00-19:30	Key Messages (NCAA, FZS, NIC, JGI, Aga Khan University, TAFORI, TANAPA, TAWA & TFS)
19:31-20:00	Award Presentations-TAWIRI
20:01-21:30	Dinner and Networking

DAY ONE 3rd DECEMBER 2025: AFTERNOON PARALLEL SESSION 4
K 222 Hall

SUB-THEMES: Innovation and technology in Wildlife Conservation

Chairperson: Prof. Julius Nyahongo

S/N	Time	Paper	Presenter
37	14:00-14:15	Ecoacoustics Monitoring Reveals New Species and Primate Behavior Insights in Gombe National Park, Tanzania	Lilian Pintea
38	14:16-14:30	Real-time classification of Serengeti wildebeest behaviour with edge machine learning and a long-range IoT network	Cyrus Kavwele
39	14:31-14:45	Establishing Environmental and Social Baselines for AI-Driven Climate Adaptation and Human-Wildlife Conflict Mitigation in the Ruaha-Rungwa Ecosystem,	Emmanuel Kazuva
40	14:46-15:00	Ultrasonographic Anatomy and Findings in Biochemically Normal Ursus Americanus Cubs admitted to a Wildlife Rehabilitation Facility	Eric Johnson
41	15:01-15:15	Developing Custom GPS Tracking Devices with Artificial Intelligence Activity Sensors for Monitoring Endangered Wildlife Species	Fredrick Mgimba
42	15:16-15:30	Using acoustics and AI in assessing biodiversity in a tropical forest in Gabon	Timothy Boucher
43	15:31-15:45	Using SEEK Code to Track, Identify, and Monitor Elephants Across the Greater Mara Ecosystem	Tinka Oloshiro

44	15:46-16:00	Assessment of Land Use and Land Cover Change: A Case Study of Kitendeni Wildlife Corridors, Tanzania	Godfrey G. Harry
	SUB THEME: Wildlife Ecology, connectivity Ecological Interactions		
45	16:01-16:15	Integrating ecological and social insights to inform African pangolin conservation around Minziro Nature Forest Reserve, Tanzania	Fenrick Msigwa
46	16:16-16:30	Mammalian species composition, diversity, and abundance in arusha national park, northern Tanzania	Elizabeth Mwakosya
	16:31- 16:40	**QUESTIONS AND ANSWERS**	Chairperson
		Workshop 1	
		Chairperson: Grant Hopcraft	
47	**16:41-17:30**	Stable isotope technique as a tool in ecological and forensic research	Jason Newton
		Workshop 2	
48	**17: 31-18:00**	GIS-Enabled Community-Led Patrolling: A Model for Enhancing Forest Conservation and Livelihoods in Western Tanzania	Noris Justine
		E N D O F D AY ONE	
EVENING SCIENTIFIC GATHERING AND NETWORKING			
	19:00-19:30	Key Messages (NCAA, FZS, NIC, JGI, Aga Khan University & TAFORI)	
	19:31-20:00	Award Presentations-TAWIRI	
	20:01-21:30	Dinner and Networking	

DAY TWO: THURSDAY 04TH DECEMBER 2025

KEY MESSAGES: SIMBA HALL

S/N	Time	Paper	Presenter
	08:20-08:30	Key Messages: ABRU, WWF, NCAA & Grumet Fund	Sponsors
MORNING SESSION: PRENARY PRESENTATION PAPER 2 SIMBA HALL **Chairperson:** Dr. Julius Keyyu			
49	08:31-09:15	Trophy hunting as a conservation and local community empowerment tool in the context of Southern Africa? Lessons and experiences from Zimbabwe	Prof Neve Muboko
MORNING PARALLEL SESSION 5: SIMBA HALL **SUB-THEME: Human-Wildlife Conflict** **Chairperson:** Prof. Jafari Kideghesho			
S/N	**Time**	**Paper**	**Presenter**
50	09:20-09:35	Promoting synergies between core protected areas and their surroundings in East Africa	Han Olff
51	09:36-09:50	Shifting Grounds – Longitudinal Change in Bushmeat Hunting and Local Ecologies in Northern Tanzania	Jacquiline Chokola
52	09:51-10:05	Minimal impact of diurnal pastoralism on spotted hyenas and of spotted hyenas on livestock and endangered rhinos in a prey-rich ecosystem	Oliver Höner
53	10:06-10:20	The benefits of inclusive conservation for connectivity of lions across the Ngorongoro Conservation Area, Tanzania	Ingela Jansson
54	10:21-10:35	Integrating AI Technologies with Indigenous Practices to Mitigate Human-Wildlife Conflicts in Communities Adjacent to Ruaha National Park	Emmanuel Mhache
55	10:36-10:50	A Community-Led Approach to Human-Lion Coexistence in the Ngorongoro Conservation Area	Ololotu Munka
	10:51-11:00	**QUESTIONS AND ANSWERS**	
	11:01-11:20	**HEALTH BREAK AND POSTER PRESENTATION**	

PARALLEL SESSION 6: SIMBA HALL **Sub Theme: Human - Wildlife Conflict** **Chairperson:** Dr. Victor Kakengi			
56	11:21–11:35	Assessment of Pastoralist-small carnivore conflict and mitigation measures in Simanjiro plains, northern Tanzania	Houghton H. Menoi
57	11:36-11:50	Wildlife Crop Selection Preferences as a Strategy to Reduce Crop Raiding (Human Elephant Conflict) in the Transmara Region, Kenya	Abigael Pertet
58	11:51-12:05	The status of Human-Elephant Conflict around Mkomazi national park, Tanzania	Lameck Mkuburo
59	12:06 -12:20	Perceived Patterns of Hyena-Induced Livestock Losses in Communities Adjacent to Mkomazi National Park, Northern Tanzania	Franco Mbise
60	12:21-12:35	Perceptions and Awareness of Chicken Farmers on Newcastle Disease and Indian House Crow (Corvus splendens)–Chicken Interactions: A Case of Dodoma, Tanzania	Francis Chebby
61	12:36-12:50	Assessment of Socio-Economic and psychological impacts of elephant incursion in Rhotia-Karatu, Arusha region, northern Tanzania.	Glory Tarimo
62	12:51-13:05	Characterizing Precautions and Profit Across a Bushmeat Supply Network in Cross River State, Nigeria	Katharine Thompson
	13:06-13:20	**QUESTIONS AND ANSWERS**	Chairperson
	13:00 - 14:00	**LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 7: SIMBA HALL **SUB THEME: Habitat conservation, Vegetation Ecology and Invasive species** **Chairperson:** Dr. Maurus Msuha			
63	14:00-14:15	Assessment of abundance and distribution of invasive alien plant species in Pugu – Kazimzumbwi Nature Forest Reserve (PKNFR) in Tanzania	Ezekiel Mwakalukwa
64	14:16-14:30	Assessment of Land Use and Land Cover Change (2000-2020) in Randilen Wildlife Management Area, Arusha, Tanzania	Oliver Nyakunga

65	14:31-14:45	Plant species composition and distribution in relation to wildebeest calving periods in the short grassland plains in Serengeti ecosystem	Benjamin Battersby
66	14:46-15:00	Impact of the Invasive Plant Gutenbergia cordifolia on Dung Beetle Assemblages in Ngorongoro Crater, Tanzania	Christina Mushi
67	15:01-15:15	The land use and land cover changes at Minja forest reserve using remote sensing techniques	Emmanuel Mlinga
68	15:16-15:30	On – farm medicinal plants for human health security and forest conservation in the Eastern Arc Mountains, Tanzania	Chelestino P. Balama
69	15:31-15:45	Local tolerance for coexistence with elephants in Karatu District, Northern Tanzania	Saeko Terada **(Online/zoom)**
	15:46-16:00	**QUESTIONS AND ANSWERS**	
70	16:01-17:00	**SYMPOSIUM 3** - Organizers: UNDP & MNRT **Chairperson:** Joas Makwati **Combating Poaching and Illegal Wildlife Trade in Tanzania: A call to Action** Combating Poaching and Illegal Wildlife Trade in Tanzania: A call to Action Sharing experiences, best practices on combating poaching and illegal wildlife trade an experience from IWT project Multi-Agency wildlife law enforcement institutions as an operational tool for combating poaching and illegal wildlife trade The role of community engagement in monitoring poaching and other illicit wildlife activities Gender Mainstreaming in the Wildlife Sector, best practices, opportunities and challenges	Damasi Masogolo
71	17:01-17-30	**Workshop 3: Organizer - FZS** **Chairperson:** Dr. Stanley Mwampeta Strategic Village Land Use Planning and Rapid Response Team in Human-Wildlife Conflict Mitigation: Experience from Greater Mahale and Serengeti Ecosystem, Tanzania.	Masegeri Rurai
END OF DAY TWO			

DAY TWO: 4TH DECEMBER 2025: MORNING PARALLEL SESSION 8 & 9 OLDONYO LENGAI HALL

SUB-THEMES:

i. **Climate change, Adaptation and Resilience**

ii. **Infrastuctures development and wildlife conservation**

Chairperson: Prof. Emmanuel Martin

S/N	Time	Paper	Presenter
	Climate change, Adaptation and Resilience		
72	09:20-09:35	Weather Patterns and Response of Large Wild Herbivores to Seasonal Variations in Enduimet Wildlife Management Area, Tanzania	Nalaila Gabriel
73	09:36-09:50	Climate Change and the Distribution of House Crows (*Corvus splendens*) in Tanzania	Shabani Haruna
74	09:51-10:05	Stakeholders' Physical and Social Mapping in the Application of Artificial Intelligence in Enhancing Climate Change Resilience for Rural Communities Living	Ladislaus Batinoluho
	Infrastuctures development and wildlife conservation		
75	10:06-10:20	Factors influencing wildlife roadkill in the Ngorongoro Conservation Area, Northern, Tanzania	Gabriel Mayengo
76	10:21-10:35	Influence of Tourism Infrastructure on the Critically Endangered Eastern Black Rhino Habitat Selection in Serengeti National Park	Doreen Mungure
77	10:36-10:50	A Decision Analysis approach for road development planning in the Greater Serengeti Ecosystem	Philipo Jacob Mtweve
	10:51-11:10	**QUESTIONS AND ANSWERS**	
	11:11 11:20	**HEALTH BREAK AND POSTER PRESENTATION**	

SUB THEME: Natural resources Governance and conservation

CHAIRPERSON: Raymond Okick

78	11:21–11:35	Financing Wildlife Conservation through a Performance-Based Model: A case of the transboundary Kitenden Wildlife Corridor.	Frank Damson

79	11:36-11:50	Land privatisation drives the spread of fencing and loss of traditional land use patterns in Maasai rangelands	Milenka Sloots
80	11:51-12:05	Reforming Tanzanian wildlife conservation laws towards thwarting crimes against wildlife	Mectrida Kaijage
81	12:06 -12:20	Perception of local people toward the benefits and cost of CBNRM: A case of Burunge Wildlife Management Area in Tanzania	Juma J. Kegamba
82	12:21-12:35	Assessment of Management Effectiveness of Tanzania's National Parks in Addressing Key Conservation Threats: A Case Study of Mikumi and Saadani	Canishaz R. Bamanyisa
83	12:36-12:50	A review of the nature and outcomes of wildlife cases appealed in the high court of Tanzania	Diana T. Butiku
84	12:51-13:05	The Influence of Environmental Factors on Greater Flamingo Populations, Nesting Site Selection, and Reproductive Success at Lake Natron, Tanzania	Akshita Rabdiy
	13:06-13:15	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 10: OLDONYO LENGAI HALL **SUB THEME: Habitat conservation, Vegetation Ecology and Invasive species** **Chairperson: Prof.** Ezekiel Mwakalukwa			
85	14:00-14:15	The Impact of Invasive Plant Species on Forage Availability, Herbivores and Distribution in the Ngorongoro Crater, Northern Tanzania	Francis Makari
86	14:16-14:30	Assessment of changes in tree species richness, diversity and density along a distance gradient from Dodoma City centre	Ignas Safari
87	14:31-14:45	Spatial-temporal analysis on forest cover change at Kindoroko catchment forest reserve	Godfrey Malima
88	14:46-15:00	Trait-Based Invasion: Assessing Vegetative and Reproductive Traits of Gutenbergia cordifolia under Fire Management Intervention in Ngorongoro Conservation area-Northern Tanzania	Eline R. Maleko
89	15:01-15:15	Invasive Plant Species in Tanzania: Emerging Trends, Institutional Gaps, and Strategic Responses	Bukombe Kija
90	15:16-15:30	Avian-Aircraft Collision Risks Assessment at the Julius Nyerere International Airport in Dar es Salaam, Tanzania.	Jackline Nguma
	15:31-15:50	**QUESTIONS AND ANSWERS**	

91	15:51-17:00	**Symposium 4: Organizer: Aga Khan & University and TAWIRI** **Chairperson:** Prof. Alex Kisingo	
		Title	**Presenter**
		Ecological Innovation for Urban Futures: Nature Preservation through Living Labs in Tanzania	Emmanuel Sulle
		Large and small mammals of the -Aga Khan sites	Janemary Ntalwila
		Assessment of avifauna species of the Arusha Climate and Environmental Research Centre at the Aga Khan University, Arusha	Ally Nkwabi
		Landscape restoration and plant diversity at Aga Khan sites	Richard Lyamuya
		Smaller majority: Insects as Indicators of the ecosystem health	Neema Kilimba
92	**17:01-17:30**	**Seminar 4: Organizer:** Tanzania Geothermal Development Company **Chairperson: Dr.** Kezia Mkwizu	
		Harnessing Geothermal Energy for Sustainable Tourism Development in Tanzania: A pathway to Innovation, conservation and Community Empowerment	Tanzania Geothermal Development Company
	17:31	**HEALTH BREAK AND POSTER PRESENTATION**	
		END OF DAY TWO	

DAY TWO: 4TH DECEMBER 2025: MORNING PARALLEL SESSION 11&12
K 204 HALL

SUB-THEME: Wildlife diseases and Ecosystem Health

Chairperson: Dr. Roberth Fyumagwa

S/N	Time	Paper	Presenter
93	09:20-09:35	How Do Molecular and Community insights inform a Decade of Coenurosis at the Wildlife-livestock interface in Northern Tanzania	Barakaeli Ndossi
94	09:36-09:50	One Health Surveillance: Migratory Little Stints (*Calidris minuta*) as Bioindicators of Antimicrobial Resistance in the Kenyan Rift Valley	Catherine Mbuthia
95	09:51-10:05	Environmental Factors Influencing Anthrax Distribution in an East African Protected Area	Ines Machelle

96	10:06-10:20	What Does the Researcher need to Consider when Planning for Capture and Collaring of Carnivores in Nyerere National Park and Selous Game Reserve?	Mikidadi Mtalika
97	10:21-10:35	Surveillance of Zoonotic Diseases in Wild Chimpanzee Populations: Lessons from the Greater Gombe Ecosystem, Tanzania.	Priscilla Shao
	10:36-10:50	**QUESTIONS AND ANSWERS**	
	10:50 11:20	**HEALTH BREAK AND POSTER PRESENTATION**	
SUB-THEME: Wildlife diseases and Ecosystem Health			
Chairperson: Catherine Mbuthia			
98	11:21–11:35	Risk Factors and Patterns of Treponema Infection Affecting Olive Baboons in Gombe National Park	Dismas Mwacha
99	11:36-11:50	Preliminary survey of ectoparasites associated with rodents and shrews on Mount Kilimanjaro	Alphonce Echumba
100	11:51-12:05	Thomson's Gazelles' movement and habitat selection shape infection risk in the Serengeti ecosystem	Peace Sabuni
101	12:06 -12:20	Blindness in free ranging common elands in Ngorongoro Conservation Area	Dickson Wambura
Human - Wildlife Conflicts			
102	12:21-12:35	Fators Influencing Community Perspectives on Elephant Crop Damage and Conservation Support in Tanzania	Franco Peniel Mbise
103	12:36-12:50	Socio-economic drivers and status of bushmeat hunting dynamics within Western Serengeti ecosystem	Revocatus Meney
	12:51-13:10	**QUESTIONS AND ANSWERS**	**Chairperson**
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 13: K 204 HALL			
SUB THEME: Bee ecology and pollinators			
Chairperson: Dr. Faith Mpondo			
104	14:00-14:15	Plants and insects of Arusha and Manyara regions, northern Tanzania	Julius Keyyu
105	14:16-14:30	Taxonomic identification of stingless bees (Hymenoptera: Apidae: Meliponini) from selected locations of Tanzania using DNA barcoding	Christopher Mduda
106	14:31-14:45	Influence of habitat types on dung beetle and grasshopper assemblages in rangeland ecosystems in Longido and Monduli Districts.	Neema Kilimba

107	14:46-15:00	Traditional Land Use and Biodiversity Conservation: A Comparative Study of Maasai Communities in Kenya and Tanzania	Fred Ledidi
108	15:01-15:15	The blessings of Kilimanjaro: perspectives of Tanzanian mountain crews	Kokel Melubo
109	15:16-15:30	Avifauna diversity and occupancy in different habitat types: Key Updates for Biodiversity Conservation in the Ruaha National Park, Tanzania	Ally Nkwabi
	15:31-15:50	**QUESTIONS AND ANSWERS**	
110	15:51-16:50	**Symposium 5: Organizer ABRU** **Chairperson:** Dr. Simon Mduma	
		Research and Long-term Continuity at ABRU in Mikumi NP	Guy Norton
		Demographic dynamics of Yellow Baboons (Papio cynocephalus) in Mikumi National Park, Tanzania	Rekichius Kadogo
		Assessing the influence of wildlife grazing pressure and climate on grass growth in Mikumi National Park, Tanzania	Shaban Fadhil
		The application of a 'theory of change' to address peri-urban behaviour in baboons of geita forest reserve, Tanzania	Samuel Mtoka
		Crop preferences of African elephants: A comparative study of crop damages to farmers adjacent to Mikumi National Park, Tanzania.	Deusdedith Fidelis
111	16:51-17:20	**Seminar 5:** Organizers TAWIRI **Chairperson:** Prof. Donald Mpanduji	
		Mitigating Human-Crocodile Conflict in Tanzania:	Janemary Ntalwila
	17:21-18:00	**HEALTH BREAK AND POSTER PRESENTATION**	
END OF DAY TWO			

DAY TWO: 4TH DECEMBER 2025: MORNING PARALLEL SESSION 14 & 15
K 222 HALL

SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions

Chairperson: Katharine Thompson

S/N	Time	Paper	Presenter
112	09:20-09:35	An updated review on the status and threats to Tanzania's vultures	Claire Bracebridge

113	09:36-09:50	Assessing the critical habitats key to cheetah space use	Dennis Minja
114	09:51-10:05	Baseline Assessment of Butterfly Diversity and Distribution in Western Usambara, Tanzania	Devolent Mtui
115	10:06-10:20	The distribution ground-dwelling mammals in the Minziro Nature Forest Reserve, Tanzania	Emanuel Martin
116	10:21-10:35	Promoting rhinoceros welfare during transit: veterinarians' perspectives on transportation practices.	Emmanuel S. Macha
	10:36-10:50	**QUESTIONS AND ANSWERS**	
	10:50 11:20	**HEALTH BREAK AND POSTER PRESENTATION**	
SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions **Chairperson:** Dr. Iddi Mfunda			
117	11:21–11:35	Brothers and peers disperse together in spotted hyenas	Eve Davidian
118	11:36-11:50	Revealing the Hidden Patterns: One-Year Monitoring of Mammalian Diversity across a Multi-Use Landscape in the Kitendeni Wildlife Corridor	Emmanuel Kivuyo
119	11:51-12:05	Birds as indicators of rangeland health in northern Tanzania	Edward Jenkins
120	12:06 -12:20	Factors Influencing Community Awareness of the Endangered Rungwecebus kipunji	Hefsiba Mawazo
121	12:21-12:35	Seasonal Dynamic of Habitat Use by Wild Bovids and Cattle in Western Tanzania - Issa Valley: Insights from Motion-Triggered Cameras	Ivorda Mhakilicha
122	12:36-12:50	A comprehensive analysis of human and livestock attacks in the Ngorongoro Conservation Area in Northern, Tanzania: patterns, determinants and management strategies	Elibariki Bajuta
	12:51-13:10	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 16: K 222 HALL **SUB THEME: Natural resources Governance and conservation** **Chairperson:** Alphonce Mallya			
123	14:00-14:15	Community-Based Natural Resources Management In Africa's SADC Region: A Training Needs Assessment	Boaz Loya

124	14:16-14:30	A scoping Review of Mental Health Risk Factors Among Wildlife Rangers	Gabriel Mayengo
125	14:31-14:45	Community-Based Conservation of Critically Endangered Kipunji Primates Through Agricultural Innovation and Stakeholder Engagement in Southwestern Tanzania	Philipo Mtweve
126	14:46-15:00	Can Tanzania Sustain Green Growth and Shared Prosperity? A Theoretical Review	Odass Bilame
127	15:01-15:15	Conservation Education as a Tool for conserving Kinyongia magomberae and the Magombera Forest Ecosystem	Kelvin Ngongolo
Sub-Theme: Sustainable tourism			
128	15:16-15:30	Implementation of the ecological mitigation measures by tourism accommodation facilities in protected areas: a case of Arusha national park	P. Mpanzo
129	15:31-15:45	Sustainable Tourism and Women in Higher Education: Perspectives on visits to National parks	Kezia H. Mkwizu
	15:46-16:10	**QUESTIONS AND ANSWERS**	
130	16:11-16:40	**Seminar 6: The Kihansi Spray Toad** **Chairperson:** Dr. Tito Lanoy **Title** Kihansi Spray Toad Conservation: Progress, Challenges, and Future Directions	**Presenter** Bukombe Kija
131	16:41-17:00	**Seminar 7: Synopsis TEMBONASI** **Chairperson: Dr. George Lohay** TEMBONASI documentary film project	Richard Magumba
	17:01-17:30	**HEALTH BREAK AND POSTER PRESENTATION**	
END OF DAY TWO			

DAY THREE: FRIDAY 5th DECEMBER 2025

KEY MESSAGES: SIMBA HALL

	Time	Paper	Presenter
S/N	08:20-08:30	Key Messages: Alteza, ECO, Mweka, Oikos, Kenzan	Sponsors
MORNING PLENARY SESSION: KEYNOTE PAPER PRESENTATION No.3 **SIMBA CONFERENCE HALL** **CHAIRPERSON:** Prof. Han Olff			
	08:31-9:15	Sustainability in Changing World: Cross-road or Highway for Wildlife Tourism?	Prof. Dev Jani,

MORNING PARALLEL SESSION 17 & 18: SIMBA HALL

SUB-THEME: Human - Wildlife Conflicts

Chairperson: Prof. Jafari Kideghesho

S/N	Time	Event/Paper	Presenter
132	09:20-09:35	Bodaboda saga: From Preached employment opportunity to biodiversity loss and public health challenge.	Julius Nyahongo
133	09:36-09:50	Regreening increases human-wildlife conflict	Michiel Veldhuis & Ester L. Oloije
134	09:51-10:05	Assessment of Human-Elephant Conflict and Mitigation Strategies in the Southeastern Ruaha National Park, Tanzania	Zablon Fataely
135	10:06-10:20	Fostering peaceful Coexistence between human-Elephant through Non-Lethal Mitigation in the Ruaha-Rungwa Ecosystem, Tanzania	Janemary Ntalwila
136	10:21-10:35	Human elephant interactions viewed as assets or liability in rural transformations: a review of cases from Tanzania with examples from other elephant range	Donald Mpanduji
	10:36-10:50	**QUESTIONS AND ANSWERS**	
	10:51 11:20	**HEALTH BREAK AND POSTER PRESENTATIONS**	

SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions **Chairperson:** Prof. Noa Sitati			
137	11:21–11:35	Assessing Long-Term Recovery and Management Strategies for Tanzania's Black Rhino Population	Grant C. Hopcraft
138	11:36-11:50	A Distinct Partial Migratory Herd in the Enashiva Nature Refuge in the Eastern Serengeti.	Benjamin Battersby
139	11:51-12:05	Coexistence through sustainable conservation strategies for sitatunga Tragelaphus spekii in African ecosystems	Gabriel Mayengo
140	12:06 -12:20	Mammal diversity and distribution for enhancing visitors experience and conservation in Ruaha National Park	Cecilia Leweri
141	12:21-12:35	Fifteen years of captive management of a population of kihansi spray toad (nectophrynoides asperginis) in tanzania: trends, challenges, and conservation	Bukombe Kija
142	12:36-12:50	Habitat selection by an extraordinary savannah raptor: environmental factors driving abundance of the Secretarybird Sagittarius serpentarius in the Serengeti National Park (Tanzania)	Federico Romani
	12:51-13:10	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNC LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 19: SIMBA HALL **SUB THEME: Wildlife Ecology, connectivity Ecological Interactions** **Chairperson:** Prof. Michiel Veldhuis			
143	14:00-14:15	Functional and Structural Connectivity Modelling for Transboundary Wildlife Corridors between Tanzania and Kenya	Noah Sitati
144	14:16-14:30	Lessons from the Serengeti for Rewilding	Rene Beyers
145	14:31-14:45	Natural dispersal is better than translocation for reducing risks of inbreeding depression in eastern black rhinoceros (*Diceros bicornis michaeli*)	Ronald Mellya
146	14:46-15:00	Migratory wildebeest respond to resources and risks when crossing rivers in the Serengeti-Mara Ecosystem	Shaya van Houdta
147	15:01-15:15	Spatial avoidance and behavioral adaptation of chimpanzees to human disturbances in a savanna-mosaic habitat: a case study of Issa Valley, Tanzania.	Simula Maijo

148	15:16-15:30	Mapping Risk in Chimpanzee Habitats using GIS Tools: Modelling Threat Encounter Rates and Their Influence on Nest Occurrence in the Masito Ugalla Ecosystem,	Paul Mjema
	15:31-16:00	**CONFERENCE RESOLUTIONS**	DRCD-TAWIRI
	16:01-16:30	**CLOSING REMARKS- SIMBA HALL**	

END OF THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

THANK YOU ALL FOR MAKING THIS CONFERENCE SUCCESSFUL

SEE YOU IN DECEMBER 2027 DURING THE 16TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

DAY THREE: 5TH DECEMBER 2025: MORNING PARALLEL SESSION 20 & 21: OLDONYO LENGAI HALL

SUB-THEME: Water Resources and Wetland Conservation

Chairperson: Prof. Alex Kisingo

S/N	Time	Event/Paper	Presenter
149	09:20-09:35	Genetic barcoding uncovers hidden diversity of haplochromines cichlids in Shirati Bay, Lake Victoria	Faraja Kakulwa
150	09:36-09:50	Incidental Catch of Endangered Marine Turtles along the Coast of Dar es Salaam: A Pilot Survey	Japhet Mwanang`ombe
151	09:51-10:05	Biodiversity Conservation in Wetlands through Integrated Water Resources Management: Key Challenges, Opportunities, and Lessons from the Katuma	Philemon Mneney
152	10:06-10:20	Biometry, hatching efficiency, growth performance and survival of the brine shrimp Artemia franciscana from Tanzania	Augustino Jacob
153	10:21-10:35	Key Threats Facing Mara River Wetland in Tanzania	Emmanuel Pagiti
	10:36-10:50	**QUESTIONS AND ANSWERS**	

	10:50 11:20	**HEALTH BREAK AND POSTER PRESENTATIONS**	
	SUB-THEME: Water Resources and Wetland Conservation **Chairperson:** Emmanuel Mtiti		
154	11:21–11:35	Steps to change: Applying evidence-based conservation measures for the conservation of the Endangered Grey Crowned Crane (*Balearica regulorum)* in Kenya	Damaris Kisha
155	11:36-11:50	Modeling the hydrological benefit of Nature-based Solutions on freshwater resilience in the Mbarali river catchment	Nyemo Chilagane
156	11:51-12:05	Double trouble: aquatic invasive plants can promote mosquitoes	Emily Strange
157	12:06 -12:20	Water quality and reintroduction outcomes: A case study of the Kihansi Spray Toad	Felix Shayo
158	12:21-12:35	Effect of pond fertilization on growth performance and nutritional composition of Artemia franciscana	Augustino Jacob
159	12:36-12:50	Counting the Cost of Coexistence: An Empirical Study of Human-Lion Conflict in Serengeti's Human-Wildlife Interfaces	Matana Ng'weli
	12:51-13:10	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	

AFTERNOON PARALLEL SESSION 22: OLDONYO LENGAI

SUB THEME: Wildlife Ecology, connectivity Ecological Interactions

Chairperson: Grant C. Hopcraft

S/N	Time	Event/Paper	Presenter
160	14:00-14:15	Camera trap insights: elephant activity and occupancy in protected areas	Lameck Mkuburo
161	14:16-14:30	Masai giraffe Population dynamics, Abundance, and Predation risk in the context of Saadani National Park in Tanzania	Leon Vitalis
162	14:31-14:45	Habitat Suitability for Puku (Kobus vardonii) Across Various Climate Scenarios in Tanzania	Maureen Francis Daffa
163	14:46-15:00	Revealing the effects of anthropogenic structures on the spatial distribution of migratory wildebeest	Majaliwa M. Masolele
164	15:01-15:15	The Cercopithecus Monkey Hybrid Zone in Gombe National Park: A Unique Case Study of Natural Hybridization	Kate Detwiler

164	15:16-15:30	Rapid assessment on Population and Spatial Distribution of the Ashy Red Colobus Monkey (Piliocolobus tephrosceles) in Community Forests in Biharamulo District, Northwestern Tanzania	Kaiza Kaganzi
	15:31-16:00	**CONFERENCE RESOLUTIONS-SIMBA HALL**	DRCD-TAWIRI
	16:01-16:30	**CLOSING REMARKS- SIMBA HALL**	

END OF THE 15TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE
THANK YOU ALL FOR MAKING THIS CONFERENCE SUCCESSFUL

SEE YOU IN DECEMBER 2027 DURING THE 16TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

DAY THREE: 5TH DECEMBER 2025: MORNING PARALLEL SESSION 23 & 24
K 204 HALL

SUB-THEME: Habitat conservation, Vegetation Ecology and Invasive species

Chairperson: Dr. Jerome Kimaro

S/N	Time	Event/Paper	Presenter
166	09:20-09:35	Carbon Storage Potential of Forest Trees in Wildlife Protected Areas: A Case Study of Ruaha National Park, Tanzania	Raymond Okick
167	09:36-09:50	Opposing Impacts of Invasive Alien Plants on Large Herbivore use on Habatat use in Savannah ecosystem	Exavery Kigosi
168	09:51-10:05	Impact of Indian house crow (*Corvus splendens*) on avian diversity across six Tanzanian Cities with varying histories of sympatry.	Charles Luchagula
169	10:06-10:20	A Tale of Two Guilds: How Woodland Encroachment Drove the Collapse of Introduced Grazers and the Persistence of Resident Browsers in Saadani National	Ismail Ismail
170	10:21-10:35	Burned Area Mapping in Kilimanjaro National Park Using MODIS-Derived Normalized Burn Ratio, Burn Area Index and Normalized Difference Vegetation Index	John E. Makunga
	10:36-10:50	**QUESTIONS AND ANSWERS**	
	10:50 11:20	**HEALTH BREAK AND POSTER PRESENTATIONS**	

SUB-THEME: Habitat conservation, Vegetation Ecology and Invasive species **Chairperson:** Dr. Chelestino P. Balama			
171	11:21–11:35	How does Normalized Difference Vegetation Index and Land Surface Temperature analysis support the sustainable management of Riverine Forests in Sudan?	Elmugheira Mohammed
172	11:36-11:50	Preliminary Faunal Biodiversity Assessment of Community-Managed Coastal Forests in Mkinga District, North-eastern Tanzania.	Steven Temu
173	11:51-12:05	Spatial variation of the Indian House Crow (*Corvus splendens splendens*) Breeding Biology-A Review	Paulo Athumani
174	12:06 -12:20	Terrestriality in Arboreal Red-Tailed Monkeys (*Cercopithecus ascanius*) from the Issa Valley, Western Tanzania.	Joram Navaya
175	12:21-12:35	Impacts of agricultural expansion on habitat reduction at Mto wa Mbu game controlled area	Mgawe Mtani
176	12:36-12:50	Rangeland condition and degradation patterns in eastern Serengeti: Implication to grazing habitats for wildlife and livestock management	Kwaslema Hariohay
	12:51-13:10	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	
AFTERNOON PARALLEL SESSION 25: K 204 HALL **SUB THEME: Human - Wildlife Conflicts** **CHAIRPERSON:** Oliver Höner			
S/N	**Time**	**Event/Paper**	**Presenter**
177	14:00-14:15	Assessment of impacts of crop raiding elephants to food availability and accessibility to farmers adjacent to Mikumi National Park, Tanzania.	Deusdedith Fidelis
178	14:16-14:30	Confronting Human-wildlife conflict in the Mkomazi ecosystem, Tanzania	Emanuel Kivuyo
179	14:31-14:45	Farmers' perceptions of farm-based elephant deterrents in the Kilombero Valley, Tanzania	Grace Mchome
180	14:46-15:00	Self-reported wildlife wire snaring by illegal hunters in Serengeti National Park, Tanzania	Boaz Loya
181	15:01-15:15	A Poisoning Incidence Involving a White-Backed Vulture in Mikumi National Park, Tanzania	Haruna Ramadhani

182	15:16-15:30	Livelihood Pressures and Habitat Connectivity Loss: Threats to Wildlife Survival in Igando-Igawa Wildlife Corridor, Southern Tanzania	Joas J. Makwati
	15:31-16:00	**CONFERENCE RESOLUTIONS-SIMBA HALL**	DRCD-TAWIRI
	16:00-16:30	**CLOSING REMARKS- SIMBA HALL**	

END OF THE 15TH TAWIRI INTERNTIONAL SCIENTIFIC CONFERENCE

THANK YOU ALL FOR MAKING THIS CONFERENCE SUCCESSFUL

SEE YOU IN DECEMBER 2027 DURING THE 16TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

DAY THREE: 5TH DECEMBER 2025: MORNING PARALLEL SESSION 26&27
K 222 HALL

SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions

Chairperson: Ingela Jansson

S/N	Time	Event/Paper	Presenter
183	09:20-09:35	Rapid Survey of the Ruaha-Rungwa to Udzungwa Wildlife Corridor	Josephine Smit
184	09:36-09:50	A Population Viability Analysis for Masai Giraffes (*Giraffa tippelskirchi*) in Arusha National Park: Projecting Futures and Identifying Conservation Leverage	James Madeli
185	09:51-10:05	Seasonal Dynamic of Habitat Use by Wild Bovids and Cattle in Western Tanzania - Issa Valley: Insights from Motion-Triggered Cameras	Ivorda Mhakilicha
186	10:06-10:20	How Prey threatens Survival of Predator: A Field Experience on African Lion in Nyerere-Selous Complex	Mikidadi Mtalika
187	10:21-10:35	Wildlife Status and Threats in Key Protected Areas in Western Tanzania	Paolo Strampelli
	10:36-10:50	**QUESTIONS AND ANSWERS**	
	10:51 11:20	**HEALTH BREAK AND POSTER PRESENTATIONS**	

	SUB-THEME: Wildlife Ecology, connectivity Ecological Interactions **Chairperson:** Prof. Flora Magige		
188	11:21–11:35	Yellow Baboon Activity Budget in the Issa valley, Western Tanzania.	Mali Lepukot
189	11:36-11:50	Reproductive Inequalities and the role of socially inherited privilege in the spotted hyenas	Marta Mosna
190	11:51-12:05	Spatial variation of the Indian House Crow (Corvus splendens splendens) Breeding Biology- A Review	Paulo Chiza Athumani
191	12:06 -12:20	Impact of cultivation on butterflies species assemblages	Rose C. Sanga
192	12:21-12:35	Distribution of viramba yellow baboons sleeping sites in relation to topography, Mikumi national park, Tanzania	Samuel Mtoka
193	12:36-12:50	Population Status and Spatial Distribution of Red Colobus Monkeys in Gombe National Park, Tanzania	Sila Mbise
	12:51-13:10	**QUESTIONS AND ANSWERS**	
	13:11-14:00	**LUNCH BREAK & POSTER PRESENTATION**	

AFTERNOON PARALLEL SESSION 28: K 222 HALL

SUB THEME: Wildlife Ecology, connectivity Ecological Interactions

CHAIRPERSON: Alexander Piel

S/N	Time	Event/Paper	Presenter
194	14:00-14:15	Tiny Giants of the Ecosystem: Unlocking the Tourism Potential of Small Mammals in Southern Tanzania	Wilfred Marealle
195	14:16-14:30	A survey of the birds of Kitwe woodland in Kigoma-Ujiji Municipality, western Tanzania	Chacha Werema,
196	14:31-14:45	Breeding population status, and nesting preferences of White-backed Vulture in Western Serengeti, Northern Tanzania	Vainess Laizer
197	14:46-15:00	Linking Dietary niche breadth and body size to rodent diversity conservation in the Rungwe Mountain Forest Reserve	Upendo Ngoda
198	15:01-15:15	Lion and spotted hyena abundance in the Western buffers of the Serengeti Ecosystem	Stanslaus Mwampeta

199	15:16-15:30	Snakebite and snakebite management at Meserani snakebite clinic in Tanzania between January 2020 and June 2024: a retrospective case-series analysis	Tito Lanoy
	15:31-16:00	**CONFERENCE RESOLUTIONS-SIMBA HALL**	DRCD-TAWIRI
	16:01-16:30	**CLOSING REMARKS- SIMBA HALL**	

END OF THE 15TH TAWIRI INTERNTIONAL SCIENTIFIC CONFERENCE

THANK YOU ALL FOR MAKING THIS CONFERENCE SUCCESSFUL

SEE YOU IN DECEMBER 2027 DURING THE 16TH TAWIRI INTERNATIONAL SCIENTIFIC CONFERENCE

POSTER PRESENTATIONS

Chairperson(s): John Sanare and Ellen Ponsian

S/N	Author(s)	Title	Sub-theme
1	Lukiko S.B	Influence of Kongwa Weeds on Honey Production and Physico-Chemical Characteristics in Kongwa District, Dodoma Region	Bee ecology and pollinators
2	Mohamed Jovinary	Impact of lantana camara on bees distribution	Bee ecology and pollinators
3	Ramadhan Mwiko	Impact of urbanization on butterfly species assemblages	Bee ecology and pollinators
4	Selemani Moshi	Butterflies composition and diversity in different habitat types of Moyowosi Game Reserve, Western Tanzania	Bee ecology and pollinators
5	Massay	Developing a Holistic Climate Change Adaptation Framework for Tourism Resilience in Kilimanjaro National Park	Climate change, Adaptation and Resilience
6	Franco P. Mbise	Community Engagement through Outreach Initiatives: A Case Study from Villages Near Tarangire National Park, Tanzania	Human - Wildlife Conflicts
7	Emanuel Kivuyo	The long-term monitoring of livestock predation cases in the Mkomazi sub landscape, Tanzania	Human - Wildlife Conflicts
8	Emmanuel Ngomuo	Local community coping and adaptation strategies on human-wildlife conflict at kwakuchinja wildlife corridor, connecting Tarangire-Manyara national parks	Human - Wildlife Conflicts
9	Fenrick Msigwa	Human-Elephant Conflict and Socioeconomic Impacts in Communities Bordering Burigi Chato National Park, Tanzania	Human - Wildlife Conflicts
10	Kwaslema Hariohay	Factors influencing the adoption of climate change adaptation strategies in mitigating human-wildlife conflict	Human - Wildlife Conflicts
11	Kwaslema Hariohay	Perceived effectiveness of predator-proof bomas in mitigating human-carnivore conflict in Babati district, nothern Tanzania	Human - Wildlife Conflicts
12	Mikidadi Mtalika	Mass Capture and Translocation of Olive Baboons in Geita Forest Reserve in Tanzania	Human - Wildlife Conflicts

S/N	Author(s)	Title	Sub-theme
13	Nyemo Chilagane	Understanding the encounters, utilization and Illegal trade of Pangolins in the Mahale-Gombe-Moyowosi Landscape	Human - Wildlife Conflicts
14	Saipi Moini	Assessment of Human - Wildlife Conflicts Effects in the Ngorongoro Conservation Area: A Case Study of Ndutu Conservation Zone	Human - Wildlife Conflicts
15	Richard Lyamuya	Status of wildlife roadkill in the Ngorongoro Nonservation Area, northern Tanzania	Infrastuctures development and wildlife conservation
16	Charles Luchagula,	Can artificial nest boxes offset the loss of tree cavity in human-modified tropical landscapes? A study along the southern slopes of Mount Kilimanjaro	Innovation and technology in Wildlife Conservation
17	Samwel Rashid	Assessing the Dynamics of Agricultural and Settlement Development and their Impact on Mountain Hanang Nature Forest Reserve Using Remote Sensing	Innovation and technology in Wildlife Conservation
18	Awadhi Mndeme	Evaluating Land Use Land Cover in Mramba Forest Reserve Using GIS and Remote Sensing	Innovation and technology in Wildlife Conservation
19	Gabriel Mayengo	Spatial-Temporal Analysis on Forest Cover Change At Kindoroko Catchment Forest Reserve	Innovation and technology in Wildlife Conservation
20	Annolbert Mutalemwa	Community-Driven Regeneration of Miombo Woodlands and Chimpanzee Corridors in Western Tanzania:	Natural resources Governance and conservation
21	Joyce J. Machange	The effectiveness of Trash in Trash Out (TITO) policy on waste management practices inside Protected areas: A case of Arusha National Park	Natural resources Governance and conservation
22	Mectrida Kaijage	Breaking the ceiling of laws on actors' roles in wildlife conservation in Tanzania	Natural resources Governance and conservation
23	Naushad Yunus	Contribution of Community-Based Conservation in Enhancing Wildlife Conservation at Makuyuni Wildlife Park	Natural resources Governance and conservation
24	Nickson P. Mkiramweni	Exploring local attitudes, beliefs, and knowledge about White-backed Vulture in Northern Tanzania: An implication for conservation and tourism	Natural resources Governance and conservation

S/N	Author(s)	Title	Sub-theme
25	Sanya John	Diverse motivations underpinning the differential use of Indigenous and Local Knowledge in Chagga homegardens, Tanzania	Natural resources Governance and conservation
26	Kokel Melubo	The blessings of Kilimanjaro: perspectives of Tanzanian mountain crews	Sustainable Tourism
27	Omary Mvano	Wilderness Medical Emergencies in Key Northern Tanzania's National Parks: Patterns and Management for Sustainable Tourism.	Sustainable Tourism
28	Gerubin Liberath Msaki[a]	Characterization of bird, reptile, and insect community diversity in constructed wetlands and waste stabilization ponds across Tanzania	Water Resources and Wetland Conservation
29	John Kimaro	Freshwater Conservation: A phased approach to designing and management of freshwater community protected and conserved areas in Lake Tanganyika:	Water Resources and Wetland Conservation
0	Ayubu Singoye	Restorative Seaweed Aquaculture empowering coastal communities and preserving nature	Water Resources and Wetland Conservation
31	Alfred Shayo	Prevalence of Haemoparasites in Rodents and Shrews Trapped from Domestic and Peridomestic Houses in Morogoro Municipality, Tanzania.	Wildlife diseases and Ecosystem Health
32	Obanda Vincent	From Vector to Mammal: A Cross-System Diagnostic Platform for Real-Time Surveillance of Rift Valley Fever	Wildlife diseases and Ecosystem Health
33	Vincent Obanda	Vector on the Move: Climate and Infrastructure Drive the Spread of *Anopheles stephensi* in Kenya	Wildlife diseases and Ecosystem Health
34	Charlotte Searle	Wildlife diversity in the Selous-Nyerere ecosystem: Insights from camera trap surveys	Wildlife Ecology, connectivity Ecological Interactions
35	D. Anthony Collins	Dominance rank and reproductive failure in female baboons at Gombe National Park.	Wildlife Ecology, connectivity Ecological Interactions
36	Frank P. Lyimo	Bird community response to multiple stressors along urbanization gradient	Wildlife Ecology, connectivity Ecological Interactions
37	Glory Daniel	Influence of the elevation on the land snails species richness, abundance and diversity in the afro montane forest of mount Kilimanjaro	Wildlife Ecology, connectivity Ecological Interactions

S/N	Author(s)	Title	Sub-theme
38	Dennis Peshut	Results and lessons learned from a lion survey in the Ngorongoro Conservation Area using Spatial Capture-Recapture	Wildlife Ecology, connectivity Ecological Interactions
39	Herieth Mkomwa	Behind the laugh: Core research topics and methods of the Ngorongoro Hyena Project	Wildlife Ecology, connectivity Ecological Interactions
40	Hillary Mrosso	Feeding Ecology and Habitat Use of Pangolins in Tanzania's Wildlife Corridors	Wildlife Ecology, connectivity Ecological Interactions
41	John Sanare	Species distribution patterns and environmental variability in Mkomazi National Park: A case of oryx and eland	Wildlife Ecology, connectivity Ecological Interactions
42	Juma Minya	Demography; a better explanation for the Serengeti elephant population growth.	Wildlife Ecology, connectivity Ecological Interactions
43	Leon Vitalis	Community Perspectives and Illegal Hunting of Masai Giraffe in Muyowosi Game Reserve, Tanzania	Wildlife Ecology, connectivity Ecological Interactions
44	Loning'o K. Kileto	Impact of livestock grazing intensity on beetle species assemblages at Ngorongoro Conservation Area	Wildlife Ecology, connectivity Ecological Interactions
45	Mariam Michael	Spatial and Temporal Dynamics of Illegal Bushmeat Hunting in the Serengeti Ecosystem	Wildlife Ecology, connectivity Ecological Interactions
46	Robert Mushi	Rubondo Island National Park: Overlooked World's Largest Tropical Lake Island Protected Area in Tanzania.	Wildlife Ecology, connectivity Ecological Interactions
47	Sabuni, P.L.	Thomson's Gazelles' movement and habitat selection shape infection risk in the Serengeti ecosystem	Wildlife Ecology, connectivity Ecological Interactions
48	Jasson John	Avifauna Status of the Ngorongoro Conservation Area: Preliminary Findings	Wildlife Ecology, connectivity Ecological Interactions
49	Lameck Jacob	**Status, Distribution, and Conservation Challenges of the Southern Patas Monkey in the Serengeti Ecosystem**	Wildlife Ecology, connectivity Ecological Interactions
50	Zabibu Kabalika	Understanding dietary interaction between chimps and baboons of Gombe national park	Wildlife Ecology, connectivity Ecological Interactions

ABSTRACTS FOR ORAL PRESENTATIONS

KEYNOTE SPEAKERS

PLENARY PRESENTATION ONE: INNOVATION AND TECHNOLOGY IN WILDLIFE CONSERVATION

Harnessing Technology and Innovation to Advance Wildlife Conservation in Tanzania

Dr. Ernest Eblate Mjingo

Director General- Tanzania Wildlife Research Institute
Email address: eblate.mjingo@tawiri.or.tz

Abstract

Wildlife conservation in the 21st century demands the integration of innovation and technology to address increasingly complex challenges facing conservation efforts. Wildlife populations in Tanzania and Africa continue to be threatened by habitat loss, poaching, climate variability, invasive alien species, human–wildlife conflict, and emerging diseases. These pressures not only endanger biodiversity but also compromise local livelihoods and the sustainability of nature-based tourism. This keynote aims to demonstrate how innovation and technology can strengthen wildlife conservation in Tanzania by enhancing monitoring, mitigating conflicts, managing disease, controlling invasive alien species and fostering resilient conservation strategies through innovations and technological tools, for conservation practice and creating solutions to these challenges. In human–wildlife conflict, deterrent technologies such as electric fences, geo-fences, chilli bombs and pepper thunder flushes are employed to reduce crop damage and human fatalities, particularly in conflicts with elephants, hippopotamuses and crocodiles. In wildlife monitoring, Unmanned Aerial Vehicles (drones), camera traps, satellite imagery, advanced survey methods, and aircraft equipped with high-resolution mounted cameras are improving population estimates for large mammals, and generating robust data to inform management and tourism planning. In disease management, molecular diagnostics, field-deployable testing kits, and digital surveillance platforms are strengthening early detection and control of wildlife diseases. The use of AI, mobile technologies, geospatial and ecological modelling tools are guiding tourism development by identifying sensitive/hotspots habitats to protect and optimize the placement of infrastructure and game viewing circuits ensuring that development supports rather than undermines conservation. Furthermore, illegal wildlife offtake can be tracked using DNA barcoding, while invasive alien plant species may be transformed into alternative energy sources. In addition, the use of database systems for data storage provides a reliable pathway for future reference and analysis. This presentation highlights that embracing innovation and technology is a necessity for modern conservation. When applied within adaptive management systems and inclusive governance, these tools strengthen biodiversity protection, secure the wildlife resources on which sustainable tourism depends and improve local livelihoods.

Keywords: Technology, Conservation, innovation, sustainable tourism, livelihoods

PLENARY PRESENTATION 2:
NATURAL RESOURCES GOVERNANCE AND CONSERVATION

Trophy hunting as a conservation and local community empowerment tool in the context of Southern Africa? Lessons and experiences from Zimbabwe

Prof. Muboko N & Gandiwa E

Zimbabwe Parks & Wildlife Management Authority, P.0.Box CY140, Causeway, Harare

Abstract

Hunting in Africa and beyond is historical and presence one of the oldest profession. However, hunting, especially trophy hunting has of late been entangled in protracted and contentious debates amplified by global media frenzy dominated by emotions on animal welfare and the preservation agenda. In Africa, wildlife conservation is an expensive undertaking and now with an added layer of increased human-wildlife conflict management efforts the conservation costs continue ballooning. For instance, Parker et al (2009) estimates that effective protected area management range from US$460-US$2 048/km^2. This against a an average trophy hunting of approximately US$138-US$1 091/ km^2 in gross income, as stated by Lindesy et al. (2025), presents a significant funding deficit. rather than science and facts. This is compounded by the fact that historically Africa's share of International tourist revenue has been low ranging between 3-5% of global tourist receipts. Drawing from the current controversies, this paper contributes to the growing debate over wildlife conservation and hunting, especially in human-dominated landscapes of Southern Africa. The focus is to; i) revisit the legal and institutional framework for trophy hunting, processes and procedures in the case of Zimbabwe, ii) assess how trophy hunting can act as a conservation and financial tool, and iii) understand the extent to which trophy hunting contributes to local community livelihoods and development. Results indicate that in Africa, trophy hunting is designed to meet multiple objectives such as creating an economic value to landowners, funding conservation, managing wild animal populations, creating incentives for local communities and act as human-wildlife conflict management tool.

Key words: Conservation; livelihoods; local community; preservation; trophy hunting; wildlife

PLENARY PRESENTATION 3: SUSTAINABLE TOURISM

Sustainability in Changing World: Cross-road or Highway for Wildlife Tourism?

Prof. Dev Jani

University of Dar es Salaam Business School, yogi_dev@hotmail.com

Abstract

Sustainability is an imperative concept to be embraced in all aspects of life. However, due to its multidimensional nature and the ever-changing world, the concept's practicality and implementation are lagging behind. In the tourism setting, it is an even bigger challenge, given the contextual and dynamic nature of tourism that depends on both the spatial and temporal aspects of the supply and demand sides. Innovation in tourism management and operations offers optimal avenues to navigate through the ever-changing world, at the same

time ensuring sustainability. Specifically, in the context of wildlife tourism, innovation serves to balance the two arms of conservation and economic aspects. Does such a balance imply a crossroads or a highway situation for tourism stakeholders? Who is supposed to act? How are the stakeholders supposed to react if not anticipating and planning for the foreseen changes? Definitely, navigating the dynamic environment with the goal of ensuring sustainability is a 'One Size Fits All' scenario. Thus, concepts like resilience, adaptability, and accommodation within the spectrum of wildlife tourism stakeholders are imperative. The presentation will serve to amplify the key tenets in sustainable tourism and provide alternative innovative trajectories. Definitely, the cross-road and highway trajectories in an alternative adaptive and evolving nature are unavoidable. Specific dynamic strategies and tools revolving around the Triple Ps of sustainability (Profit, People, and Planet), integrated with dual Es of management goals (Efficiency and Effectiveness), will be proposed. Change is inevitable, tourism needs to change, with multifaced dimensions of innovations being part and parcel wave.

Keywords: Cross road, Innovation, Sustainability, Tourism

ABSTRACTS FOR ORAL PRESENTATIONS AS PER SUB-THEMES

SUB-THEME BEE ECOLOGY AND POLLINATORS

Impact of fire on ground-dwelling insects along Namalok Nature Reserve

Innocensia E. Tarimo[1], Julius V. Lasway[1]

[1]*Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O. Box 3031, Moshi, Tanzania*

Corresponding author: Innocensia E Tarimo; email: innocensiadidas2001@gmail.com;

Abstract

Fire is a major natural and anthropogenic disturbance in terrestrial ecosystems and plays a key role in shaping biodiversity, particularly in savannahs. However, fire outbreaks often caused by human activities like land clearing and honey harvesting have become a growing conservation concern due to their impact on soil, plants, and especially invertebrate species. Despite the ecological significance of invertebrates, particularly ground-dwelling insects, most fire impact studies in Tanzania focus on plants and vertebrates, with insects remaining underrepresented. Understanding fire's role in insect decline requires assessing its effects on ground-dwelling insect diversity and abundance across habitats in nature reserves. A study was conducted at Namalok Nature Reserve in Kahe Ward, Moshi District, to assess fire's impact on ground-dwelling insect diversity and abundance between burnt and unburnt sites. Data were collected using pitfall traps across 10 transects (5 per site), with 50 traps per site. Specimens were preserved and identified using South and East African field insect guidebooks. The Shannon-Wiener Index was used for species diversity, with data analyzed using R software. Study reveal that 560 ground-dwelling insects were collected, representing 17 species from five insect orders: Coleoptera, Hymenoptera, Dermaptera, Orthoptera, and Hemiptera. Species abundance and diversity were lower in burnt sites, indicating that fire negatively affects insect communities, likely due to habitat destruction, loss of plant cover, and changes in soil moisture and temperature. It is recommended that fire management in the reserve consider the ecological roles of these insects. Conservation efforts should include post-fire recovery monitoring and awareness of insect-based ecosystem services in reserves like Namalok.

Keywords: Fire disturbance; ground-dwelling insects; insect diversity; Namalok Nature Reserve

Taxonomic identification of stingless bees (Hymenoptera: Apidae: Meliponini) from selected locations of Tanzania using DNA barcoding

Christopher Mduda[1]

[1]University of Dar es Salaam

Corresponding Author: mduda@udsm.ac.tz

Abstract

Accurate taxonomic identification of stingless bees is critical for their conservation and sustainable management, yet morphological methods are often limited by species complexity and lack of expertise. This study employed DNA barcoding targeting a 650 bp

fragment of the mitochondrial cytochrome oxidase I (COI) gene to identify stingless bee specimens collected from 19 locations across mainland Tanzania. A total of 28 specimens representing wild colonies were analyzed, yielding reliable species-level identification (>97% similarity to reference sequences in the BOLD database) for 53.6% of samples. Identified species included *Plebeina armata, Hypotrigona gribodoi, Axestotrigona ferruginea*, and *Dactylurina schmidti*. Specimens with barcode similarity between 95 - 97% were assigned to the genus Axestotrigona, indicating potential unresolved taxonomic status. Despite reliable identification, we observed significant morphological diversity among *P. armata* and *H. gribodoi* specimens, with average within-group genetic distances of 3.2 and 3.9 %, respectively. Phylogenetic analyses corroborated these identifications and revealed potential cryptic speciation and genetic structuring consistent with geographical locations. The findings underscore the utility of DNA barcoding to complement traditional taxonomic approaches and highlight the underexplored diversity of Afrotropical stingless bees. Further molecular and morphological studies are recommended to clarify species boundaries within the genus Axestotrigona, resolve taxonomic discrepancies in Afrotropical stingless bees and improve regional biodiversity assessments.

Keywords: Cryptic species, DNA barcoding, Genetic diversity, Meliponini, Stingless bees,

Geospatial Analysis and impacts on insect pollinators of the invasive weed Astripomea hyoscyamoides Vatke var. Verscin in Central Tanzania's Dodoma Region

Faith Mpondo[1]

[1]University of Dodoma, Department of Environmental Engineering and Management
Corresponding Author: chypo08@gmail.com

Abstract

The invasive Kongwa weed (Astripomoea sp) possess significant ecological and agricultural threats across various landscapes. Our study aimed to map the distribution and assess the impacts on insect pollinators of Kongwa weed in relation to altitude and habitat within Dodoma region, central Tanzania. We conducted a comprehensive fieldwork covering six districts of Dodoma, involving systematic sampling and geospatial mapping to assess the occurrence and prevalence of this invasive species. Our initial results reveal a marked variation in Kongwa weed density with changing altitudes whereby lower altitudes such as Kongwa exhibited higher weed densities, whereas mid to high altitudes showed a notable decrease in infestation levels especially above 1300 m asl. Sites with intensive weed infestation had potentially few insects' abundance and diversity compared to weed free sites. When comparing pollinator-plant network properties including connectance, nestedness, robustness, number of links and network diversity between affected and unaffected sites we noted that weed free areas contained significantly larger networks than affected areas. The findings suggest that altitude and habitat types play a crucial role in the proliferation of Kongwa weed, potentially due to variations in temperature, moisture, vegetation and soil conditions. Understanding these patterns is essential for developing targeted management strategies to mitigate further spread of Kongwa weed and potential impacts on biodiversity especially insect pollinators. This research highlights the importance of altitude-specific approaches in invasive species management and provides a foundational framework for further ecological studies and conservation efforts.

Keywords: Insect, Invasive species, Mapping, Pollinators, Pollination networks

Mapping Optimal Zones and Environmental Pressures for Beekeeping: An Integrative Modelling Approach

Baraka Naftal[1*], Sood Ndimuligo[2], Simula Maijo[1], Angela Mwakatobe[1], Ally Nkwabi[1], Wilfred Marealle[1], Emanuel Pagiti[1], Paul Mjema[3], Deus Mjungu[3], Pius Kavana[4], and Eblate Mjingo[1]

[1] Tanzania Wildlife Research Institute, P.O. Box 661, Arusha, Tanzania, [2]Tanzania Landscape Restoration Organization (TaLRO), Kigoma, Tanzania, [3]Jane Goodal Institute P.O. Box 70728, Mikocheni, Dar es Salaam, Tanzania, and [4]Stella-Maris Mtwara University College, P.O. Box 674 932, Mtwara Tanzania
Corresponding author: baraka.mbwambo@tawiri.or.tz

Abstract

Understanding the spatial distribution of suitable habitats for beekeeping is critical for improving apicultural productivity and conserving pollination services, particularly in biodiverse landscapes such as the Greater Mahale Ecosystem in western Tanzania. This study applied the Maximum Entropy (MaxEnt) algorithm to model beehive habitat suitability by integrating georeferenced occurrence data with a suite of bioclimatic and environmental predictors. Beehive presence data were collected through participatory field mapping, while predictor variables included temperature seasonality, precipitation metrics, elevation, land use/land cover, distance to roads, and wildfire frequency. The model performed strongly, achieving an Area Under the Curve (AUC) of 0.857, indicating high discriminatory power. Among the predictors, temperature seasonality was the most influential, contributing 40.3% to the model and showing a permutation importance of 41.6%. This was followed by elevation (21.7% contribution; 15.3% permutation importance) and distance to roads (11.6%; 15.0%), highlighting the combined influence of climatic stability, topographic gradients, and human-modified landscape access on beekeeping potential. The final habitat suitability map revealed pronounced spatial heterogeneity, with highly suitable areas concentrated in mid-altitude Miombo Woodlands, riparian forest, and semi-managed village lands. In contrast, low suitability was predicted in steep highlands, arid lowlands, and intensively cultivated areas. Under a balanced threshold scenario, approximately 63% of the study area was identified as moderately to highly suitable for apiculture. These findings offer critical spatial insights to inform sustainable beekeeping interventions, conservation planning, and land-use management. By integrating ecological modeling with local knowledge systems, this study enhances the understanding of pollinator resource dynamics in the face of climatic and anthropogenic pressures in sub-Saharan Africa.

Keywords: Apiculture, Beekeeping, Environmental Drivers, Honeybees, Western Tanzania.

Impact of fire on ground-dwelling insects along Namalok Nature Reserve

Innocensia E. Tarimo[1], Julius V. Lasway[1]

[1]Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania
Corresponding author: innocensiadidas2001@gmail.com; phone: +255 (0)656912831

Abstract

Fire is a major natural and anthropogenic disturbance in terrestrial ecosystems and plays a key role in shaping biodiversity, particularly in savannahs. However, fire outbreaks often

caused by human activities like land clearing and honey harvesting have become a growing conservation concern due to their impact on soil, plants, and especially invertebrate species. Despite the ecological significance of invertebrates, particularly ground-dwelling insects, most fire impact studies in Tanzania focus on plants and vertebrates, with insects remaining underrepresented. Understanding fire's role in insect decline requires assessing its effects on ground-dwelling insect diversity and abundance across habitats in nature reserves. A study was conducted at Namalok Nature Reserve in Kahe Ward, Moshi District, to assess fire's impact on ground-dwelling insect diversity and abundance between burnt and unburnt sites. Data were collected using pitfall traps across 10 transects (5 per site), with 50 traps per site. Specimens were preserved and identified using South and East African field insect guidebooks. The Shannon-Wiener Index was used for species diversity, with data analyzed using R software. Study reveal that 560 ground-dwelling insects were collected, representing 17 species from five insect orders: Coleoptera, Hymenoptera, Dermaptera, Orthoptera, and Hemiptera. Species abundance and diversity were lower in burnt sites, indicating that fire negatively affects insect communities, likely due to habitat destruction, loss of plant cover, and changes in soil moisture and temperature. It is recommended that fire management in the reserve consider the ecological roles of these insects. Conservation efforts should include post-fire recovery monitoring and awareness of insect-based ecosystem services in reserves like Namalok.

Keywords: Fire disturbance; ground-dwelling insects; insect diversity; Namalok Nature Reserve

Effect of global climate change on insect populations, distribution, and its dynamics

Gabriel Mayengo[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author: mayengogabriel@gmail.com

Abstract

Insects are vital to various ecosystems as pollinators, decomposers, and food sources for many organisms. They dominate diverse terrestrial (e.g., glassland) and aquatic (lakes, oceans, rivers, etc.) ecosystems. Previous studies report that more than half of the estimated 2.0 million species of living organisms identified on our planet are insects. However, global climate change (GCC), characterised by rising temperatures and altered precipitation patterns, significantly impacts their populations worldwide. We reviewed the literature to provide an overview of GCC events in insects. Collectively, the study findings reveal that global temperature and precipitation change are among the extreme GCC events affecting more than 30% of insect population, distribution, physiology, feeding habits, interactions, migration, and communication across the globe. The climate change intensifies insect cycles and insect damage in agroecosystems. In response, insect species alter their geographic ranges and phenology, changing population dynamics and interactions. GCC also influences reproductive patterns, including mating behaviour and breeding synchrony. Warmer global temperatures might advance or delay insect emergence, causing mismatches with food availability or pollination partners. While some insect populations may adapt, extreme heat events or prolonged droughts exceeding their physiological tolerance result in population declines or local extinctions. Predictions suggest that up to 65% of insect populations could face extinction within the next century due to increasing climate change. Thus, understanding these impacts is essential for predicting the ecological consequences of the GCC and developing effective conservation

strategies to mitigate such impacts and protect insect biodiversity and ecosystem services.

Keywords: Biodiversity, Climate change, Habitat, Population dynamics, Phenology

Occurrence of wild bees and their interaction with foraging plants along a livestock grazing gradient of northern Tanzania

Julius Lasway[1]

[1]Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania
Corresponding author: julius.lasway@mwekawildlife.ac.tz

Abstract

Studies describing the occurrence of wild bees and their interaction with forage plants along livestock grazing gradient is critical in understanding bee-plant interaction networks and in developing conservation plans to ensure ecosystem services in human-modified landscapes. Despite this need, bee-plant interaction studies are scarce in Africa, and Tanzania is no exception. Therefore, in this study, we present wild bee species richness, occurrence, and distribution collected across sites with different levels of livestock grazing intensity and forage resources thereby. The data were collected intermittently between August 2018 and March 2020 from 24 study sites distributed along three levels of livestock grazing intensity with eight replicates for each: low, moderate, and high livestock grazing intensity. In each study site, two 50 × 50 m study plots were set from which bees and floral resources were sampled and quantified. The two plots were placed in a way to capture the overall structural heterogeneity of the respective habitat by placing the two plots in contrasting microhabitats where possible. For example, in moderately livestock-grazed habitats, plots were placed on sites with and without tree or shrub cover to ensure representativeness. This paper presents wild bees comprising of 2,691bee individuals from 183 species representing 55 genera of the five bee families: Halictidae (74), Apidae (63), Megachilidae (40), Andrenidae (5), and Colletidae (1). In addition, the study comprises 112 species of flowering plants that were identified as potential forage resources for bees. This paper supplements rare but critical data on bee pollinators in Northern Tanzania and advances our knowledge of the potential drivers of bee-pollinator whose populations diversity are declining globally

Keywords: Bee species, Bee-plant interaction, Forage resources, Grazing, Intensity, Richness

Spatial and ecological drivers of bee diversity across Kilimanjaro's altitudinal and vegetation Zones.

Neema Kilimba[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: neema.kilimba@tawiri.or.tz

Abstract

Understanding the distribution and diversity of bees in ecosystems is crucial because bees play a vital role in pollination of plants, making their distribution and diversity important ecological indicators. Mount Kilimanjaro, provides a unique opportunity

to explore how these factors influence bee communities due to its varied elevations and distinct vegetation zones. Further, Mount Kilimanjaro is a hub of pollinators that are critical not only for local biodiversity but also for maintaining the ecological balance of the region, particularly in terms of plant reproduction and food security. This study explores the distribution and composition of bee species across different vegetation zones and elevations of Mount Kilimanjaro. Sampling was conducted at various altitudes, ranging from the lower montane forest to the alpine zone, covering key vegetation types. Our results revealed a significant variation in bee diversity and abundance, with species specialized to elevations and vegetation types. These findings indicate that both vegetation structure and altitudes determine the distribution and diversity of bees, with species specialized in high elevation being adapted to more colder conditions and the vegetation that are also propagate in such conditions. These findings are very crucial in predicting the impacts of climate change on pollinators such as bees found in High Mountain including the Kilimanjaro, and hence necessitate conservation efforts of pollinators in the face of changing climatic conditions.

Keywords: Altitude, Bees, Kilimanjaro mountain, Pollinators, Vegetation

A review of species diversity, nesting biology and threats to African stingless bees (Hymenoptera: Apidae: Meliponini)

Sued Mussa[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: suedmussa04@gmail.com

Abstract

Stingless bees are small, non-aggressive social insects classified under the order Hymenoptera, family Apidae, subfamily Apinae and tribe Meliponini. With approximately 605 known species globally, they are widely distributed across tropical and subtropical regions including African ecosystems. The review exercise focused on primary search engines including Google Scholar and Google Search, due to their broad accessibility and comprehensive coverage of academic and grey literature. A total of 33 species of stingless bees, belonging to eight different genera, have been documented across four distinct regions of Africa. This diversity highlights the ecological richness of the continent and the important role stingless bees play in pollination and biodiversity conservation. Among these, the genera Meliponula, Hypotrigona, and Axestotrigona are the most widespread and extensively studied. They typically nest in tree trunks, underground cavities, exposed sites, and live within termite or ant nests. Their wide distribution across varied ecosystems from tropical forests to savannahs demonstrates their adaptability and the potential for sustainable use in local beekeeping and conservation initiatives. However, the African stingless bees are threatened by several factors such as honey hunting, nest extraction deforestation, application of agrochemical, wild fires, pests and predators. The sustainable conservation and use of stingless bee resources in Africa require continued research, innovation, collaboration, and integrated approaches. To resolve taxonomic challenges, future studies should combine morphological analysis with molecular techniques such as DNA barcoding and nest architecture assessment.

Keywords: Diversity, Nest, Nesting site, Nest architecture, Stingless bee, Threats

Assessment of The Opportunities and Challenges Facing Beekeeping Activities at Rau Forest Reserve, Moshi Urban Area

Ellen Ponsian[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: ellen.ponsian@tawiri.or.tz

Abstract

Beekeeping is among economic activities which provides sustainable livelihood to many small-scale farmers and rural communities. The activity facilitates conservation of habitat in several key areas and yet remains underdeveloped in many regions. This study examined the social-economic and environmental factors influencing beekeeping activities at Rau Forest Reserve in Moshi Urban. Data were collected from Mabogini and Mandaka villages which were purposely selected based on the distance from the forest and the major economic activities conducted. A total of 93 respondents, representing 5% of registered households in each village, were randomly sampled and interviewed. Data were analyzed by using Statistical Package for Social Science (SPSS) version 25. Chi-square test at 0.05 significant level was used to determine relationship between variables. Poor quality of packaging materials, lack of technical skills and pests were the major challenges hindering local communities in beekeeping activities. Result also identified opportunities for local communities to participate in the activity including presence of river in an area, availability of flowering plants as well as present of forest reserve. Conclusively, majority of local communities produced honey for home use and not for market. The study recommends provision of technical skills to local beekeepers, improving access to modern equipment and packaging materials to sustain beekeeping activities at Rau Forest Reserve, Urban area.

Keywords: Beekeeping, Challenges, Forest reserve, Opportunities, Urban

Edible wild insects enhance food security and promote cultural heritage in the lake zone, Tanzania

Renatus Bwiki

[1]The University of Dodoma: Corresponding Author: renatusdioniz0@gmail.com

Abstract

Insects are part of traditional diets to many ethnic groups in Tanzania. With increasing global interest in sustainable food systems, entomophagy "the practice of consuming insects" offers a valuable opportunity to address food security, promote cultural heritage, and support environmental sustainability. This study investigated the socio-economic, cultural and nutritional dimensions of edible wild insect consumption in Kagera and Mwanza regions in Tanzania. Using semi-structured questionnaire for household survey(n=233) and key informant interviews (n=10), the study assessed demographic influences, consumption patterns, motivations, harvesting and preparation methods, and perceptions of environmental changes affecting insect availability. The results revealed that majority of respondents were self-employed(75.7%), and formal education was significantly more common in Mwanza ($p = 0.001$). Ethnically, the Haya (47.0%) and Nyambo (19.2%) were most represented, reflecting the cultural specificity of insect consumption in these communities. Winged termites (87.1%) and longhorn grasshoppers (82.4%) were the

most commonly consumed species, with cultural significance emerging as the leading motivation across all age and sex groups. No significant association was found between sex and reasons for consumption ($p = 0.833$), though perception of consumption differed slightly by gender ($p = 0.035$). Seasonal availability strongly influenced consumption patterns, with 83.7% of respondents consuming insects during rainy season. This varied significantly by region ($p = 0.009$), reflecting differences in ecological conditions and insect abundance. Habitat loss (82.4%), climate change (75.5%), and unsustainable harvesting (69.1%) were cited as key factors affecting insects' availability. Hand-picking and frying were predominant harvesting and preparation methods respectively, and did not vary significantly between the regions (harvesting: $p = 0.224$; preparation: $p = 0.315$). The findings underscore the significance of entomophagy in the region and its potential contributions to food security, cultural heritage, and rural livelihoods.

Keywords: Entomophagy, Food security, Insects availability, Longhorn grasshoppers, Winged termites

Plants and Insects of Arusha and Manyara Regions, Northern Tanzania

Julius Keyyu

[1]Tanzania Wildlife Research Institute
Corresponding author: julius.keyyu@tawiri.or.tz

Abstract

This study aimed to document the biodiversity and valuable biological resources in northern Tanzania, as well as to record indigenous knowledge among ethnic groups regarding medicinal plants, their conservation status, and their potential for use in the production of medicines and other natural products. Biodiversity surveys were conducted in two phased (dry and wet season) at TAWIRI Headquarters and Oljoro (Arusha Municipality), Monduli forest, Emairete village, Enguik village (Monduli) and Engora village (Kisongo). Methods for survey of insects included observation, sweeping, nets beating, pitfall and light traps. Methods for plants survey included plant search, image acquisition and sample collection. Results showed that a total of 1,867 insects belonging to 9 orders, 42 families and 80 genera were recorded. Moreover, results showed that a total of 366 plants belonging to 42 families, 100 genera and 122 species were recorded; and 60 species of medicinal plants. Specimens of insects and plants were collected and have been stored in the biological specimen storage room at TAWIRI. The importance of biodiversity, biological resources/specimen banks and utilization of biological resources is discussed.

Keywords: Biodiversity, Insects, Plants, Specimen bank

The First Detection and DNA Barcoding of Honey Bee Endoparasitoid Larvae (Tachinidae) in Tanzania

Christopher Mduda

[1]University of Dar es Salaam
Corresponding Author: mduda@udsm.ac.tz

Abstract

Beekeeping productivity in Tanzania is significantly lower than its potential due to factors such as inadequate management, non-standardized equipment, environmental stresses, and the presence of pests and diseases. However, these issues have not been thoroughly investigated. This study reports for the first time on parasitism of honey bee (*Apis mellifera*) colonies by tachinid flies in Tanzania. In an apiary located in West Kilimanjaro, Siha district, two late-instar dipteran larvae were discovered within the abdomens of live honey bees. The larvae had large, round, black posterior spiracles, and were assigned to the species *Rondaniooestrus apivorus* (Family Tachinidae) based on the morphological diagnostic features. Parasitized bees remained active but displayed signs of distress, including abdominal bloating and discoloration, reduced gut size, minimal fat body tissues, and signs of indigestion. Three pupae, morphologically matching the larvae, were also found at hive entrances. DNA barcoding of two larvae and one pupa showed no close matches in the Barcode of Life Data System (BOLD). However, moderate sequence similarity (89–90%) was observed with reference sequences of *Palesisa nudioculata* and Hemigymnochaeta unicolor available in GenBank. Although the prevalence of the endoparasitoid larvae was low (3.3%), their presence may go unnoticed in live hosts, potentially enabling the parasite population to increase. This is the first documented case of such parasitism in Tanzania, highlighting the need for further research to substantiate the threat posed by this honey bee pest.

Keywords: *Apis mellifera*, Diptera, DNA barcoding, Endoparasitoid larvae, *Rondaniooestrus apivorus,* Tachinid fly

Influence of habitat types on dung beetle and grasshopper assemblages in rangeland ecosystems in Longido and Monduli Districts.

Neema Kilimba[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: neema.kilimba@tawiri.or.tz

Abstract

Dung beetles and grasshoppers are important indicators of ecosystem health in grazing lands. They play key roles such as nutrient recycling, soil health, and vegetation composition. This study investigates species composition, their distribution, biomass, and class size of dung beetles and grasshoppers in various habitat types in the grazing land of Monduli and Longido Districts in Arusha, Tanzania. Surveys were conducted in various habitats including grasslands, wooded grasslands, shrublands, and bare lands. Data were collected using standardized methods, such as baited pitfall traps for dung beetles and sweep netting for grasshoppers. Our results show that there was a significant difference in species diversity, composition, and biomass in various habitat types in the grazing lands, with both groups revealing distinct distribution patterns to habitat type and structure of vegetation. The

finding from this study outlines the sensitivity of both taxa to habitat changes caused by grazing intensity and land use practices. Therefore, understanding their composition and distribution patterns is crucial for establishing sustainable grazing management approaches that support biodiversity and ecosystem services in rangeland systems.

Keywords: biodiversity, distribution, diversity, ecosystem, species

SUB THEME-CLIMATE CHANGE, ADAPTATION AND RESILIENCE

Weather Patterns and Response of Large Wild Herbivores to Seasonal Variations in Enduimet Wildlife Management Area, Tanzania

Nalaila Gabriel

Tanzania Elephant Foundation
Corresponding author: mkumbonala@gmail.com

Abstract

Weather patterns are critical indicators of wildlife habitat conditions, influencing vegetation growth and forage availability. The Enduimet Wildlife Management Area, located in northern Tanzania, serves as both a key habitat and migratory corridor, yet the ecological effects of long-term weather variability in this landscape are scarcely documented. This study assessed historical weather trends and habitat conditions in Enduimet WMA from 1983 to 2023 and examined herbivore density and habitat selection across seasons in 2024. Precipitation data from CHIRPS and NDVI values were used to analyse weather and vegetation trends, respectively. Herbivore ecology was studied using distance sampling across five habitat types: shrubland, grassland, wooded grassland, woodland, and mixed vegetation, from May to December 2024. Results showed a bimodal rainfall pattern with peaks during November–December (short-rains) and March–May (long-rains), with average monthly rainfall of 51.2 ± 1.7 mm. Significant variation was found between wet and dry season rainfall (Wilcoxon W = 3015, $p < 2.2e-16$). Severe wet years included 1989, 1997, 2002, and 2020, while drought years were observed in 1983–1984, 1993, and 2017. NDVI trends were mostly stable over the long term, except in extreme years, where vegetation cover deviated markedly. Key informants reported increased wildlife mortality and migration during harsh seasons, particularly affecting buffalo, wildebeest, and giraffe. Species richness was 10, with higher densities recorded for Thomson's gazelle, zebra, and Grant's gazelle. Seasonal changes in species density were not statistically significant ($\chi^2 = 7.173$, $p = 0.405$), nor were overall habitat selection patterns ($\chi^2 = 0.3946$, $p = 0.9807$), though species-specific preferences varied. These ecological patterns were shaped by species' physiology, foraging behaviour, and seasonal habitat availability. Given Enduimet's ecological importance and sensitivity to weather extremes, long-term monitoring and cross-border habitat connectivity are essential to support wildlife resilience.

Keywords: Enduimet, Herbivores, Season, Variations, and Weather.

Climate Change and the Distribution of House Crows (Corvus splendens) in Tanzania

Shabani Haruna

Tanzania Wildlife Research Institute
Corresponding author: shabani.haruna@tawiri.or.tz

Abstract

Global climate change has recently received attention as it affects species distribution at all scales. Many species, including invasive species, have indicated a shift in their ecological ranges in response to climate change. However, little is known about the

impacts of climate change on house crows (Corvus splendens) habitat distribution in Tanzania. We assessed the impacts of climate change on current and future potential suitable habitat distribution for house crows using Maxent 3.4.1. We estimated the extent of both current and future potential suitable habitats for house crows, the persistence of house crows' suitable habitats through time, and the size of suitable habitat in protected areas of Tanzania. Current suitable habitat distribution tallied with the observed house crow distribution along the coast of the Indian Ocean. We identified new potential suitable areas around Lake Victoria. Future climate change will likely cause extreme expansion of house crows throughout this century; interestingly, contemporary house crow suitable niche will likely persist towards the end of this century, as we predicted overlap between potential current and future suitable niche. We predicted 51,000 km2 as the currently suitable area, which was more than 20 times less than predicted future potential ranges in Tanzania. Future climate change impacts are estimated to expand suitable habitat for house crows into protected areas of Tanzania. These findings suggest that the biodiversity would continue to experience threats from house crow invasions. Mitigation measures against house crow are inevitable, to alleviate socio-economic impacts likely from house crow invasions in Tanzania.

Keywords: House Crows, Climate Change, Species Distribution Modeling in Tanzania

Stakeholders' Physical and Social Mapping in the Application of Artificial Intelligence in Enhancing Climate Change Resilience for Rural Communities Living Adjacent to Protected Areas in Tanzania

[1]Ladislaus Batinoluho, [2]Daudi Lema, and [3]Godfrey Nyangaresi

[1]Department of Geography, Tourism and Hospitality Studies, The Open University of Tanzania
[2]Tanzania National Parks Authority; [3]Southern Tanzania Elephant Program
Corresponding author: Darksky.tanzania@gmail.com

Abstract

Rural communities bordering Tanzania's protected areas face significant climate resilience challenges that require innovative solutions. Currently, technological applications remain underutilized in addressing human-wildlife conflicts (HWC), food insecurity from crop damage, and erratic rainfall, fatalities from wildlife encounters, deforestation, and community Protected Areas (PAs) management tensions. Tanzania's extensive protected network covers 33% of national territory (376,973 km²), including 21 National Parks (99,306.5 km²), the Ngorongoro Conservation Area (8,261 km²), 28 Game Reserves, 27 Game Controlled Areas, and 20 Wildlife Management Areas (169,553 km²), plus additional nature and forest reserves. These areas dinterface directly with local communities, where wildlife causes disproportionate losses - claiming one life every 52 hours and destroying 41,404 hectares of crops between 2020-2023, alongside 792 animal fatalities, despite government compensation of 4.6 billion Tanzanian shillings. This study conducted comprehensive stakeholder mapping to identify actors and infrastructure supporting climate resilience near PAs. Using mixed methods, researchers engaged 392 participants through questionnaires (91.8%), focus group discussions (4.8%), and key informant interviews (3.3%), representing regional to village governments, public/private institutions, Community Social Organizations, faith-based groups, and youth/women networks. Data analysis employed qualitative thematic approaches within the Ruaha-Rungwa Ecosystem (Iringa District), covering

12 villages across four wards. Findings reveal critical stakeholder fragmentation, with farmers, entrepreneurs, pastoralists, religious groups, and government agencies operating independently. Gender imbalance was evident (63.8% male participation). The study highlights opportunities for integrated technological solutions to strengthen climate adaptation, conservation efforts, and community resilience through coordinated stakeholder engagement and youth education initiatives.

Key words: Adaptation, Community, Engagement, Climate change, Resilience

SUB-THEME - Habitat conservation, Vegetation Ecology and Invasive species

Assessment of abundance and distribution of invasive alien plant species in Pugu – Kazimzumbwi Nature Forest Reserve (PKNFR) in Tanzania

Ezekiel Mwakalukwa

Sokoine University of Agriculture
Email: ezedwa@sua.ac.tz

Abstract

The coastal forests of Tanzania are among the global biodiversity hotspots, harbouring dozens of narrow endemic species. However, the biodiversity found in these forests area currently threatened by the spread of invasive alien plant species (IAPS). This study assessed the abundance and distribution of IAPS in Pugu-Kazimzumbwi Nature Forest Reserve (PKNFR) located in Kisarawe district, Tanzania, to support efforts by Tanzania Forest Services Agency (TFS) in combating these noxious weeds. A combination of three methods (a 14-day reconnaissance survey, systematic vegetation sampling across an area of 2,410 ha in Pugu forest using 55 circular plots and 4,887 ha in Kazimzumbwi forest using 77 circular plots, and spatial analysis) were employed in the assessment. The results indicate that seven IAPS were recorded in Pugu forest and 26 IAPS in Kazimzumbwi forest. In Pugu forest, the most dominant species was Manihot carthaginensis subsp. glaziovii, contributing to over 51 % of total IAPS individuals and recorded in more than 15 % of plots. Other prominent species included Lantana camara and Senna siamea, both found in association with past mining activity, charcoal extraction trails, and edge disturbances. Their distribution was more diffuse, with no large monoculture thickets but several ecologically sensitive incursions. In Kazimzumbwi forest, Lantana camara was identified as the most dominant species accounting for over 70 % of IAPS stems and recorded in 13 % of plots. Other alien species included Senna siamea, Manihot carthaginensis, Elaeis guineensis, and Gmelina arborea. IAPS were most frequently observed in bushland, wooded grassland, and thicket vegetation types, often coinciding with areas of reduced canopy cover and proximity to disturbed edges or informal access paths. These results demonstrate that Kazimzumbwi forest remains at an early to moderate stage of invasion, while in Pugu forest is moderate. Thus, early intervention and adaptive management are essential to maintain the reserve's ecological integrity.

Keywords: Biodiversity loss, Coastal forests, Human disturbances, Invasive species, Tanzania Forest Services Agency

Assessment of Land Use and Land Cover Change (2000-2020) in Randilen Wildlife Management Area, Arusha, Tanzania

Oliver Nyakunga

College of African Wildlife Management, Mweka
Email: oliver.nyakunga@wildlife.ac.tz

Abstract

This study assesses land use and land cover changes in the Randilen Wildlife Management Area, Arusha, Tanzania, from 2000 to 2020, and projects future trajectories for 2040. Utilizing GIS and Remote Sensing techniques, we collected data to analyze spatial and temporal changes. A systematic sampling approach was employed to acquire Landsat images from 2000, 2010, and 2020, with analyses conducted using ArcGIS 10.8 and future simulations performed using the CA-Markov Model in QGIS 2.8.1. Results indicated an increase in cultivated areas (10.79%) and a decrease in swamps (2.80%) and water bodies (0.23%) from 2000 to 2010, prior to the establishment of Randilen WMA. Between 2010 and 2020, there was a significant increase in open woodland (41.63%) and grassland and shrubs (31.83%), alongside declines in cultivated land (22.93%), bare land (22.36%), and built-up areas (18.67%). The CA-Markov simulation predicts that by 2040, land cover will predominantly consist of open woodland (64.06%) and grassland and shrubs (25.68%), with further losses in swamp areas and the complete disappearance of water bodies. The positive changes observed from 2010 to 2020 are attributed to conservation initiatives following the establishment of Randilen WMA in 2012, contrasting with the earlier period. This research highlights the importance of continuous monitoring of land use and land cover changes, thereby reinforcing conservation efforts and implementing measures to safeguard water resources and maintain habitat diversity.

Keywords: Land cover change, Land use, Randilen Wildlife Management Area, *Remote sensing,* Trajectories

Plant species composition and distribution in relation to wildebeest calving periods in the short grassland plains in Serengeti ecosystem

Benjamin Battersby

Tanzania Wildlife Research Institute
Email: bentan777@gmail.com

Abstract

The wildebeest migration plays a crucial role in shaping the Serengeti Ecosystem. A critical factor in the migration is the plant species composition, diversity and abundance which support the migratory animals as they search for suitable grazing land for the massive number of animals in the migration. This study examines the impact of wildebeest grazing during three distinct annual periods: before, during and after calving in the short grassland habitats. The grasslands studied in the Serengeti Ecosystem include the Ngorongoro Conservation Area (NCA), Loliondo village land and the Pololeti Game Reserve. The survey of each assessed a 12 transect grid of 2.5 km in length & width for observing vegetation. The results demonstrated a total of 123 plant species from 26 plant families. Of these, 59.3% (n= 73) were categorized based on growth habits as herbs, 32.5% (n= 40) grasses, 4.9% sedges (n=6), and 3.3% climbers (n=4). The composition of plants

observed between the three above-mentioned wildebeest time periods and the three sites shows the presence of variations in the number of species. The plant heights were statistically significantly different in relation to wildebeest grazing period before, at, and after calving. The results indicate that the mean plant heights were affected during the period at wildebeest calving which would be due to heavy foraging by the high wildebeest density recorded. In conclusion, the study findings highlighted the importance of wildebeest in maintaining grasslands habitat variations and heights when present in the short grassland habitat. Future studies should focus on long-term monitoring of the plant life forms to assist with better informed land management of these critical Migratory corridors in the Serengeti Ecosystem.

Keywords: Wildebeest, Migration, Vegetation growth, Wildebeest migration, Community ecology

Impact of the Invasive Plant Gutenbergia cordifolia on Dung Beetle Assemblages in Ngorongoro Crater, Tanzania

Christina Denis Mushi[12] , [1]Franco David Ngonya and Oliver Castor Nyakunga*[1]

[1]The College of African Wildlife Management-Mweka, Kilimanjaro, Tanzania
[2]Ngorongoro Conservation Area Authority, Tanzania
Corresponding author: onyakunga@gmail.com

Abstract

A study assessing the effect of *Gutenbergia cordifolia* invasion on the abundance and diversity of dung beetles was conducted in Ngorongoro Crater in April 2025. Specifically, the study aims to determine the abundance and diversity of dung beetles in invaded and non-invaded areas. Data were collected in plots using pitfall traps. A total of 872 dung beetles, representing 27 species and nine tribes, were recorded. The invaded site had 165 dung beetles from 11 species, while the uninvaded site yielded 707 dung beetles from 25 species. Nine species were shared between sites; 16 were exclusive to the uninvaded site, and only two were exclusive to the invaded site. The abundance of dung beetles was significantly lower at the invaded site compared to the non-invaded site ($U = 35$, $P < 0.001$). The Shannon-Weiner diversity was significantly lower in the invaded site compared to the uninvaded site ($U = 49$, $p < 0.001$). *Gutenbergia cordifolia* reduces the abundance and diversity of dung beetles in Ngorongoro Crater. This study provides the first field-based evidence of its negative impact on dung beetle communities in Ngorongoro Crater, highlighting the need for targeted invasive species management to preserve the integrity of Tanzania's protected areas.

Keywords: *Gutenbergia cordifolia*, Dung beetles, Invasive species, species diversity, Species abundance, Ngorongoro Crater, Tanzania

The land use and land cover changes at Minja forest reserve using remote sensing techniques

Emmanuel Charles Mlinga, Gabriel Mayengo

College of African Wildlife Management, Mweka, P.O. Box 3031, Moshi, Tanzania,
Corresponding author: emmanuelmlinga9@gmail.com

Abstract

This research examines the LULCC at MFR using remote sensing techniques. LULCC are among the major environmental driver affecting biodiversity and climate systems at global scale, regional scale and local scale. This research it applies a mixed approach where it combined both quantitative data from satellite images and qualitative data from ground truthing by identification of drivers through field observation surveys. The moderate resolution of 30 m the Landsat images of dry season from 1995, 2005, 2015 and 2025 were analyzed and classified in both GEE and ArcGIS Pro of version 2.8.29 tool to assess the spatial and temporal changes of dense forest, bareland, shrubland and waterbodies. The research findings show the significant changes in landcover classes, particularly increase in dense forest from 82.71 ha in 1995 and 2005 to 145.08 ha in 2005 and 2015 but also a decrease in dense forest from 203.85 ha in 2015 and 2025. Conversely, bare land showed fluctuations particularly increase from 60.3 ha in 2015 and 2025. A decrease from 204.12 ha in 1995 and 2005 but also a decrease from 17.64 ha in 2005 and 2015. While shrubland showed an increase by 123.04 ha in 1995 to 2005 but also the increase by 144.27 ha in 2015 to 2025, the decrease in shrubland from 126.27 ha 2005 to 2015. The area covered by waterbodies it shows the decrease from 1.63 ha in 1995 to 2005, from 1.17 ha in 2005 to 2015 and from 0.72 ha in 2015 to 2025. Key drivers identified through field survey include logging, livestock grazing, man-made fire points, expansion of farmland and water infrastructure installations. But also, the quantification of drivers at MFR it shows that logging activities has high number frequency of occurrence in terms of percentage followed by the other drivers include livestock grazing, installation of water pipes, farmland and fire points. Moreover, these findings provide valuable understandings that can support data driven in clear decision making, forest policy improvements, sustainable resource use to preserve biodiversity and ecosystem services at MFR. Further research is needed to assess the socio-economic impacts of these changes on forest structure, biodiversity and ecosystem.

Keywords: Land use, Landcover, Drivers, Area, Biodiversity, Minja Forest Reserve, Environmental change

On – farm medicinal plants for human health security and forest conservation in the Eastern Arc Mountains, Tanzania

Chelestino P. Balama[1], Upendo L. Msalilwa[1], Samson Hilonga[2] and Zacharia Mmary[1], Naftari L. Mahewa[1] and Ramadhani Karim[1]

[1]Tanzania Forestry Research Institute, Morogoro
[2]Institute of Traditional Medicine, Dar es Salaam

Abstract

Medicinal plants play great role in human health as well as ensuring forest conservation. However, there is limited scientific information on the potential of on-farm medicinal plants to human health security as well as forest conservation in the country. This called for a

study on assess the role of on-farm medicinal plants for human health security and forest conservation in the Eastern Arc Mountains of Tanzania. The study was specifically carried out in areas surrounding Uzungwa Scarp Nature Forest Reserve in Kilolo (Masisiwe and Ilutila villages) and Mlimba (Makutano and Ikule villages) district councils. Specifically, the study determined: communities' perception on availability, types and uses of on-farm medicinal plants and willingness to participate in conservation of on-farm medicinal plants: the stocking and utilization status of on-farm medicinal plants in the studied area: active ingredients of on-farm medicinal plants and documenting conservation potential of some on-farm medicinal plants: and factors affecting availability and uses of on-farm medicinal plants. Data collection method involved desk review, Focus Group Discussion, Key Informant Interviews, Household interviews, on farm transect walk and field observation. Collected data were subjected to descriptive statistical analyses and content analysis. The results from this study reveal several key insights regarding their use, effectiveness, and the socio-economic context of the community involved. The majority of the respondents (60.4%) reported learning about medicinal plants from family and friends, with minimal input from traditional healers or academic sources, indicating a strong cultural transmission of knowledge. Gastrointestinal disorders are the most frequently treated conditions using MPs (36.6%), followed by respiratory issues and wounds. Women play a crucial role in the management of medicinal plants, engaging in preparation (45.4%), administration (26.1%), collection (11.8%), and even serving as Traditional Medicine Practitioners (TMPs). This highlights their importance in the local healthcare system. Communities have adopted various conservation strategies, including on-farm conservation (55.9%) and selective harvesting (14.7%), to ensure sustainable use despite threats to availability. Medicinal plants (MPs) are primarily sourced from private farms (71.4%) and wild collections (22.0%). However, the availability of these plants is declining due to anthropogenic activities such as the establishment of Pine and Eucalyptus plantations and inadequate conservation practices. Farming practices pose the greatest threat to on farm medicinal plants (46.0%), with many farmers neglecting their care. The most prevalent preparation method for medicinal plants is infusion (80.9%), followed by decoction (76.5%). Most medicinal plants (63.6%) are administered orally, reflecting the nature of the diseases treated, primarily affecting internal systems. General perceptions of the respondents spotted on need for training on identifying and using medicinal plants. This suggests a gap in knowledge that could be addressed to enhance access to MPs. Also, the majority (80.9%) of respondents rated MPs as "very effective" for treating ailments, indicating strong community reliance on these natural remedies. On-farm collection of medicinal plants portrays conservation of the Eastern Arc Mountains, Tanzania through reduced human interaction in the reserved forests.

Keywords: On-farm, Medicinal plants, Eastern Arc Mountains, Communities

The Impact of Invasive Plant Species on Forage Availability, Herbivores and Distribution in the Ngorongoro Crater, Northern Tanzania

Francis Makari

Ngorongoro Conservation Area Authority
Email: francis.makari@ncaa.go.tz

Abstract

Invasive plant species (IPS), both native and exotic, pose a major ecological threat to the Ngorongoro Crater. This study evaluated the impacts of two dominant unpalatable IPS

Gutenbergia cordifolia and Bidens schimperi on forage availability and the distribution of five selected herbivore species: Connochaetes taurinus, Syncerus caffer, Equus burchellii, Gazella granti, and Gazella thomsonii. IPS invasion extent was assessed through GIS analysis and ground surveys, while forage biomass was measured using fresh and dry weight sampling. Seasonal herbivore counts were conducted between 2021 and 2023. Results indicated that 20.3% of the Crater floor was invaded, with grasslands being severely impacted habitat type. In 2021, forage biomass was significantly lower in invaded areas ($U = 52$, $p = 0.02$), suggesting reduced primary productivity. However, no significant difference was observed in 2023 ($U = 91$, $p = 0.45$), likely due to management interventions including mechanical mowing and controlled burning. Herbivore abundance varied significantly with site ($F_{1,4} = 67.681$, $p < 0.0001$), season ($F_{1,4} = 4.554$, $p = 0.04036$), and their interaction ($F_{1,4} = 10.159$, $p = 0.003$), with higher densities in non-invaded areas and during the wet season. These findings underscore the importance of sustained, adaptive management to mitigate IPS impacts and conserve ecological integrity within the Crater.

Keywords: Forage biomass, Herbivore distribution, Invasive plant species, Ngorongoro Crater

Assessment of changes in tree species richness, diversity and density along a distance gradient from Dodoma City centre

Ignas Safari* & Habiba K. Omary

Department of Biology, The University of Dodoma, P.O. Box 335 Dodoma, Tanzania
* Corresponding author: safariignas@yahoo.co.uk

Abstract

Dodoma City is a very fast growing city in Tanzania. To understand how the on-going rapid urbanization is affecting the vegetation, we evaluated changes in tree species richness, diversity and density along a distance gradient from the city centre up to 10 km away. A total of 12 transects measuring 500m long and 40m wide were established perpendicular to the four major roads radiating from the city centre, namely Morogoro road, Kondoa/Arusha road, Bahi/Singida road, and Iringa road. In each road, three transects were established, the first transect within the city centre, the second 5km, and the third 10 km from the city centre. In each transect, all trees were identified to the species level and counted. Furthermore, each tree species was classified into native or exotic to the sub-Saharan Africa region using available literature. Species richness, Shannon-Wiener diversity index, density (trees/hectare) and proportion of native species were calculated for each transect as well as the average for all transects within the respective distance band. Furthermore, trend in tree species richness, diversity, density and proportion of native species from the city centre towards the periphery was analysed. A total of 55 tree species comprising of 17 native and 38 exotic were recorded, dominated by the native *Trichillia emetica* (13.94%) and non-native *Azadirachta indica* (13.76%). Whereas species richness, diversity and density declined with distance from the city centre (Kruskal–Wallis test, $P < 0.05$), the proportion of native species increased marginally along the distance gradient (Kruskal–Wallis test, $P = 0.059$). Generally, the study shows that areas within the city centre contains more trees species, density and exotic trees than those on periphery. We recommend for increased effort of tree planting in the peripheral areas of the city and consideration of including native tree species in the on-going greening programme.

Keywords: Dodoma, Diversity, Density, Species richness

Spatial-temporal analysis on forest cover change at Kindoroko catchment forest reserve

Godfrey Edmund Malima and Gabriel Mayengo

Department of Wildlife Management, College of African Wildlife Management
Corresponding author: godfreymalima22@icloud.com

Abstract

The forest cover change impairs forest ecosystem functions and threatens the survival of forest-dependent species. This study aimed to show the Kindoroko Catchment Forest cover change for the last three decades (1993-2003, 2004-2014, 2015-2025) and to identify the drivers of change. Three land cover maps were produced for 1995, 2011 and 2024, representing each decade, respectively. The random forest algorithm was used to classify Landsat 5 Thematic Mapper (TM) image, Landsat 7 Enhanced Thematic mapper plus (ETM+) image and Sentinel 2 Surface Reflectance image (S2_SR) into two main land cover types, namely; forest and bare land. The accuracies of 88%, 94% and 95% were obtained with the Kappa Indices of Agreement (KIA) of 0.8, 0.85 and 0.9 for each land cover map respectively. The forest cover percentages were 93.75%, 80.32%, 70.8%; bare land cover percentages were 6.46%, 19.8% and 29.37% for year 1995, 2011 and 2024 respectively. Overall, the forest cover decreased by 22.952% from 1995 to 2024 and the bare land cover increased by 22.864% from 1995 to 2024, indicating a significant loss of forest cover at Kindoroko Catchment Forest. The decline in forest cover is the reflection of increased human population around the forest area, resulting into increased land pressure due to increased agricultural expansion, settlement expansion, logging, animal grazing and occurrence of wild fires. Enforcing the laws, strengthening cooperation with local communities around the forest and promotion of effective conservation policies is crucial for restoring and maintaining the health of Kindoroko Catchment Forest.

Keywords: Conservation, Drivers of change, Forest, Remote sensing, GIS.

Trait-Based Invasion: Assessing Vegetative and Reproductive Traits of Gutenbergia cordifolia under Fire Management Intervention in Ngorongoro Conservation area-Northern Tanzania

Eline R. Maleko[1] and Oliver Castor Nyakunga*[1]

[1]The College of African Wildlife Management-Mweka, Kilimanjaro, Tanzania
Corresponding author: onyakunga@gmail.com

Abstract

The study investigates the trait-based invasion dynamics of *Gutenbergia cordifolia* in the Ngorongoro Conservation Area (NCA), Tanzania was conducted in April 2025. Specifically, the study compares vegetative and reproductive traits between invaded burnt and invaded unburnt sites. Using field measurements and statistical analyses (independent t-tests, GLM), we assessed leaf area (LA), specific leaf area (SLA), leaf dry matter content (LDMC), plant height, herbivory, and flower production. Results revealed significantly higher LA (32.3 vs. 17.1 cm^2), plant height (65.2 vs. 30.4 cm), and flower counts in invaded burnet sites ($p < 0.01$), alongside reduced herbivory ($p < 0.001$), suggesting that fire enhances growth and reproductive success. In contrast, SLA

and LDMC remained stable across sites, reflecting a conservative ecological strategy. These findings indicate that *Gutenbergia cordifolia* exploits post-fire conditions through rapid resource acquisition, taller stature for competitive light capture, and increased reproductive output traits aligned with ruderal-competitive strategies. The study challenges the efficacy of fire as a control measure for this invasive species, highlighting its potential to amplify invasion success. We recommend integrating trait-based monitoring with alternative management strategies to mitigate unintended facilitation of *Gutenbergia cordifolia*. This research advances our understanding of fire-driven invasion mechanisms in savanna ecosystems and underscores the need for adaptive management in globally significant conservation areas, such as the NCA.

Keywords: Invasive species, Functional traits, Fire management intervention, *Gutenbergia cordifolia,* Savanna ecosystems, Ngorongoro Conservation Area (NCA), Tanzania

Invasive Plant Species in Tanzania: Emerging Trends, Institutional Gaps, and Strategic Responses

John K.Bukombe[1], Gregory Mtega[2], Raymond Okick[1], Alphonce D. Echumba[1], Pray Solomon Kweka[3] and William Kindeketa[4]

[1]Tanzania Wildlife Research Institute, Southern Highland Wildlife Research Center, P.O. Box 1596 Iringa; [2]Ngorongoro Conservation Area Authority, Department of Ecological Monitoring, P.O. Box 1, Ngorongoro Crater, Arusha; [3]Tanzania Forestry Research Institute, Moshi Timber Utilization Research Center, P.O. Box 10, Moshi; [4]Tanzania Forestry Research Institute, Mufindi Pulpwood Research Center, P.O. Box 45, Mafinga

Corresponding author: bukombe.john@tawiri.or.tz

Abstract:

Invasive plant species (IPS) pose a growing threat to Tanzania's biodiversity, ecosystem integrity, and rural livelihoods. This study synthesizes ecological surveys (2021–2024), spatial modeling, and institutional analyses to assess the status, spread, and management gaps of IPS across selected areas. Field surveys in Ngorongoro Rangelands revealed high IPS prevalence, with cover outside protected areas (30–40%) significantly higher than inside (17–23%), particularly for *Parthenium hysterophorus*, *Chromolaena odorata*, and *Gutenbergia cordifolia*. Habitat suitability modeling using MaxEnt showed high predicted occurrence for *P. hysterophorus* in Dodoma (≥0.85), *C. odorata* in Tanga and Pwani (≥0.82), and *Prosopis juliflora* in lowlands of Kilimanjaro, Arusha, and Manyara. One-way ANOVA confirmed significant habitat differences among species ($F = 9.05$, $p = 0.0004$), with *P. hysterophorus* and *C. odorata* favored across wide gradients. Temporal trends revealed *P. hysterophorus* expanding from 12% (2017) to 59% (2025), while *C. odorata* increased from 20% to 47%, and *P. juliflora* from 5% to 18%. IPS spread was strongly linked to grazing intensity and land disturbance, with native-invasive *G. cordifolia* increasingly dominant in overgrazed rangelands. Institutional review highlighted weak inter-agency coordination, limited monitoring, and underutilization of the National Invasive Species Strategy and Action Plan (2019). Findings support spatially targeted management through early detection, ecological restoration, and community engagement. Recommendations include enhanced monitoring in hotspot zones, promoting digital-based community reporting, and aligning local actions with regional strategies. These findings align with TAWIRI's conference theme on ecological resilience and provide actionable insights for strengthening Tanzania's national strategies on invasive species management.

Keywords: Biodiversity threats; Habitat suitability modelling; Invasive plant species; Rangeland degradation; Tanzania

Carbon Storage Potential of Forest Trees in Wildlife Protected Areas: A Case Study of Ruaha National Park, Tanzania

Raymond Okick[1], John Bukombe [1], Nelson Mungoya[1], Alphonce Echumba[1], Arnold Shao[1], Felix Shayo[1]

[1]Tanzania Wildlife Research Institute
Corresponding author: Raymond.okick@tawiri.or.tz

Abstract

National parks, especially those with miombo woodlands, play a critical role in both biodiversity conservation and climate change mitigation through carbon sequestration. Despite their importance, the carbon storage potential of forest trees in those protected areas, particularly in Tanzania, remains unexplored. This study assessed the population structure, biomass, and carbon stock of forest trees in Ruaha National Park (RUNAPA), a critical wildlife-protected area dominated by miombo vegetation. We sampled 716 individual trees across 50 randomly selected plots, measured tree diameters and estimated carbon stock using allometric models specific to miombo woodlands. Our results indicate that the majority of the trees (62.3%) are in the lower diameter class (≤ 10 cm) with progressively lower proportion of larger trees. The estimated plot mean above-ground biomass and carbon stock were 43.14 ± 6.35 tons/ha and 20.23 ± 2.98 tons/ha, respectively. The total biomass and carbon stocks in the park's woodlands area were estimated at 43,652,247 tons and 20,516,556 tons, respectively. This study highlights that the population structure of trees in RUNAPA follows a reverse J-shape, indicating healthy regeneration and a stable ecosystem. The significant role of RUNAPA's miombo woodlands in carbon storage provides crucial data for climate change mitigation and forest management strategies. These findings also underscore the need for further research to explore the carbon sequestration potential of other protected areas in Tanzania, contributing to global climate initiatives.

Keywords: Carbon sequestration, Tree distribution, National park, Miombo woodland

Opposing Impacts of Invasive Alien Plants on Large Herbivore use on Habatat use in Savannah ecosystem

Exavery Kigosi

Grumeti Fund
Email: kigosi87@gmail.com

Abstract

Invasive alien plants are species that have established outside of their native range and negatively impact their non-native environment. In African savannas, invasive alien plants threaten native biodiversity, ecosystem functioning and resilience. Their spread is expected to intensify in the future, further exacerbating adverse impacts. In northern Tanzania, Opuntia is invading the Grumeti Game Reserve, part of the Greater Serengeti-Mara ecosystem. This is one of the last intact ecosystems of Africa and a crucial habitat for large herbivores. Opuntia spreads readily and in impenetrable thickets, altering savanna vegetation structure and in turn influencing large herbivore habitat use. Considering large herbivores' central role in maintaining vegetation structure, disrupted behavior may trigger cascading ecological consequences. This study quantified the effects of Opuntia on large herbivore habitat use through camera trapping. Camera

traps gathered photo footage for a year-long period at six sites: three sites heavily infested with Opuntia and three sites that were once infested but where Opuntia has been cleared. Species occupancy analysis was conducted with AI-assisted species identification using TrapTagger and statistical occupancy modelling. The results of this study indicate considerable effects of Opuntia on large herbivore habitat use for six species in Grumeti. Elephant, baboon, impala and buffalo showed higher occupancies in cleared areas while klipspringer and vervet monkey showed higher occupancies in Opuntia areas. Elephant, baboon, buffalo and vervet monkey also showed seasonal variation, with most pronounced effects in Opuntia vegetative and fruiting season. The research findings emphasize the complexity of multi-trophic invasive alien plant impacts by demonstrating altered large herbivore behavior in response to Opuntia, with species-specific and seasonally varying effects. Given the critical role of large herbivores in maintaining savanna vegetation structure and thereby ecosystem balance, such behavioral shifts may cause wider ecological consequences that affect the long-term stability of savanna ecosystems. This study underpins the urgency of understanding how invasive alien plants threaten savanna ecosystems, to ultimately develop effective management strategies and protect native savanna biodiversity.

Keywords: Behavior, Camera traps, Habitat use, Invasive alien plants, Large herbivores, Opuntia, Savanna ecosystems, Tanzania

Impact of Indian house crow (*Corvus splendens*) on avian diversity across six Tanzanian Cities

Charles Luchagula[1], Eivin Røskaft[2], Augustine Arukwe[2], Kwaslema Malle Hariohay[3], Grace Emily Kabitina[4], Franco Peniel Mbise[5], Laszlo Köver[6], Peter Sjolte Ranke[2]

[1] Tanzania National Parks (TANAPA), Ugalla River National Park, Tanzania
[2] Department of Biology, Norwegian University of Science and Technology (NTNU), Trondheim, Norway
[3] College of African Wildlife Management, Mweka, Tanzania
[4] Conservation Education Tanzania (TANED), Tanzania
[5] Department of Biology, University of Dodoma (UDOM), Tanzania
[6] University of Debrecen, Hungary
Corresponding author: charles.luchagula@tanzaniaparks.go.tz

Abstract

Invasive species are organisms introduced to new environments where they often become overpopulated, disrupt native ecosystems, and cause ecological and economic damage. While many invasive species are plants, several vertebrates, including birds, have been spread by human activities. One notable example is the Indian house crow (*Corvus splendens*), which has rapidly spread in Tanzania since the 1980s due to its adaptability and lack of natural predators. This study investigates the impact of Indian house crows on urban bird diversity across six Tanzanian cities with varying histories of sympatry with the species. The selected cities include Dar es Salaam and Tanga (over 100 years of crow presence), Dodoma and Morogoro (intermediate presence), and Moshi and Arusha (recent or limited presence). Bird surveys were conducted using walking transects in residential areas outside city centers. Crow numbers were highest in Dar es Salaam and Tanga, intermediate in Dodoma and Morogoro, and lowest in Moshi and Arusha. In contrast, total bird abundance was highest in Moshi, followed by Dar es Salaam and Tanga, with the lowest observed in Morogoro. Species richness was highest in Arusha and

Moshi, and lowest in Dar es Salaam and Tanga. These results suggest that prolonged sympatry with house crows is associated with a decline in both bird abundance and species richness. As Tanzania's human population continues to grow, increased waste production provides more resources for house crows to thrive and expand. In the absence of natural predators, this poses a growing threat not only to birds but also to other taxa such as insects, reptiles, amphibians, and small mammals. Our findings underscore the urgent need for Tanzania to develop and implement targeted management strategies to control the spread and ecological impact of this invasive species.

Keywords: Indian house crow, Invasive species, Abundance

A Tale of Two Guilds: How Woodland Encroachment Drove the Collapse of Introduced Grazers and the Persistence of Resident Browsers in Saadani National Park, Tanzania

Ismail Ismail

Tanzania National Parks
Email: ismail.omary@tanzaniaparks.go.tz

Abstract

Conservation interventions can yield unintended, cascading ecological consequences. This study investigates the long-term outcomes for herbivore species introduced to Saadani National Park, Tanzania, in the 1960s-70s, decades before a passive, non-consumptive management regime was initiated with its formal gazettment in 2005. We analyzed the population dynamics of introduced grazers: wildebeest (Connochaetes taurinus), zebra (Equus quagga)) and mixed-feeders: eland (Tragelaphus oryx) in comparison to the resident herbivores. Land cover changes were quantified using remote sensing (1990-2015), and 2015 herbivore survey data which were compared with historical data from 2004. The results reveal a dramatic habitat shift: woodland cover expanded by 34% (from 71,342 ha to 95,873 ha), while grasslands contracted by 82% (from 32,906 ha to 5,727 ha), primarily driven by the encroachment of woody species, such as Acacia zanzibarica. This habitat alteration precipitated a catastrophic 99.3% decline in the introduced wildebeest population (from 3,766 to 25). Conversely, resident browsing and mixed-feeding herbivores, such as buffalo (Syncerus caffer) and giraffe (Giraffa Camelopardalis), thrived, with their success strongly correlated with the increase in woodland cover (r = 0.87). The collapse of the introduced grazer guild was correlated with the loss of grasslands (r = 0.77). We conclude that the herbivore introduction program did not achieve its objective due to a fundamental trophic mismatch created by passive conservation management, which permitted woodland encroachment to eliminate critical grazing habitats. These findings underscore the necessity of active, long-term habitat management as a prerequisite for the success of wildlife conservation and reintroduction initiatives

Keywords: Woodland encroachment, introduced grazers, habitat alteration, land cover changes, Saadani National Park

Burned Area Mapping in Kilimanjaro National Park Using MODIS-Derived Normalized Burn Ratio, Burn Area Index and Normalized Difference Vegetation Index

John E. Makunga[1,3*]; Shadrack M. Sabai[2] and Fredrick M. Salukele[2]

[1]Pasiansi Wildlife Training Institute, P. O. Box 1432, Mwanza, Tanzania.
[2]Ardhi University, School of Environmental Science and Technology, Department of Environmental Engineering, P. O. Box 35176, Dar es Salaam, Tanzania.
[3]Ardhi University, School of Environmental Science and Technology, Department of Disaster Management Training, P. O. Box 35176, Dar es Salaam, Tanzania.
Corresponding email: jmakunga1@gmail.com; Mobile: +255 755 676 826

Abstract:

In Kilimanjaro National Park, the role of elevation in influencing fire behavior and postfire vegetation recovery remains insufficiently understood. This study therefore, addresses this gap by employing an integrated remote sensing approach to quantify burned areas and evaluate fire severity patterns in the park, examining how elevation influences fire behavior and postfire vegetation dynamics. The methodology combined MODIS surface reflectance data for burned area classification with high-resolution Sentinel-2 imagery for validation. Key spectral indices, including the Normalized Difference Vegetation Index, Normalized Burn Ratio, delta Normalized Burn Ratio, and Burn Area Index, were applied to detect fire impacts and monitor vegetation health. Digital Elevation Model data segmented the park into four elevation zones, facilitating analysis of altitude-related fire effects. Classification accuracy was assessed through confusion matrix metrics such as precision, recall, F1 score, and Kappa coefficient. Results revealed marked spatial and temporal variability in burned areas, with significant burn severity detected during major fire events, particularly in higher elevation zones. Vegetation recovery patterns exhibited a strong elevation gradient, with southern and lower altitude regions showing positive regrowth, while northern highlands experienced persistent vegetation decline. Burn severity thresholds validated the use of dNBR > 0.3 as an indicator of significant fire impact, though classification accuracy for burned areas declined in recent years, notably in 2024, suggesting increased challenges in fire detection due to ecological and spectral changes. Overall, this study demonstrates the effectiveness of integrated remote sensing and elevation analysis for detailed wildfire monitoring, offering vital insights for conservation and fire management strategies in Kilimanjaro National Park.

Keywords: BAI, dNBR, NDVI, Elevation, Wildfire

How does Normalized Difference Vegetation Index and Land Surface Temperature analysis support the sustainable management of Riverine Forests in Sudan?

Elmugheira Mohammed

Email: elmugheira1984@gmail.com

Abstract

Natural riverine woodlands and game reserves in Sudan form unique ecosystems that support diversified plant and animal populations with mufillous ecological services and socio-economic functions. They play a significant role in enhancing the quality and quantity of water resources, moderating water temperature, hosting various aquatic wildlife,

and supporting the tourism industry. Despite their distinctive functions and services, there is a lack of information about the composition and spatio-temporal dynamics of riverine forests in Sudan, and how they response to climatic variability and human disturbances. Therefore, this study investigated the dynamics of land cover and tree population composition in Acacia nilotica trees across the Remaila Riverine Forest Reserve in Sudan. The research employed Normalized Difference Vegetation Index (NDVI), Land Surface Temperature (LST) analysis, and ground mensuration data to investigate the changes in the A. nilotica population within the reserve. Results indicate a significant decline in vegetation cover, characterized by limited juvenile trees and poor natural regeneration. There is a great shift from dense forest to open ones with low tree density and migratory birds. Moreover, sites closer to local settlements exhibited clear signs of illegal harvesting, overgrazing by livestock, and soil disturbances resulting from intensive traffic movement. However, the LST displayed lower values in dense forest classes and sites with high elevation. The observed decline in tree cover and composition highlights the urgent need for conservation plans that will sustain current populations and improve their resilience in respect to local community needs and sustainable management protocols. Furthermore, biodiversity conservation programs must be implemented to protect the vulnerable and rare wild species in the reserve and eliminate the negative influences of invasive species and land encroachment.

Keywords: Biodiversity, Forest reserve, Habitat conservation, Juvenile trees, NDVI, Wetlands

Preliminary Faunal Biodiversity Assessment of Community-Managed Coastal Forests in Mkinga District, North-eastern Tanzania.

Steven Temu

University of Dar Es Salaam
Email: temusteven2@gmail.com

Abstract

A survey of selected Village Land Forest Reserves (VLFRs) within the Mkinga district in the Tanga region, which are among the coastal forests of Tanzania's mainland, was undertaken in October 2024. The VLFRs studied included Dima, Mazola Kilifi (hereafter referred to as Mazola), and Mbuta forest reserves in the villages of Dima, Mazola, and Mbuta. The study aimed to assess the biodiversity (fauna) of these forest reserves. A combination of methods was employed to ensure each taxon is adequately surveyed. In this study, smaller vertebrates (small mammals, amphibians, reptiles, and birds) were sampled using standard trapping and fixed-radius point count methods. Larger mammals were studied using the standard line transect method (foot census), camera traps, and opportunistic observations. Indirect methods of detection (animal signs and informal discussions with local residents) were also used to assess the presence of vertebrates. A total of 4 amphibian species were recorded during the survey, and 21 reptile species were detected in our surveys. Among the reported reptiles, two are of conservation concern: the Central African rock python (Python sebae), which is Nearly Threatened (NT), and the Usambara vine snake (Thelotornis usambaricus), which is Vulnerable (VU). Seventy-four (74) species of birds were detected in the forests surveyed. The number of bird species detected in each forest was 32, 48, and 31 for Dima, Mazola, and Mbuta, respectively. Of these, IUCN Redlist species include 2 Endangered (EN) species, namely Bateleur Eagle (Terathopius ecaudatus) and Martial Eagle (Polemaetus bellicosus), and 2

Vulnerable (VU) species, namely Tawny Eagle (Aquila rapax) and Southern Ground Hornbill (Bucorvus leadbeateri). Moreover, 5 species of migratory birds were recorded, among which two species were Palearctic and three were Intra-African migrants. Twenty-seven (27) medium and large-sized mammalian species were recorded, five of which are of conservation concern. General conservation issues noted included the presence of human activities in the forest reserves, including logging, charcoal production, and livestock grazing. This study highlights the importance of Community-based Forest Management in the conservation of coastal forest species, as they harbour many species, including species of conservation concern, although experiencing disturbances that threaten their existence. This survey has provided detailed baseline information on the biodiversity of dry season fauna in the selected VLFRs. It is suggested that further surveys be conducted in different seasons to provide more information on the forests, including population trends.

Keywords: Coastal forests, biodiversity, Human activities, Species of conservation concern, Village Land Forest reserves

Spatial variation of the Indian House Crow (Corvus splendens splendens) Breeding Biology- A Review

Paulo Athumani

The University of Dodoma
Email: pauloathumani@gmail.com

Abstract

Indian House crow (IHC; Corvus splendens splendens) is one of the most successful birds of the genus Corvus. Due to its ability to adapt to novel environments, the species has spread to all continents except Antarctica. The species has become invasive to many countries, posing significant socio-ecological and economic impacts. Different methods have been deployed to control, manage, and eradicate IHC, but they have largely proved to be failures. Poisoning of IHC kills untargeted species, leading to drastic biodiversity loss. Trapping IHCs is difficult as crows are intelligent and learn to avoid the traps. Likewise, shooting requires licenses from the government authorities and proved challenging as crows live with people. Biological control seems to be a panacea as it is branded as ecologically and environmentally friendly. However, knowledge of the breeding biology of IHC remains largely unknown. This review aims to determine the variations in the breeding biology of the IHC worldwide to fill the knowledge gap while enhancing biological control. The study involved searching for articles on IHC breeding biology using the Google Scholar search engine, EBSCOhost, and the IHC 500 Database. A total of 71 articles were included in this review. The review shows that many aspects of breeding biology have spatial variation, and some aspects have limited data worldwide, calling for research on those aspects. Thus, for successful biological control, management, and eradication of the IHC, the strategies should be localised based on the observed variation of different aspects of their breeding biology.

Keywords: Corvids, Reproductive biology, Spatial variation, Nest success, Reproductive success

Terrestriality in Arboreal Red-Tailed Monkeys (Cercopithecus ascanius) from the Issa Valley, Western Tanzania.

Joram Navaya

Greater Mahale Ecosystem Research and Conservation
Email: joramnavaya211@gmail.com

Abstract

Red-tailed monkeys (Cercopithecus ascanius) are primarily arboreal, although sometimes exhibit terrestriality in response to local ecology, especially food types and distribution. How frequently terrestriality appears in red-tailed monkeys and the factors that influence this behavior, are not well understood. By understanding the effects of living in a savanna woodland environment for an arboreal primate on terrestrially enhance understanding of their use of terrestrial niche in savanna habitat to inform conservation strategies of this species in open habitats. Given risks that primates face when on the ground, we investigated the drivers of terrestrial behaviour in a habituated group of red-tailed monkeys that live in a mosaic woodland habitat in the Issa Valley, Katavi region. We hypothesized that seasonality and vegetation would impact terrestrial behaviour. Specifically, we predicted that individuals would be more terrestrial during water-poor periods (dry season) to drink from standing ground pools. Moreover, we expected to find an interaction between vegetation type and activity, with more terrestrial behaviors found in the woodland during travel through forest patches due to higher predation risk in more open areas and feeding due to presence of mushroom while more rest and social activity being observed in the forest due to minimal risks from predators. We collected data from 2016 to 2022 (n=3177 observations) on a single red-tailed troop, including 332 observations of terrestrial behavior. We found that activity had an effect on terrestriality (χ^2 = 16.84, df=3, p <0.001) and an interaction between activity and vegetation type (χ^2 = 8.13, df=3, p=0.04) as well as season and vegetation type (χ^2 = 11.55, df=1, p=0.001). In the dry season, red-tailed monkeys spent about the same time feeding arboreally as terrestrially, whereas in the wet season more time was spent feeding terrestrially. This difference was largely driven by mushroom consumption, an exclusive wet-season resource, which was entirely accessed terrestrially. Our results have implications for understanding the drivers of terrestriality and especially the behavioral responses of an otherwise arboreal species living in a savanna woodland environment.

Keywords: Seasonality, Terrestriality, Vegetation

Impacts of Agricultural Expansion on Habitat Reduction at Mto Wa Mbu Game Controlled Area

Mgawe Mtani

College of African Wildlife Management, Mweka
Email: mgawemtani58@gmail.com

Abstract

This study assessed the impact of agricultural expansion on habitat reduction in Mto wa Mbu Game Controlled Area (GCA), Northern Tanzania, by examining land use and land cover (LULC) changes from 2000 to 2025. Satellite imagery from 2000, 2013, and 2025 was analyzed through a supervised classification approach using QGIS 3.42,

and predicted LULC for 2050 was generated using the Cellular Automata-Markov (CA-Markov) model. Four main LULC classes were identified: agriculture, grassland, woodland, and wetland. Results showed that woodland area increased from 42.18 km² (3.0%) in 2000 to 123.27 km² (8.6%) in 2025. Wetland declined from 48.00 km² (3.4%) in 2000 to 6.80 km² (0.5%) in 2013, then recovered to 74.75 km² (5.2%) by 2025. Grassland, the dominant land cover, declined steadily from 1111.46 km² (78.0%) to 793.37 km² (55.1%). In contrast, agricultural land expanded significantly from 5.88 km² (0.4%) to 217.51 km² (15.1%). Spearman correlation showed a strong negative relationship between agriculture and grassland ($\rho = -1.0$, $p = 0.0333$), indicating agriculture as a key driver of habitat loss. By 2050, agricultural land is projected to reach 246.06 km², with further reductions in grassland and wetland areas. These trends highlight the need for sustainable land management strategies to mitigate continued habitat degradation in the GCA.

Keywords: Agricultural expansion, Habitat reduction, Land use and land cover (LULC), Mto wa mbu GCA, and Spearman correlation

Rangeland condition and degradation patterns in eastern Serengeti: Implication to grazing habitats for wildlife and livestock management

Kwaslema Hariohay

College of African Wildlife Management, P. O. Box 3130,Moshi, Tanzania
Email: kwaslema2000@gmail.com

Abstract

Increased anthropogenic pressures, climate change and invasive species encroachment jeopardize rangelands worldwide. Understanding prevailing rangeland conditions and patterns is critical for habitat management, benefiting wildlife and livestock. This study investigated changes in rangeland conditions in the Loliondo-Sale rangelands of eastern Serengeti in Tanzania. A mixed method approach combining ecological fieldwork with social surveys were employed. Rangeland's condition was determined by estimating the grass cover and biomass of palatable grass materials using quadrants. To complement the quadrant data, a household survey and focus group discussion were conducted to assess local people's perceptions on the range of resource use and management practices. Our study showed that over 50% of the rangeland area was covered by increasing plant species. Non-palatable and invasive plant species accounted for 0.02% and 24.4% of the sampled area, respectively. There was a high presence of increasers in Orkuyani village dominated by Indigofera spinosa (85%). Olorien village had a 50% increase in invasive species, while Oloipiri had over 20%. Most respondents (87.1%) reported a decline in key foraging species with 84.7% indicating an increase in unpalatable plant species in recent years. Factors that were attributed to the degradation and poor conditions of the rangelands include prolonged drought, an increased number of livestock, especially with the shift towards small stocks, increased human population and encroachment of rain-fed cultivation land into the rangelands. We conclude that the rangeland condition in Loliondo has been deteriorating in terms of grassland cover, reduced productivity as animal fodder, and other ecosystem services such as rainfall absorption.

Keywords: Grazing habitats, increasers, Invasive plant species, Overgrazing, Rangeland condition

SUB THEME: HUMAN - WILDLIFE CONFLICTS

Promoting synergies between core protected areas and their surroundings in East Africa

Han Olff

University of Groningen
Corresponding Author: h.olff@rug.nl

Abstract

The relationship between core protected areas (CPAs – encompassing national parks and game reserves) and their surrounding village lands (VLs) is increasingly recognized as a complex, two-way dynamic resulting in human-wildlife conflict. This conflict manifests through various impacts, including crop damage, risks to people defending their livelihoods, livestock depredation within VLs, and poaching, illegal livestock grazing and retaliation to predators within CPAs. This escalating conflict is driven by several factors: growing human and livestock populations leading to increased land use pressure in VLs, alongside expanding elephant populations within CPAs. However, this escalation presents significant risks. The resulting ecological isolation of CPAs, particularly for large migratory mammals, threatens their intrinsic biodiversity and ecotourism potential. Simultaneously, VLs face a risk of diminishing economic spillover benefits from CPAs, such as less revenue sharing and community development opportunities. To address this challenge, innovative solutions are needed that move beyond conflict containment and prioritize synergistic relationships between CPAs and VLs. This presentation draws on our research from the Greater Serengeti-Mara Ecosystem, demonstrating how landscape-level ecological connectivity can be preserved and restored with benefits for people. Our case studies from the Ngorongoro district and Narok county highlight the power of collective action by local communities to promote effective rangeland management, benefiting both wildlife and pastoralists within a context of flexible boundaries between CPAs and VLs. Furthermore, for Serengeti district, we illustrate how carefully designed conservation fencing provides a critical solution for managing a more rigid boundary. Finally, for Bunda district, we discuss how the inclusion of a formerly VL area with many livelihood issues within a CPA resolves conflicts and unlocks novel conservation and development opportunities. Ultimately, these diverse experiences highlight key principles for fostering synergies between core protected areas and surrounding village lands, ultimately contributing to more resilient and sustainable conservation outcomes.

Keywords: Connectivity, Human-Wildlife Conflict, synergies, rangeland, management

Shifting Grounds – Longitudinal Change in Bushmeat Hunting and Local Ecologies in Northern Tanzania

Jacquiline Chokola

Grumeti Fund: Corresponding author: jacquelinekatte2@gmail.com

Abstract

Tanzania, renowned for its biodiversity, faces growing pressure as local communities near protected areas rely on bushmeat as a vital source of income. However, this poses

significant challenges to wildlife conservation amidst dynamic legal, socio-economic, and environmental systems. While other studies examine hunting behavior at a discrete point in time, less is known about how hunters adapt to changes in socio-economic and law enforcement contexts. Here we investigate shifts in hunting methods, species use, ranger encounters, and adaptive strategies over ten years in and around Northern Tanzania's protected areas. We conducted structured quantitative interviews with hunters in 2013 and mixed-method (qualitative and quantitative) interviews in 2024, engaging a total of 39 respondents (16 in 2013 and 23 in 2024) within the Monduli District. Preliminary results suggest a spatial shift in hunting activity. Hunters appear to be moving away from high-risk areas, such as National Parks, toward Controlled Areas, likely in response to stricter enforcement within the parks. Zebra and Wildebeest were consistently the most preferred species, likely due to their ecological availability or high market value. In 2013, 75% of the methods used were snares and 80% in 2024; spear use was 75% in 2013 and 60% in 2024 with guns rarely used in both years (< 10%), and hunting activities increases in dry season in both years. Participants linked ecological change (e.g. flooding) to shifts in wildlife distributions. They emphasised that not just the amount of hunting income, but the timing and usage of that income (e.g. start-up funds for other legitimate business), determines their hunting behavior. Conservation initiatives should address not only underlying drivers (e.g. unemployment), but also the complex interplay between ecological change, its impact on livelihoods, and the timing and use of income. These interconnected needs shape wildlife utilization in increasingly precious economic contexts.

Keywords: Conservation, enforcement, hunting behavior, socio-economic change, and wildlife distribution.

Minimal impact of diurnal pastoralism on spotted hyenas and of spotted hyenas on livestock and endangered rhinos in a prey-rich ecosystem

Oliver P. Höner[1,2*], Philemon Naman[1], Arjun Dheer[1,2], Renita Danabalan[3,4], Antonia Pellizzone[4], Camila Mazzoni[3,4], Liam D. Bailey[2,3], Jella Wauters[5], Victoria Shayo[6], Alex Courtiol[1,3], Eve Davidian[1,7]

[1]Ngorongoro Hyena Project, Ngorongoro Conservation Area, Arusha, Tanzania
[2]Department of Evolutionary Ecology, Leibniz Institute for Zoo and Wildlife Research (IZW), Berlin, Germany, [3]Department of Evolutionary Genetics, Leibniz Institute for Zoo and Wildlife Research (IZW), Berlin, Germany, [4]Berlin Center for Genomics in Biodiversity Research, Berlin, Germany, [5]Department of Reproduction Biology, Leibniz Institute for Zoo and Wildlife Research, Berlin, Germany, [6]Department of Wildlife and Rangeland Management, Ngorongoro Conservation Area Authority, Ngorongoro Conservation Area, Tanzania, [7]Department of Evolutionary Anthropology, Institute of Evolutionary Sciences of Montpellier (ISEM), University Montpellier, CNRS, IRD, Montpellier, France
Corresponding author: hoener@izw-berlin.de

Abstract

In habitats where species of high conservation value, large carnivores and pastoralists live alongside each other, wildlife biologists, conservationists and local authorities face the challenging task to set conservation action priorities based on an assessment of the impact of the species on each other. We exploited a natural experiment to investigate the effect of diurnal pastoralism on juvenile recruitment and allostatic load in the spotted hyenas of the Ngorongoro Crater, Tanzania, over a 24-year period. We further assessed the impact of spotted hyenas on critically endangered black rhinoceros and livestock in this prey-rich area. Pastoralism was restricted to the territories of two of the eight hyena clans,

allowing us to compare juvenile recruitment in exposed and unexposed clans. We also compared fecal glucocorticoid metabolite concentrations (fGMC)—a biomarker of an organism's allostatic load—between exposed and unexposed clans using 975 fecal samples from 475 hyenas. To assess the hyenas' impact on black rhinos and livestock, we used DNA metabarcoding on 371 fecal samples collected over the 24-year study period. We found no difference in juvenile recruitment nor fGMC between exposed and unexposed clans, indicating that pastoralism had no substantial deleterious effect on the hyenas. We further found that livestock constitutes only a small fraction of the hyenas' diet (4.1% of detections) and no evidence of black rhinoceros consumption. Our findings demonstrate that, contrary to common concerns, spotted hyenas have minimal impact on livestock and high-conservation-value wildlife in areas with abundant wild prey. They further show that exposure to anthropogenic activity may be compatible with the persistence of group-living carnivores. Our studies provides new perspectives for ecologists, conservation biologists and stakeholders who seek to assess human–wildlife conflicts and balance the needs of local communities and wildlife.

Keywords: Coexistence, Animal, Monitoring, Long-Term, Spotted Hyenas

The benefits of inclusive conservation for connectivity of lions across the Ngorongoro Conservation Area, Tanzania

Ingela Jansson

Swedish University of Agricultural Sciences
Corresponding author: ingela.jansson@slu.se

Abstract

Human impacts on the planet degrade natural habitats, often restricting wildlife to protected areas. If connectivity between such areas is lost, wildlife populations may lose genetic diversity, thereby increasing extinction risk. For large carnivores, connecting populations separated by human-occupied habitats requires dedicated effort to foster human–wildlife coexistence. Using lion observation data from 1962 to 2023 and movement data from GPS collars, we evaluated how inclusive conservation actions (i.e., directly involving local communities) in the Ngorongoro Conservation Area (NCA), Tanzania, are affecting the ability of lions to use and traverse human-occupied habitats. Efforts to promote human–lion coexistence were positively associated with the number of lions moving across human-occupied habitats and the ability of lions to settle in human-occupied areas, suggesting that conservation activities are having the desired impact on connectivity. However, despite a reduction in negative human–lion interactions from 2016 to 2021, the number of retaliatory lion killings and livestock attacks both increased sharply during an extreme drought in 2022, before dropping again in 2023. hus, although our results highlight the benefits of inclusive conservation for connectivity of large carnivore populations, recent events highlight continued challenges and the need for long-term, nimble approaches to maintain balance where humans and large carnivores coexist.

Keywords: Community, conservation, efficacy, habitat connectivity, *Panthera leo*

Integrating AI Technologies with Indigenous Practices to Mitigate Human-Wildlife Conflicts in Communities Adjacent to Ruaha National Park

Emmanuel Mhache[1]

[1]The Open University of Tanzania
Corresponding author: ngororamhache@gmail.com

Abstract

Human-wildlife conflicts (HWC) near Ruaha National Park endanger local communities, jeopardizing food security, safety, and environmental balance. Climate change, unpredictable rainfall, deforestation, land use disputes, and violent human-wildlife interactions all contribute to these conflicts. Despite increased acknowledgement of AI technology's potential, few studies have experimentally investigated its use in HWC management, particularly in protected areas such as Ruaha. This study investigates how artificial intelligence techniques can be used to restrict elephant movements, protect crops, and encourage sustainable land-use practices, ultimately lowering crop loss and increasing climate resilience in the region. Using a mixed-methods approach, data was obtained through interviews, focus group discussions, surveys, and direct observations, resulting in a thorough grasp of the region's socioeconomic and environmental dynamics. The findings indicate that combining AI technologies with conventional knowledge systems can improve human-animal coexistence, enable adaptive agriculture methods, and promote more effective wildlife management. This study adds to the growing body of literature on creative Human Wildlife Conflict solutions by showing the potential of AI to support sustainable livelihoods and ecological stability in the Ruaha-Rungwa ecosystem.

Keywords: AI, Communities, Indigenous Practices, Human-Wildlife Conflicts, Ruaha National Park

Ilchokuti: A Community-Led Approach to Human-Lion Coexistence in the Ngorongoro Conservation Area

Ololotu Munka

KopeLion Inc. Corresponding author: ololotu@kopelion.org

Abstract

The Ilchokuti Programme is a community-based lion conservation effort led by KopeLion in the Ngorongoro Conservation Area (NCA) in northern Tanzania. Ilchokuti, meaning "lion guardian" in Maa, refers to a group of trained Maasai and Datoga warriors who work within their communities to reduce conflict and support coexistence between people and lions. KopeLion currently works with 31 Ilchokuti across the area. The programme equips these local pastoralists to act as frontline responders, helping to address challenges where people and lions share space. Ilchokuti contribute directly to community safety by providing early warnings of lion activity, reinforcing livestock enclosures, treating injured livestock by all carnivores, searching and recovering lost livestock, and helping to mediate and deescalate human wildlife conflict. They also engage in meetings with elders, other warriors and local leaders, serving as a link between Kopelion and the broader community, helping to facilitate conversations around lion and wildlife conservation. A key part of their role is fostering corridors of tolerance for lions and other wildlife, encouraging acceptance

of their movement through multi-use areas in Ngorongoro. This presentation outlines the programme's structure, implementation, and observed outcomes, focusing on the practical role of Ilchokuti in protecting both communities and lions. Areas with active Ilchokuti have seen improved attitudes toward lion conservation. The programme illustrates the value of Indigenous knowledge, community involvement, and shared responsibility in promoting coexistence.

Keywords: Community-based, Ilchokuti, coexistence, Indigenous knowledge,

Assessment of pastoralists -small carnivores conflicts in Simanjiro plains, Tanzania.

Houghton Menoi

Sokoine University of Agriculture
Corresponding Author: houghtonmenoi971@gmail.com

Abstract

Pastoralist-small carnivore conflict is an increasingly significant issue in the Simanjiro Plains, Tanzania, an area adjacent to protected zones. Small carnivores frequently prey on livestock, particularly poultry, goats, and sheep, leading to substantial economic losses for local herders. This study assessed the mitigation measures employed by pastoralists to minimize small carnivore attacks and evaluated their effectiveness. Data were collected through semi-structured interviews with 222 respondents across the Simanjiro Plains. Information on mitigation strategies, their effectiveness, and factors influencing their adoption were analyzed using SPSS (version 27). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize respondent characteristics and mitigation preferences. Chi-square tests were applied to explore relationships between pastoralist demographics, livestock characteristics, and choice of mitigation measures. The results indicated that the most commonly used mitigation methods included herders (100%), deterrents (79.7%), bomas (73.9%), and guard dogs (68.95%). Among these, herding by men was perceived as the most effective strategy (71.2%) in preventing livestock depredation by small carnivores. The study recommends that government and conservation organizations prioritize supporting herding practices, as they are considered the most effective approach to reducing human-small carnivore conflict in the region.

Keywords: Pastoralists, Small carnivores, Livestock, predation

Wildlife Crop Selection Preferences as a Strategy to Reduce Crop Raiding (Human Elephant Conflict) in the Transmara Region, Kenya

Abigael Pertet

Mara Elephant Project (MEP); Corresponding Author: abigael@maraelephantproject.org

Abstract

Regions adjacent to conservation areas and wildlife corridors frequently experience human-wildlife conflicts, particularly crop raiding by large herbivores such as elephants. Wildlife-induced crop damage causes economic hardship for farmers in Kenya. It diminishes food production, harms livelihoods, and undercuts conservation

efforts. The aims of this study were: 1) To design an experimental farm to determine the relative crop selection preferences of wildlife. 2) Identify the crops most and least affected by wildlife. 3) Evaluate if planting crops that wildlife does not consume will reduce crop destruction and lead to less human-wildlife conflict. Three years of data were collected at the Mara Elephant Project Experimental Farm (Transmara Region, Kenya). Fifty plant species, repeated five times, were tested in situ in randomized 5x5 m plots. Animal crops raiding was reported weekly, along with the severity of the damage (low, medium, high). Chi-square tests and binary logistic regression analyses were used to assess the association between crop type, animal species, and severity of damage. Preferential selection was measured in terms of the rate of occurrence. Hippopotamuses(n=416), elephants(n=230), and vervet monkeys (n=105) were the most prevalent crop raiders. Maize, spinach, lemongrass, and sweet potatoes were the most affected by damage (medium to high severity). Plants with low damage (citriodora, lavender, moringa, and rosemary) were deemed effective as repellent species. Based on a chi-square analysis ($p < 0.001$), the frequency and intensity of wildlife damage were significantly associated with crop type ($\chi^2 = 73.03$, df = 10, p = 1.151e-11). This study demonstrates that crop raiding is species-specific, non-random, and wildlife intentionally target particular crop species. Reducing attractive crops in high-risk areas could reduce crop losses and lessen conflict between humans and wildlife, offering a feasible and sustainable solution to mitigate the vulnerability of farmers experiencing human-wildlife conflict.

Keywords: Human-wildlife conflict, Crop raiding, crop selection, mitigation

The status of human-elephant conflict around Mkomazi national park, Tanzania

Lameck Mkuburo[1], Edward Kohi[2], Athuman Mathayo[1], Nalaila J. Gabriel[1], Vaileth Sanga[1], Aman Hamisi[1], Thomas Katunzi[3] Janemary Ntalwila[4],

[1]Tanzanian Elephant Foundation, P.O Box 6502, Moshi, Kilimanjaro, Tanzania
[2]Ministry of Natural Resources and Tourism, P.O Box 1351, Dodoma, Tanzania
[3]Same District Council, P.O Box 138, Same, Tanzania; Tanzania Wildlife Research Institute, 661-Arusha Tanzania

Abstract

Human-elephant conflict (HEC) remains a significant challenge for both conservation efforts and local livelihoods in many African regions, especially where growing human settlements encroach on traditional elephant habitats and migration corridors. This study examined the status, drivers, and mitigation efforts related to HEC in six districts surrounding Mkomazi National Park, Tanzania. Previous report from Tanzania Wildlife Research Institute (TAWIRI) revealed that, the park is home to approximately 1,273 elephants during the dry season and plays a critical ecological role in the transboundary Tsavo-Mkomazi ecosystem. However, the rise in elephant incursions into nearby communities has intensified conflicts, especially in areas dependent on agriculture. Using a mixed-methods approach, including household questionnaires (n = 905), focus group discussions, and key informant interviews, this study explored forms of HEC, community perceptions, and mitigation measures. Findings revealed that 98.9% of respondents experienced HEC, primarily through crop raiding and property destruction. Nighttime crop-raiding incidents were significantly more prevalent than daytime ($\chi2_{(0.05,\ 2)} = 1296.25,\ p = <<<<<<0.01$). Elephants were perceived as the major cause of crop losses ($\chi2_{(0.05,\ 4)} = 605.89,\ p = 2.2E\text{-}16$), significantly more so than other factors such as low rainfall or crop diseases. Prevailing views of elephants were mostly unfavorable,

influenced by ongoing conflicts with them and a sense of inadequate support from authorities. Moreover, the duration of stay and livelihood activity, mainly agriculture were the main determinants of peoples' attitudes (*p = 0.013 and 0.003,* respectively). Even amid the severe conflict, the lack of retaliatory killings points to opportunities for fostering human-elephant coexistence. Beehive fences were the most preferred mitigation option, followed by electric and physical barriers. Respondents also called for greater investment in education, community engagement, and use of trained and equipped community rapid response teams. This study underscores the urgent need for integrated HEC management strategies that combine ecological understanding with local livelihoods. Enhancing community resilience, securing migratory corridors, and fostering conservation education are vital for improving coexistence and protecting this elephant population.

Keywords: Conflict, Elephants, Human, trans boundary,

Perceived Patterns of Hyena-Induced Livestock Losses in Communities Adjacent to Mkomazi National Park, Northern Tanzania

Franco Peniel Mbise

Department of Biology, University of Dodoma, P.O. Box 338, Dodoma, Tanzania
Correspondence: francombise@gmail.com **Mobile:** *+255 67845 2007*

Abstract

This research assessed the extent and patterns of livestock predation by spotted hyenas (*Crocuta crocuta*) between 2021 and 2022 in six villages located near Mkomazi National Park in northern Tanzania. The main aims were to analyze the frequency of attacks, identify key influencing factors, and evaluate existing protective strategies. Information was gathered from 180 respondents using structured interviews and examined through descriptive analysis, binary logistic regression, and the Kruskal–Wallis test. Findings showed sheep (57.1%) and goats (36.7%) were most commonly attacked, primarily at night (65.3%), in the dry season (75.5%), and within homesteads (59.2%). Proximity to the park emerged as the only significant variable influencing depredation levels, with communities nearer to the boundary reporting more incidents. Respondents' perceptions of hyena presence differed depending on their distance from the park (p = 0.039). Local mitigation responses included making noise or scaring predators (42.2%), keeping guard dogs (29.4%), and manual livestock guarding (28.3%). Although most participants (81.6%) observed a decline in predation events, spatial variation in conflict intensity calls for targeted, location-specific management actions. These insights are crucial for enhancing human–carnivore coexistence and formulating responsive conservation policies.

Keywords: Human–wildlife conflict · Livestock loss · Depredation control · Spotted hyena

Perceptions and Awareness of Chicken Farmers on Newcastle Disease and Indian House Crow (Corvus splendens)–Chicken Interactions: A Case of Dodoma, Tanzania

Francis Chebby

The University of Dodoma; Corresponding Author: francismuzaga20@gmail.com

Abstract

Newcastle disease (ND) is among the most serious threats to poultry health in Tanzania. Despite efforts to promote vaccination campaigns, outbreaks continued to be reported, particularly among smallholder farmers. This study aimed to assess chicken farmers' perceptions and awareness of ND, focused on the perceived role of Indian house crow (*Corvus splendens*)–chicken interaction as a potential transmission pathway. To achieve the stated objective, 150 Household Questionnaire Surveys (HQSs), 3 Focus Group Discussions (FGDs) and 5 Key Informant Interviews (KIIs) were conducted in three wards in Dodoma region. The results showed that, 73.3% (n = 109) of respondents were aware of ND and reported regular outbreaks in their flocks, while 26.7% (n = 41) lacked clear understanding. Common symptoms reported included coughing (9.2%, n = 10), sudden weakness (42.2%, n = 46) and sudden death (13.8%, n = 15). However, variations across wards were not statistically significant ($\chi^2 = 35.15$, df = 26, p = 0.109). When asked about the role of Indian house crow in ND transmission, 37% (n = 55) of respondents believed the species contributes to the spread, while 63% (n = 95) disagreed, with the responses being not significance ($\chi^2 = 0.40$, df = 2, p = 0.818). To reduce crow-chicken interaction, 44.3% (n = 67) kept chickens inside enclosures, 33% (n = 49) actively chased crows, while 22.7% (n = 34) covered feeding and watering points. These practices differed significantly in adoption ($\chi^2 = 10.92$, df = 2, $p < 0.05$). Local perceptions and awareness reflect concern about ND, though understanding of transmission routes remains inconsistent. Awareness campaigns and improved access to vaccines should be prioritized to prevent the effects caused by ND to chicken farmers in Tanzania.

Keywords: Chicken, Farmers, Indian house crows (*Corvus splendens*)

Assessment of socio-economic and psychological impacts of elephant incursion in Rhotia-Karatu, arusha region, northern Tanzania.

Glory Tarimo

College of African Wildlife Management, Mweka
Corresponding Author: glory26tarimo@gmail.com

Abstract

This study aimed to assess the socioeconomic and psychological impacts of elephant incursions in Rhotia-Karatu, Arusha Region, Northern Tanzania. The research was guided by three specific objectives, namely: to assess the socio-economic impacts of elephant incursions, to examine the psychological effects of recurring elephant encounters and to explore community coping mechanisms of risk associated with elephant presence. With a sample size of 141 respondents from Rhotia ward, the study adopted a cross-sectional design with a mixed research approach encompassing

purposive and simple random sampling techniques to gather data through a household survey questionnaire and key informant guide. Data analysis involved both descriptive statistics and thematic analysis, and the chi-square test, which was used to test for the significance of variables. The findings revealed statistically significant differences (P=0.031), indicating different levels of social-economic impacts between villages, although crop damage was high in both villages, resulting to receiving of government support. Remarkably, there was an insignificant difference (P=0.571) in the psychological impacts due to elephant incursion, suggesting a similar level of impacts within villages; however, the feeling of anxiety was slightly higher (98.3%) in Kilimatembo than in Chemchem (91.6%). The study further revealed statistically significant (P=0.001) in coping mechanisms. However, beehives were reported used by 19.3% in Chemchem village, whereas in Kilimatembo, it reported 6.9%. This suggested a statistical significance in the effectiveness of the methods used within villages (P=0.023); however, the methods were very effective, 59.0% in Chemchem and 39.7% in Kilimatembo. The study concludes that elephant incursion in Rhotia ward is a real concern as it poses socio-economic losses like property damage and crop damage leading to financial losses, and also, psychological effects like increased levels of anxiety, family safety fear, and sleep problems experienced by communities in Kimatembo and Chemchem villages. Furthermore, the study revealed a varied effectiveness in coping mechanisms, where the study recommends for practical, community-based solutions be prioritized in tackling human-wildlife conflicts.

Keywords: Elephant, Incursion, Human, Psychological, Socioeconomic

Characterizing Precautions and Profit Across a Bushmeat Supply Network in Cross River State, Nigeria

Katharine Thompson[1]

[1]Penn State University
Corresponding author: katharine.thompson@stonybrook.edu

Abstract

The bushmeat trade represents a critical human–wildlife interface, where pursuit of livelihoods drives biodiversity loss and increases the risk of zoonotic disease transmission. Trade in species such as ungulates, rodents, primates, carnivores, and bats move both conservation-priority and zoonotic-host taxa from rural forests to urban markets, reshaping the spatial and social contours of human-wildlife contact. This study investigates how species-specific interactions vary by livelihood role across a bushmeat supply chain in Cross River State, Nigeria. From January 2023 to April 2024, we conducted 1,338 monthly interviews with 150 hunters and traders, documenting over 6,000 wildlife interactions spanning more than 40 species. Trade roles significantly influenced both the volume and diversity of species handled. Hunters engaged with the widest taxonomic range, including higher proportions of primates, while downstream actors (e.g. vendors and restaurant workers) handled greater overall volumes, particularly of rodents. Rodents and primates, both known zoonotic reservoirs, were frequently processed in high-risk forms (raw or semi-preserved), increasing the potential for pathogen exposure. Vulnerable and protected species were exploited across all trade roles, though the specific taxa varied. Importantly, no single node of the trade was uniquely responsible

for high-risk interactions or species depletion; rather, risks were distributed across the supply chain and shaped by differentiated livelihood strategies. Our findings illustrate how bushmeat markets extend zones of human-wildlife conflict into urban areas, where species exploitation and zoonotic risks persist in distinct but interconnected ways. Effective interventions must move beyond isolated enforcement or education efforts to address the ecological, economic, and public health dimensions of this trade, accounting for the roles and risks faced by diverse actors within the network.

Keywords: Bushmeat, Economics, Market dynamics, Supply chain, West Africa, Zoonotic disease

Bodaboda saga: From Preached employment opportunity to biodiversity loss and public health challenge

Julius William Nyahongo[1*], Janemary Ntalwila[2] and Robert Fyumagwa[3]

[1]College of African Wildlife Management, P. O. Box 3130,Moshi, Tanzania
[2]Tanzania Wildlife Research Insitute P.O.Box 661-Arusha,Tanzania
[3] Wildlife Conservation Initiative,P. O. Box 16020, Arusha, Tanzania
[*]Correspondence author: Julius.nyahongo@mwekawildlife.ac.tz

Abstract

In many parts of Africa, the use of motorbikes for transporting passengers and goods is widespread. This form of business is viewed as potential employment opportunities to reduce the economic burden to low-income-earning communities. Despite the advantages motorbike businesses are reported to provide to riders, the industry has become source of biodiversity loss through illegal hunting and transportation. It also has turn out to be a silent epidemic due to the high frequency and fatal accidents and health problems posed by poor motorbike designs. The study investigated the efficiency of motorbikes in transporting bushmeat cargo from the source villages adjacent to Serengeti National Park to the established market 200 km away. It also recorded the usage of motorbikes during dry season in three villages surrounding the northwestern Serengeti ecosystem and compared the patterns with those in a control village (Ntyuka- Dodoma) to confirm any possible usage of the motorbikes in illegal hunting. Finally, the study investigated the impact of different motorbike designs on the health of users and the time at which such health conditions initially occurred. Motorcycles were 8.4 and 3.4 times more efficient than donkeys and bicycles, respectively. Each trip, the mean weights of bushmeat packages delivered motorbike was 185.0 kg, 188.4 kg by donkeys and 109.0 kg when using bicycles. The mean depletion rates of motorcycles were 92.5 kg of bushmeat per day. Bicycles depleted 16.0 kg, while donkeys only depleted 11.2 kg per day. Interviewed anti-poaching personnel confirmed the usage of motorbikes in illegal hunting during the day and at night. Different models of motorbikes used in Tanzania possess either one or two coil springs surrounding a shock absorber. The action-reaction forces acting between each backbone vertebrae disc of a motorbike rider or a passenger is influenced by the angle the shock absorber is inclined. A few bodaboda had already experienced back pain in the first year, the majority experienced the pain after four years of riding, and no driver was without pain after nine years of riding. Every additional member of a household, and an additional coil increases the chance of experiencing back pain. There should be thorough investigation of motorbike usage and designs in the country to establish their suitability and safety to users as well as reducing loss of biodiversity.

Key words: motorbikes, illegal hunting, fatal accidents, health problems, Serengeti NP

Seeds of conflict: regreening increases human-wildlife conflict

Ester L. Oloije[1], Edwin Sadala[2], Ester Futterer[1], M.C.P. Tramper[1], Tim Moschl[1], Ole Makui[2], Dennis Lamayan[2], Guy Western[2], Emily F. Strange[1], and Michiel P. Veldhuis[1]

[1]Institute of Environmental Sciences, Leiden University, Einsteinweg 2, 2333CC, Leiden, The Netherlands
[2]Southern Rift Association of Land Owners (SORALO), Lalenok, Kenya

Abstract

Arid and semi-arid regions make up nearly 41% of the world's land surface and support over a third of the global population, the majority of whom reside in developing countries. Approximately 1.5 billion people worldwide are impacted by land degradation, with about 250 million residing specifically in drylands. Efforts by national and international agencies to restore degraded lands span local, regional and global scale. Revegetation of degraded lands by planting fast-growing and multipurpose tree species regreening is one of these key land restoration efforts, and for many years it has been considered an amicable solution. Regreening efforts in East-Africa in the 1980s included planting *Prosopis juliflora*. Over the past decades this species has expanded and become invasive in many areas across the Africa. Here, we document the impacts of Prosopis expansion on local communities in Kajiado, Kenya, and their perspectives towards Prosopis, using a mixed-methods approach. We connect semi-structured interviews with satellite-based distributions of Prosopis and human-wildlife conflict incidences. We show that human-wildlife conflict is higher near Prosopis thickets, which aligns with the perceptions of Prosopis increasing human-wildlife conflict. We discuss the current efforts and outlook on ways forward to mitigate these impacts.

Keywords: Invasive, human-wildlife conflict, *Prosopis juliflora*, re-greening

Assessment of Human-Elephant Conflict and Mitigation Strategies in the Southeastern Ruaha National Park, Tanzania

Zablon Fataely

Sokoine University of Agriculture
Corresponding Author: zfataely92@gmail.com

Abstract

Human-elephant conflict (HEC) negatively affects both people and elephants significantly. Despite mitigation efforts, conflicts are increasing in Sub-Saharan Africa. This research was conducted from May to July 2024 to determine the status of HEC in villages near Southeastern Ruaha National Park, Tanzania. Specifically, the study evaluated the extent and causes of HEC, potential mitigation strategies, and their effectiveness. Using a cross-sectional design, data were collected through a questionnaire survey, focus group discussions (FGD), and review of secondary data. Data analysis employed both quantitative and qualitative methods. Descriptive statistics, such as frequencies, means, and respondent proportions, were derived from the survey and secondary sources. Qualitative data from FGDs were analyzed thematically, with responses sorted into key themes. The Kruskal-Wallis test and Structural Equation Modeling (SEM) examined relationships between types of human-elephant conflict and predictor variables. Results indicated that the most common HEC types were crop damage (71.2%) and property damage (18.3%), while loss of income was the most frequently cited consequence (100%). Additionally, landscape

and climatic factors were primary drivers of HEC. The most common mitigation strategies were fire and drumming, each accounting for 29% of responses. The effectiveness of these strategies varied significantly (KW, χ^2 = 126.765, df = 6, $p < 0.001$), with fire perceived as more effective (48.1%). In conclusion, resource competition and landscape factors mainly drive HEC in Southeastern Ruaha. To sustainably reduce conflicts, integrated approaches are recommended, including fire deterrents, land-use planning, and community awareness.

Keywords: Coexistence, Deterrents, Human-elephant conflict

Fostering peaceful coexistence between Human-Elephant through Non-Lethal Mitigation in the Ruaha-Rungwa Ecosystem, Tanzania

Janemary Ntawlwila[1*], Revocatus Meney[1], Emmanuel Masenga[1], Ntiniwa Kipemba[1], Nassoro Wawa[2], Sikujua Ramadhani[2] and Damasi Masologo[3]

[1] Tanzania Wildlife Research Institute, P.O. Box 661, Arusha
[2] Wildlife Division, Ministry of Natural Resources and Tourism, P.O. Box 1351, Dodoma
[3] United Nations Development Programme (UNDP), Tanzania Country Office,
P.O. Box 9182, Sam Nujoma Rd, Dar es Salaam
*Corresponding author: e-mail: janemary.ntawlwila@tawiri.or.tz

Abstract

Human-Elephant Conflict (HEC) poses a significant threat to rural livelihoods and elephant conservation in Tanzania, particularly within the Ruaha-Rungwa ecosystem. Driven by increasing human population pressure and agricultural expansion, habitat loss has intensified interactions between humans and elephants (*Loxodonta africana*). In response, the Tanzania Wildlife Research Institute (TAWIRI), in collaboration with the United Nations Development Programme (UNDP), initiated a management intervention aimed at fostering human-elephant coexistence through Non-lethal mitigation methods. This project, conducted from 2022 to 2024 across six districts of Mbarali, Iringa, Kilolo, Manyoni, Wanging'ombe, and Itigi focused on community-based capacity building and demonstration plots. A total of 135 community members were trained as Trainers of Trainees (ToTs) to implement non-lethal strategies and sustainable farming techniques. Selected interventions were prioritized based on their scalability, local suitability, innovation, and income-generating potential. Monitoring showed that 68% (92 out of 135) of participants adopted the strategies. Unpalatable Crops to elephants introduced as buffer and alternative crops, particularly bird's eye chili and surflower (Cartum type), demonstrated high effectiveness, with a reported 100% success rate in preventing elephant raids. Conversely, Hysin sunflower was highly targeted, with raids reported across all districts except Mbarali. The beehive fence approach showed a remarkable 98% occupancy in Itigi, while Iringa and Mbarali had 60% occupancy rates; all areas utilizing beehive fences reported complete effectiveness in deterring elephants. The HEC toolkit, which included Roman candles and paper thunder flashes, found notable success in ousting crop raiding and marauding elephants, although noise balls showed less effectiveness in Itigi. These findings underscore the importance of community engagement, skills development, and ongoing financial and technical support in mitigating HEC. Expanding successful interventions is vital for enhancing coexistence and ensuring long-term conservation in Tanzania's elephant habitats.

Keywords: Coexistence, Community, Elephant, Engagement, Non-lethal

Human elephant interactions viewed as assets or liability in rural transformations: a review of cases from Tanzania with examples from other elephant range states.

Donald Gregory Mpanduji[1] and Paulo Chiza Athumani[2]

[1]Faculty of Science, Technology and Environmental Sciences, The open University of Tanzania,
[2]College of Natural and Mathematical Sciences, University of Dodoma.
Email addresses: donald.mpanduji@out.ac.tz, pauloathumani@gmail.com,

Abstract

The presence of human in perceived elephants range areas is an interesting debate to both development practitioners, conservationist, people and the government. The demand for land and the need for rural transformation has increased the contact of elephants and human. Increased human population, raised the needs for infrastructure developments, land for agriculture and pastures establishments. These actions impact on elephant range areas by reducing and or fragmenting the habitats. On the other hand, the regional and local efforts to conserve elephants appear to bear positive impacts exemplified by increase of elephants. Recently, animals are seen in places they disappeared for decades. However, the increased elephant and human populations likely to raise the competition to the limited resources available and consequently increase the conflicts between human and elephants. Events such as crop raiding, human and animal injury or death and damage to infrastructure are normal in contact areas. Retaliation measures usually directed towards the elephants and includes but not limited to killing the apparent impostors, driving them away to other areas or creating barriers to restrict encroachment. The increased contacts between elephants and human and the resultant outcome are currently viewed as liability to the rural communities. Recommendations are made to the government, conservation practitioners and communities harboring elephants to join efforts and come up with concrete solution that will inculcate change of the mind-set of the rural people to view elephants as assets. This is not limited to engaging in extensive dialogues in order to come up with a solid programs that will directly benefit individuals. Consumptive and non-consumptive utilizations must be investigated and recommendations on implementations of such use be instituted as the number of elephants are likely to increase.

Key words: Elephants, Human, elephant-human interactions

Assessment of impacts of crop raiding elephants to food availability and accessibility to farmers adjacent to Mikumi National Park, Tanzania.

Deusdedith Fidelis

Tanzania Wildlife Research Institute
Corresponding Author: deusdedith.fidelis@tawiri.or.tz

Abstract

The crop raiding behavior by elephants has been reported to be highly influenced among other factors by food availability and crop preferences. Elephant crops preference has been reported in villages adjacent to Mikumi National Park (MNP). This paper aims at assessing crops' preferences and damage by elephants towards establishing sustainable mitigation measures. Data on crop loss rating was done through likert scale statements and extent for crop damages was collected from July to October 2023 to 405 affected

households from 10 villages adjacent to MNP. Descriptive analysis was run in R.. The results indicated that Maize was most highly preferred by elephants whereas Millet, Banana, Tomato, and Paddy were the preferred, while Sesame was not preferred by elephants. Kendall's Concordance Test for assessing agreement among respondents on ranking crops elephant preferences (Coefficient W=0.758) indicating a strong agreement among respondents on preferences. Crop losses recorded in Maize, Pigeon peas, Sorgum, Tomato and Paddy were 102; 56; 36; 34; and 28 acres respectively. The spearman's rank test for the relationship between elephant preferences and size of damaged crops (Coefficient $\rho = 0.066$, $p=0.1866$), indicating a strong relationship between preferred crops and damaged crops. Understanding elephant crop preferences is crucial towards crafting effective mitigation measures to promote co-existence between humans and elephants. This could be done through educational awareness of communities in areas prone to elephant damage.

Keywords: Crops, preference, damages, behavior, mitigation

Confronting Human-wildlife conflict in the Mkomazi ecosystem, Tanzania

Emanuel Kivuyo, Kayanda Kolady, Elia Sabula and Noah Sitati

WWF Tanzania Country Office, P.O. Box, 63117, Dar es Salaam, Tanzania
Corresponding Corresponding author: emichael@wwftz.org

Abstract

The Mkomazi sub-landscape is a vital component of the larger East African ecosystem, located in northeastern Tanzania. Local communities leaving adjacent to Mkomazi NP are experiencing HWC manifested through human death and injury, crop damage, disruption and retaliation as well as property and infrastructure destruction by wildlife resulting to subsequent economic losses for communities, retaliatory killings of animals leading to potential decrease in local support for conservation initiatives. The study presents the results from the monitoring data collected in the respective Districts bordering the park through local communities (VGS) from 2020 to 2023 using government forms as well the regular monitoring of HWC following the capacity building of the District Game Officers, Protected Areas Wardens, managers and community members on the use of mobile phones installed with Miombo/ODK from 2024 to 2025. Where ~ 3,000 incidents were recorded where 10550 ha of crops including cereals (5402.1486 ha), beans (260 ha), tubers (122 ha), vegetables (62 ha), fruits (77 ha) and other crops (4628 ha) were destroyed by elephant damages at~98%, baboon and buffaloes both damages at ~0.17% and hippos with damages at ~0.11%. Moreover, ~ 59 people were attacked where 53% were injured and 47% deaths by wildlife. Elephants' attacks were 93% followed by leopards (3%). Lushoto district had the most attacks (31%), then Korogwe (27%), Same (15%), Rombo (12%), Mwanga (87%), and Mkinga (7%) districts. It has been observed that crop damage incursions occur typically during the end of the rainy season at this time crops are either close to maturity stage or reach maturity stage. There is the need for enhancing the capacity of DGOs, and government institutions Rangers and Managers (TAWA, TFS and TANAPA) as well as local community in managing HEC as well as sensitization of the local community on cultivation of unpalatable and less preferable crops to Elephants.

Keywords: Human–wildlife conflict, Mkomazi, human attacks, Miombo, and VGS

Farmers' perceptions of farm-based elephant deterrents in the Kilombero Valley, Tanzania

Grace Mchome

Southern Tanzania Elephant Program
Corresponding author: mchomegrace2018@gmail.com

Abstract

Human-elephant conflict (HEC) is a potential threat to elephant conservation and community livelihoods adjacent to protected areas. Most prior research on farm-based elephant deterrents focused on evaluating the efficacy of these deterrents with little attention to farmers' perceptions of the efficacy of these deterrents and their willingness to use them. This study was conducted in Tanzania's Kilombero Valley to investigate i) farmers' perception of the efficacy of three farm-based deterrents: solar-powered strobe light fencing, beehive-metal strip combination fencing, and beehive-solar light combination fencing; and ii) farmers' willingness to use these fences as elephant deterrents. We used interviews that included open-ended and close-ended questions to collect data on farmers' perceptions towards the trial fences. We interviewed a total of 71 farmers that were farming near the trial fences in May- June 2023. Most farmers perceived the trial fences to be effective at deterring elephants and reported a decline in crop damage, the number of elephant incursions into their farms, and the effort used to guard their farms at night. More than 80% of farmers said they were willing to use the trial fences as elephant deterrents in their farms. However, we found low income and cost of fence materials to be important hindrances towards adoption of these fences, despite farmers' willingness to use them. Farmers perceive having both farm-based elephant deterrents and rangers to safeguard farms to be important in reducing elephant crop damage. Successful demonstration of mitigation measures to farmers is very important in enhancing chances to adoption of the methods. However, since adoption of the mitigation approaches is highly affected by farmers livelihoods and affordability of the mitigation methods, supporting farmers' livelihoods with alternative sources of income to enable them to afford deterrents, and lowering the cost of these deterrents likely to be important in managing HEC.

Keywords: Farm-based, elephant, deterrents, Adoption, Beehive fences

Self-reported wildlife wire snaring by illegal hunters in Serengeti National Park, Tanzania

Boaz Loya

College of African Wildlife Management, Mweka: Corresponding author: boazloyaloya@gmail.com

Abstract

Wildlife hunting mediated by wire snares was self-reported by 85 illegal hunters apprehended during scheduled ranger patrols in the western part of Serengeti National Park between July and August 2023. Each intercepted hunter was separately interviewed by the head of a ranger post, as part of procedural preliminary interrogations following an interception. The inquiry was guided by a semi-structured questionnaire, with a focus on the origin of the apprehended hunter, types and sourcing of wire snares, and, in particular, the stepwise illegal process for their acquisition, transportation, and subsequent deployment into the park.

Before embarking on the survey, each interviewer was thoroughly exposed to the study philosophy and then embarked on field-testing the whole interview process, including recording. Illegal hunters came from 38 villages at distances of 11-41km (n=84) from the park boundary. Most (95%; n=83) of them conceded to have routinely used wire snares, most of which (95%; n=74) were processed from used car tyres and purchased at about 2.19-3.78 US$ per piece on average. Snares were mainly transported on foot (82%; n=76) from villages located mainly adjacent to the park. On average, a hunter carried out 159 trips (range 4-204 trips; n=60) to deploy up to 338 pieces of snares per year. About 96 (range 20-200 trips; n=55) trips were carried out into the park to retrieve the set snares, yielding about 7-10 animal carcasses per trip. These results are discussed to strengthen control of wire snaring propagated poaching.

Keywords: Wire Snaring, Poaching, Bushmeat, Conservation, Illegal Hunters

A Poisoning Incidence Involving a White-Backed Vulture in Mikumi National Park, Tanzania

Haruna Ramadhani and Mikidadi Mtalika

Tanzania Wildlife Research Institute: Corresponding author: mikidadi.mtalika@tawiri.or.tz

Abstract

In response to a received alert regarding an elephant carcass at Korongo la Mgoda in Mikumi National Park, the Vet team conducted a field trip to the site. Upon reaching the site, a decomposed elephant carcass surrounded by six carcasses of white-backed vulture was discovered. However, one vulture was alive and exhibited clinical signs of dull demeanor, weakness, flaccid neck, astasia, white diarrhea around the vent and ventral part of the abdomen, hypoventilation, delayed eye-opening, and oral clear fluid vomitus. The vulture was transported to Sokoine University of Agriculture Animal Hospital in Morogoro Municipality for treatment. The tentative diagnosis was Poisoning and therefore the immediate treatment was administered based on clinical signs and the tentative diagnosis. The animal was administered with 4mls of atropine, 900mls of DNS fluid therapy, and two tablets of medicinal activated charcoal. After initial treatment, the vulture showed improvement in breathing, alertness, and ability to stand, and released in the wild after six days of management. The case added the value into a series of frequent poisoning incidences of wildlife in protected areas in the Eastern and Southern Highland of Tanzania. More than 462 terrestrial and aquatic wild animals have been reported dead in poisoning incidences in the landscape from 2015 to 2025. The incidences involved lions, wild dogs, vultures, pigeons, guinea fowls, warthogs, impala, hippo, hyaena and elephant from Wildlife Management Areas (WMAs), open areas, game-controlled areas, game reserves and national parks. As both retaliatory and sentinel poisonings have been associated with incidences, there is an urgent need for the knowledge and awareness creation to communities, responsible pesticides firms, and improved surveillance and management of health threats to wildlife.

Keywords: Carbofuran, Pesticides, Sevin (Carbaryl), Wildlife Poisoning, Tanzania

Livelihood Pressures and Habitat Connectivity Loss: Threats to Wildlife Survival in Igando-Igawa Wildlife Corridor, Southern Tanzania

Joas J. Makwati[1, 4, *], Steven Temu[1], Philipo K. Mwanukuzi[2], and Henry J. Ndangalasi[3]

[1]Department of Zoology and Wildlife Conservation, University of Dar es Salaam, Tanzania
[2]Department of Geography, University of Dar es Salaam, Tanzania
[3]Department of Botany, University of Dar es Salaam, Tanzania
[4]Tanzania Wildlife Management Authority (TAWA), Southern Highlands Zone
*Corresponding author: j.makwati@gmail.com

Abstract

Protected Areas (PAs) are crucial for long-term maintenance and conservation of biodiversity as they play a fundamental role in safeguarding ecosystems and ensuring the survival of various wild species. However, many PAs are increasingly becoming spatially disconnected due to increased pressure on adjacent areas from human activities such as agriculture, logging, overgrazing and land development. These activities disrupt the continuous flow of ecological functions across PAs. This study explores the livelihood practices, the destruction of habitat and their effects on the existence and survival of wildlife within the Igando- Igawa wildlife Corridor (IIWC) that links Mpanga-Kipengere Game Reserve and Ruaha National Park in southern Tanzania. To examine how anthropogenic activities influence habitat connectivity and wildlife viability within Igando – Igawa Wildlife Corridor, we conducted social and wildlife surveys through questionnaires, focus group discussions, key informant interviews and field observations. Our findings indicate that human activities in the IIWC are increasingly undermining habitat connectivity, thereby impairing the corridor's ability to facilitate wildlife movement between the aforementioned PAs. Results indicate that agriculture expansion and scattered settlements, deforestation and grazing activities are responsible for the continuing habitat destruction and alteration of wildlife movement and distribution. The insightful feedback from survey responses regarding wildlife presence in the corridor, along with observations of fresh animal signs, indicates that the corridor remains generally active and functional, despite ongoing human pressures. We recommend for streamlined land-use practices within a socio-ecological economic framework that will enhance livelihoods while bolstering biodiversity and the overall health of the IIWC ecosystem. We also suggest that comprehensive habitat mapping be undertaken to identify elephant and other large mammal conflict hotspots to develop mitigation strategies. Finally, we recommend the inclusion of the IIWC in the National Action Plan for corridors that require urgent interventions.

Keywords: Igando-Igawa, Wildlife Corridor, Connectivity, Human

Factors Influencing Community Perspectives on Elephant Crop Damage and Conservation Support in Tanzania

Franco Mbise and Janemary Ntalwila

The University of Dodoma
Corresponding Author: francombise@gmail.com

Abstract

Human-wildlife dynamics continue to present conservation challenges worldwide, particularly where human livelihoods and wildlife habitats overlap. This study examined local perceptions of elephant crop damage and conservation support in eight villages situated

near Lake Manyara National Park (LMNP) and Swagaswaga Game Reserve (SGR) in Tanzania. The study aimed at determining how community characteristics influence reported experiences with elephant crop raiding, trends over a five-year period, and attitudes toward elephant protection. Data were obtained through structured surveys administered to 240 households (30 per village) between, March 2022 -April 2023. Analyses were conducted using Generalized Linear Mixed Models (GLMM), incorporating ordinal probit and ordinal logistic regressions to explore predictors of perceived raiding frequency and a binomial logistic model to assess support for elephant conservation. Results showed that residents living near game reserves were significantly less likely to support elephant conservation compared to those near national parks (β = -2.867, $p < 0.001$). Additional factors influencing attitudes included village location ($p = 0.002$), education attainment ($p = 0.002$), and age category ($p = 0.003$). The outcomes emphasize the importance of recognizing the varying local contexts in conservation planning. Addressing both ecological concerns and social realities is essential to promoting long-term coexistence between communities and elephants near protected landscapes.

Keywords: Community engagement, Conservation attitudes, Crop damage, Elephants, Human-wildlife coexistence

Socio-economic drivers and status of bushmeat hunting dynamics within Western Serengeti ecosystem

Revocatus Meney

Tanzania Wildlife Research Institute, Email: revocatus.meney@tawiri.or.tz

Abstract

Illegal bushmeat hunting continues to pose a significant threat to wildlife conservation in the Western Serengeti ecosystem. This study was conducted to investigate the socio-economic drivers of illegal hunting in Serengeti and Bunda Districts between January and February 2023. Semi-structured interviews and focus group discussions were conducted across eight villages to assess the key factors influencing poaching, including livelihood dependence, market demand, and hunting practices. Results revealed that hunters, averaging 17.5 years of experience, primarily engaged in bushmeat hunting for nutritional and financial needs, exacerbated by food insecurity, crop raiding by elephants, and limited employment opportunities. Hunting methods varied, with 42% employing active hunting, 19% passive hunting (e.g., snares), and 38% using a combination. Snares were predominantly made from repurposed materials, with wire sourced from nearby towns. Hunters reported harvesting at least 255 animals across 13 species in their most recent trips, with bushmeat sales generating substantial income (≈$15,137 USD). Seasonality influenced hunting intensity, with peaks from June to December coinciding with wildebeest migration. The study also found that law enforcement patrols were a major deterrent; however, hunters adapted by employing risk-coping strategies such as avoiding patrolled areas and hunting at night. To address the prevailing challenges associated with bushmeat hunting, this study highlights the importance of multi-faceted, adaptive interventions that target both economic incentives and enforcement strategies to ensure sustainable wildlife conservation in the Western Serengeti. Specifically, the study recommends several measures to mitigate illegal hunting, including microfinance initiatives, job creation, and strengthening community outreach programs.

Keywords: Bushmeat hunting, Socio-economic drivers, Wildlife conservation, Serengeti, Poaching, Law enforcement, Livelihood strategies.

SUB THEME INFRASTUCTURES DEVELOPMENT AND WILDLIFE CONSERVATION

Factors influencing wildlife roadkill in the Ngorongoro Conservation Area, Northern, Tanzania

Gabriel Mayengo

College of African Wildlife Management, Mweka
Corresponding author: mayengogabriel@gmail.com

Abstract

Globally, extension of road network is among the major threats affecting different fauna survival. Roads traversing protected areas, usually harm wildlife species (e.g., wildlife roadkill). Wildlife roadkill is of global conservation concern and has been reported to occur in different protected areas worldwide. Very little information on the problem is currently available in the Ngorongoro Conservation Area (NCA). The purpose of this study was to identify factors that affect wildlife roadkill in the NCA. The 82-kilometer main road from Lodoare to Golini served as the study's transects. Data was collected for a duration of one year from July 2021 to June 2022. Vehicle moving with a speed limit of 20km/hr were used during the data collection. The survey started early in the morning from 07:00 am to 06:00 pm and employed both direct and opportunistic encounter observations for recording wildlife roadkill incidences. The results revealed that 85 individual animals belonging to 21 families, i.e., 5 mammalian, 3 reptilian, and 10 bird orders were recorded killed within one year period in the area. These animals comprised 26 different species, which included 10 mammalian, 5 reptilian, and 11 bird species. Moreover, more birds (69.4%) than mammals (18.8%) and reptiles (11.8%) were found killed in the area. Additionally, the night jars (*Caprimulgus europaeus*; 30.6%) followed by black rat (Rattus rattus; 7.1%) and chameleon (*Chamaeleo chamaeleon*; 3.5%) were the most frequently recorded killed species in the area. Furthermore, wildlife roadkills did not differ significantly between seasons ($p=0.371$) and time of day (e.g., morning vs. afternoon; $p=0.652$) but differed significantly between their body size (e.g., small, medium, and large; $p<0.001$) and habitat types (e.g., grassland, woodland, shrubland, wooded grassland, forest; $p=0.005$). The study recommends punishments and penalties for overspeeding drivers and installing cameras, speed limits, and signboards along the highway to alert drivers to reduce speed. Further, providing regular education to road users on the impacts of roadkill within the ecosystem is critical.

Keywords: Ecology, Mortality Road, Transportation Wildlife,

A Decision Analysis approach for road development planning in the Greater Serengeti Ecosystem

Philipo Jacob Mtweve[1,7]*, Abraham Eustace[2], Qambemeda Masala Nyanghura[7], Vincent Moseti[1], Tanja Kramm[3], Christina Bogner[4], Pierre Ibisch[5], Lisa Biber-Freudenberger[1,6]

[1]Centre for Development Research (ZEF), University of Bonn, Genscherallee 3, 53113 Bonn, Germany;
[2]Tanzania Wildlife Management Authority (TAWA); [3]GIS and Remote Sensing Group, Institute of Geography, University of Cologne;
[4] Ecosystem Research Group, Institute of Geography, University of Cologne;
[5]Centre for Econics and Ecosystem Management at the University of Applied Sciences Eberswalde (HNEE);
[6] Institute of Researchers (InRes)
[7] Sokoine University of Agriculture – Department of Widlife

*Corresponding author: philipo.mtweve@sua.ac.tz

Abstract

Road infrastructure expansion in high-biodiversity areas presents challenges in balancing socio-economic development with biodiversity conservation. This study aimed to evaluate trade-offs between livelihood improvement and biodiversity conservation for four proposed road development options Serengeti, Northern, Eyasi, and Mbulu—in Tanzania's Greater Serengeti Ecosystem, providing transparent integration of development and conservation considerations. Multi-Criteria Decision Analysis (MCDA) and Bayesian Belief Networks (BBN) were employed as complementary methodologies to assess sustainable infrastructure planning. Analysis included sensitivity testing, scenario modeling under varying development intensities (30%, 50%, 100%), and 30-year time-series projections to evaluate long-term sustainability outcomes. The Eyasi Road emerged as the most balanced choice in MCDA, performing strongly in both biodiversity conservation and livelihoods, while BBN analysis identified Mbulu as most efficient for optimizing both objectives. Both methods ranked Eyasi highly for overall positive impact. Mbulu Road demonstrated superior biodiversity conservation performance but slightly lower socio-economic benefits. Northern Road prioritized livelihoods but showed weak biodiversity performance. The currently implemented Serengeti Road consistently ranked lowest across both analyses, underperforming in biodiversity and livelihood outcomes with high assessment uncertainty. Integrating MCDA and BBN provides a holistic framework for infrastructure planning, capturing stakeholder preferences and probabilistic uncertainty. Eyasi Road appears most suitable for balanced development objectives, while Mbulu Road is more appropriate when prioritizing long-term ecological sustainability. The analysis demonstrates significant benefits of transparent, multi-criteria approaches in sustainable infrastructure decision-making.

Keywords: Bayesian networks, conservation, infrastructure, multi-criteria analysis, sustainable development

Counting the Cost of Coexistence: An Empirical Study of Human-Lion Conflict in Serengeti's Human-Wildlife Interfaces

Matana Ng'weli

Tanzania Wildlife Research Institute
Corresponding Author: matana.ngweli@tawiri.or.tz

Abstract

African lion (*Panthera leo*) populations in East Africa have declined by nearly 60%, largely due to escalating human-lion conflict (HLC). While promoting coexistence between people and lions is widely recognized as the most sustainable solution, efforts to manage conflict remain hindered by the lack of reliable conflict monitoring systems. Without robust data collection and analysis, it is difficult to understand where and when conflicts occur, what drives them, and how effective current interventions are. This study addresses that gap by presenting the first spatially explicit assessment of HLC across eight districts bordering the Greater Serengeti Ecosystem (GSE); an East Africa's key stronghold for African lions facing growing human pressures. We analysed the patterns, severity, and geographic distribution of conflict incidents, as well as temporal trends and geographic variation. While preliminary findings reveal significant regional variation in conflict intensity across the landscape, further analyses are underway to deepen our understanding of how these patterns intersect with ecological and socio-political factors. Seasonal dynamics, in particular, warrant deeper exploration as we continue to build and examine the conflict dataset. This evolving research expedition establish a critical baseline for long-term conflict monitoring and adaptive management in the Greater Serengeti Ecosystem (GSE). This new dataset provides valuable insights to inform the design, evaluation, and adaptation of conflict mitigation strategies. Moreover, the research offers evidence-based support for conservation planning and policy, contributing to efforts aimed at securing a future of sustainable human-lion coexistence in one of Africa's most ecologically important landscapes.

Keywords: Community, livelihoods, Lion, Human Coexistence

Influence of Tourism Infrastructure on the Critically Endangered Eastern Black Rhino Habitat Selection in Serengeti National Park

Doreen Mungure

University of Glasgow
Corresponding Author: doreenmungure8@gmail.com

Abstract

Tourism infrastructure is expanding across African protected areas at unprecedented rates. Tourism is a major source of national economic revenue that funds conservation, yet its impacts on the behaviour of endangered or sensitive species remains largely unexplored. This study investigated how roads, permanent lodges, seasonal campsites and key ecological variables such as woody cover, water sources, terrain ruggedness, normalized difference vegetation index (NDVI) and rainfall influence habitat selection of Eastern black rhinoceroses *(Diceros bicornis*), a critically endangered species, in the Serengeti-Mara Ecosystem, Tanzania. We analysed 21,624 GPS locations from 91 adult rhinos

collected between 2000 and 2024 using a resource selection function (RSF). Results indicated that rhinos consistently avoided areas near roads and permanent lodges, with avoidance intensifying where these features intersect. The effects of tourism infrastructure were magnified in translocated and male rhinos. However, selection of areas near seasonal campsites was unexpectedly high. Additionally, rhino preferred areas with relatively dense woody cover and near water, though these preferences varied seasonally with the selection of areas near water intensifying significantly during periods of low rainfall. Our findings demonstrate that tourism infrastructure can significantly alter habitat selection patterns in black rhinos, with variation by sex and translocation history. These results underscore the need for strategic tourism planning that minimizes disturbance in critical rhino habitats. Policy makers should consider nuanced effects that tourism development have on the behaviours of rhinos and other sensitive species, when promoting the expansion of tourism facilities to ensure sustainability of both wildlife conservation and economic aims.

Keywords: Black Rhino, Habitat selection, Serengeti National Park, Tourism

SUB THEME: INNOVATION AND TECHNOLOGY IN WILDLIFE CONSERVATION

Ecoacoustics Monitoring Reveals New Species and Primate Behavior Insights in Gombe National Park, Tanzania

[1]Jane Goodall Institute USA: Corresponding Author: lpintea@janegoodall.org

Abstract

Large-scale conservation requires an automated and inclusive remote sensing system for monitoring species occurrence over time. Acoustic remote sensing is an emergent, cost-effective technology that provides the game-changing capacity to expand the scope of biodiversity monitoring. Gombe National Park, Tanzania, is an ideal model system to pilot ecoacoustics and other conservation technologies to monitor biodiversity in Africa. Gombe is home to a population of endangered eastern chimpanzees and other primates that have been studied continuously for 65 years. It has a non-invasive health monitoring program initiated in 2004 and has also been continuously mapped and monitored using very high-resolution satellite imagery, GIS, and other conservation technologies since 2000. In the first application of ecoacoustics to monitor biodiversity in Gombe National Park, 100 AudioMoth Edge devices were deployed in the dry and wet seasons, followed by 10 long-term acoustics sensors. We analyzed the data through a combination of manual validation, template-matching algorithms, and regional AI models, and an acoustic baseline of biodiversity for Gombe was created. Ninety-nine species were detected, including 86 species of birds, 12 species of non-flying mammals, and one amphibian, between October 2022 and November 2023. This includes new sightings for Gombe of Thomas's bushbaby (*Galago thomasi*) and Freckled nightjar (*Caprimulgus tristigma*) that could result in the potential expansion of their range. The study clearly shows that ecoacoustics is a valuable tool that could complement other long-term data collection efforts and be operationally used to monitor biodiversity in Gombe and across Tanzania.

Keywords: Biodiversity, Chimpanzees, Conservation technology, Ecoacoustics, Gombe National Park, Remote sensing

Real-time classification of Serengeti wildebeest behaviour with edge machine learning and a long-range IoT network

Cyrus Kavwele[1]

[1]University of Glasgow
Corresponding Author: cyruskavwele@gmail.com

Abstract:

Globally, animal populations are facing increasing levels of environmental disturbance. Human activity, land-use change, and global warming are altering migration routes, space use, activity budgets, and the behaviour of many wildlife species. Understanding the impacts on wildlife at a fine scale is essential to identify locations of increased disturbance, mitigate its effects, and predict potential population-level outcomes. In this work, we introduce a low-cost animal tracking system that integrates open-source electronics, edge machine learning, and an Internet of Things network to provide real-time information on the location and behaviour of animals. The system employs an onboard machine learning

algorithm to identify distinct behaviours and then transmits classification outputs along with location data over a long-range network. We deployed the system on wildebeest (*Connochaetes taurinus Burchell*, 1823) in Serengeti National Park, Tanzania, a highly social migratory ungulate population that is ecologically and economically vital to the region. Analysis of the transmitted data showed activity readings were consistent with location data and revealed biologically meaningful fluctuations in daily activity patterns. Our system introduces a new dimension to studying animal behaviour and movement ecology by offering immediate insights into the behaviour and location of collared animals.

Keywords: Animal, Behavior, Conservation, Technology, Tracking, Wildebeest

Establishing Environmental and Social Baselines for AI-Driven Climate Adaptation and Human-Wildlife Conflict Mitigation in the Ruaha-Rungwa Ecosystem, Tanzania

Emmanuel Kazuva[1]

[1]The Open University of Tanzania
Corresponding Author: ekazuvae@gmail.com

Abstract

Climate change and human-wildlife conflict (HWC) increasingly threaten livelihoods and conservation efforts in the Ruaha-Rungwa ecosystem, Tanzania. Communities dependent on rain-fed agriculture and livestock face erratic rainfall, droughts, and escalating wildlife encounters, particularly with elephants and carnivores, exacerbating poverty and food insecurity. Emerging technologies such as Artificial Intelligence (AI) present opportunities to enhance community resilience through improved wildlife monitoring, early warning systems, and agricultural market access. However, successful application requires a clear understanding of baseline environmental and social conditions, including knowledge, attitudes, perceptions, and technological readiness. This study reports on an Environmental and Social Impact Assessment (ESIA) baseline survey conducted in March 2025 in selected villages the bordering Ruaha-Rungwa protected areas. A mixed-methods approach was employed: a structured household survey of 365 randomly selected respondents was used to collect data on demographics, livelihoods, proximity to protected areas, climate risks, HWC experiences, and perceptions of climate change. Awareness and readiness to adopt AI-driven solutions were also assessed. Complementary qualitative data were obtained through key informant interviews and focus group discussions with local leaders, game scouts, agricultural officers, and conservation authorities, ensuring a geographically diverse representation. Findings indicate that climate variability and wildlife incursions are major livelihood challenges. While community awareness of AI remains low, there is a notable willingness to adopt AI-based tools for adaptation and wildlife monitoring. Barriers include limited digital literacy, low smartphone ownership, and concerns over privacy and data use. Thus, communities demonstrate openness to digital innovations provided they are locally relevant and inclusive. These findings offer a baseline for the AI4 Climate Change Tanzania Project and will guide the design of interventions while serving as a benchmark for future impact assessments.

Keywords: Adaptation, AI, Climate Change, ESIA, Human-Wildlife Conflict, Ruaha-Rungwa, Technology

Ultrasonographic Anatomy and Findings in Biochemically Normal Ursus Americanus Cubs Admitted to a Wildlife Rehabilitation Facility

Eric Johnson[1]

[1]Elephant Conservation Organization (ECO)
Corresponding Author: eric@ecotz.org

Abstract

Ultrasound is a noninvasive tool that allows for visualization of the internal parenchymal organ anatomy of many species, including both large and small mammals. A vast number of publications exist documenting the ultrasonographic anatomy of domestic species, but a dearth of knowledge exists on the ultrasonographic anatomy of many wildlife species including *Ursus americanus*. This study aimed to document the sonographic appearance of the abdominal organs in American black bear cubs with normal biochemical values to form a foundational database of perceived normal anatomy that will allow for future studies on abnormal sonographic features. A retrospective search was performed on the database of the Wildlife Disaster Network's medical records for black bears less than 1 year of age that had normal biochemical values within 24 hours of an abdominal ultrasound. Thirteen bear cubs met the inclusion criteria. The body weight range was 19-27kg with five females and eight males. All ultrasound exams were performed under heavy sedation. The ultrasound examinations were evaluated by a board-certified veterinary radiologist (EGJ) and organ features including size, parenchymal echotexture and echogenicity, and novel anatomic features including muscularis propria thickening in the pylorus and reniculate kidneys which are atypical for land-dwelling mammals were documented. These perceived normal findings will be used to screen future American black bears for abnormalities to help determine if they can be successfully rehabilitated and to monitor responses to diagnosed disease. Given the large expense associated with wildlife rehabilitation ultrasound should be incorporated into every entry examination to avoid enrolling wildlife with significant morbidities and to allow for prompt treatment of existing comorbidities to increase the likelihood of successful rehabilitation and eventual release back into the wild. This program can be adapted to many other species including those found on different continents.

Keywords: Anatomy, Bear, Rehabilitation, Ultrasound

Developing Custom GPS Tracking Devices with Artificial Intelligence Activity Sensors for Monitoring Endangered Wildlife Species.

Fredrick M. Mgimba*[1], J. Grant C. Hopcraft[1], Cyrus M. Kavwele[2], Gerald E. Nyaffi[3], and Colin J. Torney[2]

[1]School of Biodiversity, One Health & Veterinary Medicine, University of Glasgow, Glasgow, G12 8QQ, UK.
[2]School of Mathematics and Statistics, University of Glasgow, Glasgow, G12 8SQ, UK
[3]Tanzania National Parks, Box 3134, Arusha, Tanzania
Corresponding author: fred.krypton7@gmail.com

Abstract

The rapid decline of endangered species, such as black rhinos (*Diceros Bicornis*), highlights the urgent need for innovative conservation strategies. Traditional wildlife monitoring methods, such as manual patrols, are time-consuming, resource-intensive, and often ineffective in remote landscapes. Despite significant advances in Artificial Intelligence

(AI) and the Internet of Things (IoT) technologies, their full conservation potential for real-time tracking of threatened species remains untapped due to several critical challenges. For example, many existing devices suffer from short battery life and high energy consumption, limiting their long-term deployment in the field. Additionally, the harsh environmental conditions and limited connectivity in remote areas further hinder the effectiveness of IoT-based monitoring systems and have slowed the adoption of AI and IoT in conservation. This study presents a custom AI-enabled Internet of Things (IoT) collar that integrates GPS tracking, accelerometers, LoRaWAN communication, and an AI-driven behavioral classification, analysis classification system. These smart devices are equipped with solar panels to monitor real-time wildlife movement and behavior, while ensuring low power consumption, optimized recharge and the capacity to recharge the system, thereby extending the life and providing cost-effective, scalable, and efficient wildlife monitoring. And sustainable deployment. The study aims to bridge existing knowledge gaps by optimizing power efficiency, enhancing real-time data processing, and improving transmission reliability in remote conservation areas. Ultimately, this work supports the broader goal of protecting endangered species.

Keywords: Collar, Endangered Species, GPS, LoRaWAN, Technology

Using acoustics and AI in assessing tropical forest biodiversity in Gabon

Timothy Boucher[1]

[1]The Nature Conservancy
Corresponding Author: tboucher@tnc.org

Abstract

This study explores the use of acoustics and artificial intelligence (AI) in assessing biodiversity within a tropical forest in Gabon. The primary objective was to pilot and test new technologies that could enhance the efficiency, cost-effectiveness, and repeatability of biodiversity studies. The research involved deploying 24 acoustic recorders over multiple days across three forest management types: a heavily used community forest, a sustainably logged forest, and a protected area within Ivindo National Park. Over 3,500 hours of sound recordings were analyzed using Birdnet Analyzer, focusing on detecting 120 possible bird species out of 400. The analysis revealed that the protected forest had the highest number of bird species, followed by the sustainably logged forest, and the community forest had the fewest. Additionally, the study found that the protected and sustainably logged areas had more primary forest species, while the community forest had more secondary species. The number of bird calls and their timing throughout the day were also compared, showing that the protected area had more overall bird calls and a subtle difference in the timing of calls, particularly in the afternoon. The study concludes that combining AI with acoustic recordings significantly increases the efficiency of analyzing large datasets and allows for diverse analytical approaches. However, it also highlights the need for some level of curation and knowledge of tropical forest bird ecology to ensure accurate results. The findings underscore the potential of these technologies in advancing biodiversity research and conservation efforts.

Keywords: Acoustics, AI, biodiversity, technology, birds

Using SEEK Code to Track, Identify, and Monitor Elephants Across the Greater Mara Ecosystem

Tinka Oloshiro[1]

[1]Mara Elephant Project (MEP)
Corresponding Author: amos@maraelephantproject.org

Abstract

Accurate, efficient monitoring of elephants is essential for assessing conservation effectiveness and guiding management strategies in the Greater Mara Ecosystem. Most traditional field identification methods utilize manual records, which can be time-consuming, prone to error, and limit efficient re-identification and tracking of elephants. Alternatively, fully automated computer vision for elephant identification is often difficult due to the expense and need for advanced expertise. The objective of this study was to validate the use of an innovative semi-automatic human-in-the loop re-identification system called Elephant book with research teams in the Mara. This program is a web-based platform and database that uses the innovative System for Elephant Ear-pattern Knowledge (SEEK) algorithm. This algorithm precisely maps unique ear tears and hole patterns for reliable individual recognition. With this program, field researchers collected photographic and observational data daily across multiple monitoring sites in the Mara. The photos and manually labeled attributes such as estimated age, sex, tusk status (including tusklessness or asymmetry), ear patterns, and other anatomical traits were uploaded into Elephantbook. Using SEEK, each elephant entered was assigned a unique descriptive code thereby creating a searchable database of known elephants. The database was also integrated with EarthRanger, enabling real-time mapping of individual movements, family units, and home ranges across the ecosystem. Over the last four years, 1,283 unique elephant individuals were identified with a SEEK code and new individuals are continuously added to Elephantbook. This system has demonstrated high identification accuracy and consistent re-identification of individuals across multiple sightings. This has resulted in an in-depth, archivable record of elephant distribution, movements, and social structure. The use of ElephantBook with SEEK represents a significant advance in elephant monitoring, enhancing the efficiency, accuracy, and scalability of conservation data collection. Future applications include expanding to other elephant populations and further integration with conservation efforts across Africa.

Keywords: Conservation, Elephant, Re-identification, SEEK, Sightings

Assessment of Land Use and Land Cover Change: A Case Study of Kitendeni Wildlife Corridors, Tanzania

Godfrey G. Harry[1]

[1]College of African Wildlife Management, Mweka
Corresponding author: harrygmassey@gmail.com

Abstract

Land Use Land Cover (LULC) changes significantly impact habitats and biodiversity, affecting wildlife, species spread and movement. Understanding these changes is vital for effective conservation, especially in wildlife corridors. The Kitendeni wildlife

corridor has been facing conservation threats as a result of various land use, land cover change (LULC) in the corridor. This study aimed to assess the LULC changes over 30 years (1994-2024) at Kitendeni wildlife corridor. LULC changes between 1994, 2004, 2014, and 2024 were classified and monitored for spatial-temporal patterns, and predictions were made for the period from 2024 to 2044. Image preprocessing and classification, employing Google Earth Engine and ArcGIS Pro, used a supervised approach with ground truthing to map land cover types. Classification accuracy was validated with confusion matrices, achieving high overall accuracies (90–91.5%) and Kappa Indices of Agreement (KIA) ranging from 0.85 to 0.90, which indicate reliable classifications. Change detection analysis was conducted to quantify spatiotemporal transitions among land cover classes. Grassland exhibited the highest positive change, at 28.8%, followed by forest at 11.7%. Conversely, bushland and bare land declined sharply by 24.9% and 15.6%, respectively. Results from three epochs indicate substantial transformations in land cover across all categories, particularly in barren land and shrubland. Meanwhile, grasslands and forested areas have experienced notable growth. These alterations could impact the Kitendeni wildlife corridor. It is advised that the government formulate a comprehensive land-use management plan and implement a community-centred natural resources management strategy, both intended to enhance resource utilization and diminish human activities within the Kitendeni wildlife corridor.

Keywords: Corridor, Kitendeni, Land cover change, Modelling, Wildlife

SUB THEME: NATURAL RESOURCES GOVERNANCE AND CONSERVATION

Financing Wildlife Conservation through a Performance-Based Model: A case of the mtransboundary Kitenden Wildlife Corridor.

Frank Damson and Noah Sitati,

WWF Tanzania Country Office, P.O Box 63117, Dar Es Salaam

Abstract

The escalating global biodiversity crisis presents a formidable annual funding gap, estimated at US$700-711 billion, necessitating innovative financial mechanisms beyond traditional public and philanthropic sources to secure wildlife corridors that are threatened with human encroachment affecting free movement of wildlife. This paper analyzes the Wildlife Credits model, an innovative conservation performance payment model, implemented in Tanzania's Kitenden Wildlife Corridor. The Wildlife Credits Model is uniquely designed with a "Rights-First Approach", prioritizing the recognition and protection of Local Communities (LCs) rights, including communal land tenure and traditional governance, as a foundational prerequisite for sustainable conservation. The model operates on a "rewards for results" philosophy, directly linking financial incentives to verifiable conservation performance. Its core innovations include collaboratively developed Key Performance Indicators (KPIs) encompassing corridor extent, habitat integrity, priority species, governance and community wellbeing. These were rigorously monitored by an Artificially Intelligence powered dashboard integrating camera traps, patrol and satellite data, ensuring transparent and evidence-based payment triggers. A meticulously co-designed and community approved benefit sharing mechanism ensures equitable distribution of funds, addressing critical local needs such as a Predator Consolation Fund and investment in social services. The findings from the Kitenden pilot demonstrate significant results including cessation of encroachment into the 2,752 hectors corridor and a substantial increase in community tolerance towards wildlife, rising from a 39% baseline in 2022 to 70% in 2024. The results provide robust empirical evidence that linking conservation performance to direct, equitable financial incentives can transform human-wildlife dynamics from conflict to sustainable co-existence. This case study underscores the model's potential for scalable, equitable, and effective conservation finance, showcasing how a rights-based framework, coupled with technological transparency and local ownership, can drive both ecological integrity and multidimensional wellbeing enhancement.

Keywords: Wildlife Credits Model, Wildlife corridors, Financial incentives, Conservation Finance, Local community

Land privatisation drives the spread of fencing and loss of traditional land use patterns in Maasai rangelands

Milenka Sloots[1]

[1]University of Groningen
Corresponding Author: milenkasloots@gmail.com

Abstract

Changes in land tenure in East Africa, specifically the subdivision of formerly open communally used land into private land raise concerns for continuing human-wildlife coexistence in these rangelands. When followed by enclosure fencing, this can potentially pave the way for land degradation, deterioration of pasture quality, and habitat fragmentation - outcomes that are detrimental to both livestock and wildlife. In this study, we analyse and compare the development of private land fencing (for cropland and ranching) in the transboundary Siana-Loita (Kenya) and Loliondo region (Tanzania) from 2009 to 2024, with a more detailed focus on the Pololeti Plains in Kenya. We find that the whole region is experiencing significant increases in fenced land. In Kenya, these increases are more widespread across landscapes and primarily associated with rangeland wire fencing driven by land privatisation and subdivision. In contrast, fencing in Tanzania is more localized, constrained to areas determined by traditional land use patterns, and mainly involves green fences used for subsistence crop farming. Enclosure fencing and the resulting loss of mobility options for both pastoralists and wildlife can have devastating impacts in an increasingly variable climate. Our results highlight the importance of immediate action to mitigate fencing in Kenya to preserve human-wildlife coexistence in this region, ideally through community-based conservation.

Keywords: Enclosure fencing, Fragmentation, Habitat, Land tenure, Pastoralism

Reforming Tanzanian wildlife conservation laws towards thwarting crimes against wildlife

Mectrida Kaijage

Sokoine University of Agriculture: Email: meckyb@sua.ac.tz

Abstract

Tanzanian Wildlife Conservation Laws criminalises all "wrongs" committed against wildlife. Meaning that, all the wrongs committed against wildlife are termed as "crimes." Much as it seems for criminal sanctions to attract severe penalties, nevertheless, researchers have regularly revealed that, crimes against wildlife are stern in Tanzania. Again, studying the severity of crimes against wildlife and against the nature at large, criminal sanctions imposed on most categories of crimes are imperfect. Moreover, legal science on "why people commit crimes" informs that, in a setting such as that availed in Tanzanian laws, crimes against wildlife are foreseeable. This study analyses Wildlife Conservation Laws of Tanzania and supports the presupposition of theoretical foundation on why people commit crimes as founded on Rational Choice and Social Learning theories as drivers for persistent crimes in the wildlife sectors. The two theories suggest that, humans are rational beings and so their participation in criminal activities is rationally made decisions. The

theories immensely explain that, individuals choose to commit crimes after evaluating the benefits of the crimes versus the sanctions; and thereby decide whether to commit or refrain from committing crimes. That people invest in getting knowledge on crimes and associated motivations and / or sanctions, how to avoid the consequences; and after they are acquainted to all possible criminal models, they choose to commit crimes; when cost-benefit analysis presents greater rewards than the risks associated with committing crimes. This study deploys both doctrinal and empirical study methodology to confirm that, the wildlife conservation laws of Tanzania are low-risk and are crimes benefits permeability. The study concludes that, Tanzanian laws contain loopholes inciting commission of crimes but also deterrence is possible. The study recommends reform measures towards severity and certainty penalties for effective thwarting of crimes against wildlife and commercial valued penalties for ecosystem repair in Tanzania.

Keywords: Laws, Crimes, Surplus, Persistent Crimes

Perception of local people toward the benefits and cost of Burunge WMA: The voice of minority groups

Juma Kegamba

College of African Wildlife Management, Mweka
Email: kegambajuma@gmail.com

Abstract

Involving local people in the sustainable conservation of biodiversity is a global issue that requires urgent attention for better conservation outcomes. Understanding the views of those living next to the protected areas, particularly under the community-based natural resource management (CBNRM) is critical to decision making in achieving the desired conservation goals. This study assessed the perceptions toward the benefits and costs, and the level of support by local people with differing livelihood strategies to Burunge Wildlife Management Area (BWMA). A cross-section survey using semi-structured questionnaire was used in the two selected villages. We found that the large number of the respondents from the majority agro-pastoralist group showed a negative perception toward the benefits received from the BWMA. The views of the agro-pastoralists who do not support the continued existence of BWMA are associated with the cost they experience from it and the long-term need for the same area as grazing land. On the contrary, respondents from minority groups (i.e., fish mongers, business, and weaving) were significantly positive toward the benefits of the BWMA and its existence, as their livelihood strategies are highly dependent on it. Furthermore, the level of support for the existence of the BWMA was different between the two surveyed villages, which might be due to the different conflicts they have with its operations. Investigations of local perceptions toward natural resources management should not be limited to the groups in a society that have the majority livelihood strategy, but should also consider those whose livelihood strategies are in the minority and whose voices largely tend to be ignored.

Keywords: Agro-pastoralist, Burunge WMA, Natural resources, Minority groups,

Assessment of Management Effectiveness of Tanzania's National Parks in Addressing Key Conservation Threats: A Case Study of Mikumi and Saadani

Canishaz R. Bamanyisa[1], Michael Muganda[1], Nsajigwa Mbije[2]

[1]Department of Wildlife Management, Sokoine University of Agriculture, Morogoro, Tanzania
[2]College of Forestry, Wildlife and Tourism, Sokoine University of Agriculture, Morogoro, Tanzania
Corresponding Author Email: canishazbamanyisa@gmail.com

Abstract

National parks are essential for conserving biodiversity, but their efficacy is being threatened by growing threats. This study used the Management Effectiveness Tracking Tool (METT) to evaluate management effectiveness in Mikumi and Saadani national parks. It focused on nature and extent of key threats and evaluated each park's ability to respond. Data were collected through structured questionnaires administered to 14 park staff and 4 community leaders from adjacent villages. The findings showed that there are human wildlife conflicts in both parks, with roadkills affecting Mikumi and growing human population pressure affecting Saadani.Mikumi and Saadani received overall management effectiveness scores of 85.37% and 67.48% respectively. In all five management elements planning, inputs, processes, outputs, and outcomes, Mikumi outperformed Saadani as a result of improved resource availability and enforcement capabilities. Roadkill and in-park settlements are examples of persistent external threats that have shown the limitations of internal management strategies. The results highlight how crucial it is to allocate resources, involve the community, collaborate across sectors, and change policies in order to address conservation issues. Strengthening partnerships and adopting adaptive management practices are essential for long-term sustainability of Tanzania's protected areas.

Keywords: Management effectiveness, National Parks, Protected Areas, Conservation threats, Tanzania

A review of the nature and outcomes of wildlife cases appealed in the high court of Tanzania

Diana T. Butiku[1], Elias R. Mwita[1] and Juma J. Kegamba[1*,]

[1]College of African Wildlife Management (CAWM), Mweka, P.O. Box 3031, Moshi, Kilimanjaro, Tanzania
*Corresponding author: kegambajuma@gmail.com

Abstract

Wildlife crimes are one of the major threats facing conservation of natural resources and reducing wildlife population. It has become one of the reasons for extinction of some species especially those with lower number of individuals. Collaborative approach between wildlife authorities and the government using law enforcement have been one of the strategies towards achieving a fight against wildlife crimes. This study reviewed a total of 918 judgements of the appealed wildlife cases to the High Court and Court of Appeal of Tanzania over a twelve-year period, from 2012 to 2024 from the Tanzania Legal Information Institute (TanzLII) database. The review analyzed the judicial outcomes, the nature of the frequently appealed wildlife offenses and the reasons for the acquittals. Majority of the judgement reviewed (83.4 %) had each of the appellant (84.0 %, n = 932) sentenced 20 years or above incarcerations in the first judgement by the trial court. Generally, majority (63 %)

of the wildlife cases appealed resulted into acquittal of the offenders (72 %) and only small percentages were convicted, while the rest percent of the cases appealed were ordered to be retried. The review shows that, weaknesses in prosecution procedures, including failure to prove cases beyond reasonable doubt, lack of jurisdictional consent, improper handling of evidence and improper court procedures are the main reasons for the high acquittal rate. Wildlife law enforcement needs major improvement in several aspects such as, proper prosecution trainings, collection and handling of evidences in order in order to secure victory in court proceeding.

Key words: Wildlife, crimes, protected areas, Prosecutions, High Courts, Wildlife cases, Law enforcement.

The Influence of Environmental Factors on Greater Flamingo Populations, Nesting Site Selection, and Reproductive Success at Lake Natron, Tanzania

Akshita Rabdiya[1]

[1]University of Dar es Salaam
Corresponding Author: akshitarabdiya@gmail.com

Abstract

Greater Flamingos (*Phoenicopterus roseus*) are long-distance migratory birds whose populations are highly influenced by environmental factors. This study assessed the factors influencing Greater Flamingo (GF)'s abundance, breeding success, and nesting habitat preferences at Lake Natron, Tanzania. The overall estimated mean GF population from the southern (Magadini) and western (Pinyinyi and Monik) lake shores was 824.66±252.25, with Magadini recording the highest population density of 1622.92±676.1. Monthly variation showed the lowest total counts in May (n=175) and peak numbers in October (n=10,200) from all the three sites. Water parameters significantly influenced the population distribution, particularly dissolved oxygen and pH, with high GF counts aligned with optimal conditions. Although nesting was recorded in all the study sites, the highest breeding success (3,500 hatchlings in October) was restricted to the southern part of the lake. Principal Component Analysis revealed that nest distribution was strongly correlated with distance from lake shore and colony size, suggesting that larger colonies formed farther from the shoreline, surrounded by water, to reduce disturbance and predation. The findings highlight the critical role of hydrological and physicochemical parameters in GF habitat selection and breeding success. Conservation efforts should prioritize habitat stability both upstream and along streams, particularly in response to climate change and anthropogenic disturbances.

Keywords: Breeding Success, Habitat, Parameters, Population, Quality

Community-Based Natural Resources Management In Africa's SADC Region: A Training Needs Assessment

Boaz Loya

College of African Wildlife Management, Mweka
Email: boazloyaloya@gmail.com

Abstract

A Training Needs Assessment (TNA) for Community-Based Natural Resources Management (CBNRM) was undertaken in four Southern African Development Cooperation (SADC) countries of Malawi, Mozambique, Tanzania, and Zambia as part of a wider project: 'Strengthening Research and Innovation in Community-Based Natural Resources Management' and Waste Management' (RiNaWa). The findings were meant to support CBNRM curricula development within the region based on the current realities and needs. An in-depth questionnaire aligned to the main assessment themes was prepared, validated, and field-tested prior to being administered online to 172 employers and trainers. For trainers, the inquiry focused on institutional circumstances surrounding an efficient delivery of CBNRM academic programs, while for employers, it was on gauging the qualifications and competencies of employees in this sector. CBNRM-related functions, duties, and tasks were also gathered consultatively from a sample of 41 employees. The questionnaire response rate was 49%. Overall, well-trained CBNRM staff were scarce in the region at - 46.4% - especially so for non-degree staff (-62%). Employers were in favor of clear-cut job separations, with more 'hands-on' duties for non-degree staff compared to managerial, research, supervisory, and consultancy ones for their degree holder counterparts. A theory-to-practice balance in training and application of creativity and innovation in addressing CBNRM challenges was highly advocated, and integration of ICT-based CBNRM modules was considered crucial in academia. The teaching and learning environments were rated at >50% of requirements, with specific improvements suggested. These findings are discussed, given the strengthening of CBNRM training within the SADC region.

Keywords: Community-Based Natural Resources Management (CBNRM), Training curriculum, Job requirements

A scoping Review of Mental Health Risk Factors Among Wildlife Rangers

Gabriel Mayengo

College of African Wildlife Management, Mweka
Email: mayengogabriel@gmail.com

Abstract

Rangers play a crucial role in conserving wildlife resources. Despite need to protect species, there is limited focus on their mental health which impacts their well-being, relationships and conservation at large. This scoping review analyses mental health risk factors among rangers. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework was used. Inclusion/exclusion criteria were applied to identify relevant literature across Web of Science, ScienceDirect, and Scopus within the domain of mental health from 2005 to 2024. Duplicate literature was removed, reducing

the total literature to 246 items. Abstract and title review was performed and literature that dealt with mental health risk factors were considered. Full-text review was thereafter conducted, in which 81 items were included in the synthesis. Rangers face diverse stressors, including limited career progression, financial struggles, traumatic incidents, exposure to diseases and social isolation. These challenges can lead to mental health issues. This review underscores the need for government, employers, and other stakeholders to address work-related mental health risks by creating supportive environments and providing mental health resources for rangers. Through collaborative efforts, rangers' mental health can be safeguarded, allowing them to thrive in their roles while effectively contributing to conservation.

Keywords: Biodiversity, Mental Health, Risk, Law enforcement, Protected Area, Well-being, Psychological Pressure

Community-Based Conservation of Critically Endangered Kipunji Primates Through Agricultural Innovation and Stakeholder Engagement in Southwestern Tanzania

Philipo Jacob Mtweve[12]*, Felician Ezekiel[1], Neema Lukumay[1], David Kaberege[1], Denis Onesmo Mng'ong'o[1]

[1]Environmental Conservation for Wildlife and Community Enterprise (ECOWICE), Morogoro, Morogoro Region, Tanzania
[2]Department of Wildlife Management, Sokoine University of Agriculture, Morogoro, Tanzania
*Corresponding author: philipo.mtweve@sua.ac.tz

Abstract

The Livingstone Mountains Ecosystem in southwestern Tanzania harbors the critically endangered Rungwecebus kipunji, facing severe threats from escalating human-wildlife conflict as primates' raid crops, jeopardizing both biodiversity conservation and rural livelihoods. This study aims to develop sustainable conservation strategies that reduce crop-raiding conflicts while ensuring kipunji population recovery and enhancing community food security. We established a permanent, community-staffed monitoring network across eight villages bordering Rungwe Nature Reserve and Kitulo National Park to track kipunji populations and quantify conflict dynamics. An agricultural buffer strategy was piloted, transitioning farmers from maize cultivation to primate-resistant crops including irish potatoes, millet, sesame, and soybeans, with surplus converted into value-added poultry feed. Environmental education programs were implemented in ten schools through interactive field visits and cinema-based outreach. Multi-stakeholder workshops engaged village environmental committees, extension officers, and protected-area authorities in developing actionable management guidelines. The monitoring network successfully established baseline population data and conflict documentation protocols. Preliminary agricultural trials demonstrate crop diversification feasibility and reduced primate-related losses. Educational programs show increased conservation awareness among participating students and communities. This integrated approach demonstrates potential for reducing human-wildlife conflict while supporting kipunji conservation through community-driven solutions. The model offers scalable applications for primate conservation in human-modified landscapes, requiring continued monitoring and stakeholder engagement for long-term sustainability.

Keywords: Community conservation, crop-raiding, human-wildlife conflict, kipunji, primate conservation

Can Tanzania Sustain Green Growth and Shared Prosperity? A Theoretical Review

Odass Bilame[1] and Janemary Ntalwila[2]

[1]University of Dodoma, College of Business and Economics
[2]Tanzania Wildlife Research Institute
*Corresponding author: obilame@gmail.com

Abstract

This paper explores the theoretical foundation of green growth and shared prosperity, focusing on Tanzania's efforts to align economic development with environmental sustainability and social equity. Using a documentary review approach, it examines how a green economy (GE) can generate economic value while minimizing ecological degradation and promoting inclusiveness. Inclusive green growth acknowledges the trade-offs between economic growth, environmental protection, and social equity. It offers synergies by ensuring that growth supports long-term environmental health and benefits the most vulnerable populations. The World Bank's concept of shared prosperity-improving the welfare of the bottom 40% of a population—serves as a benchmark for inclusive outcomes in development strategies. Tanzania has made notable strides toward green growth through national policies such as the National Climate Change Strategy and Five-Year Development Plans, alongside its commitment to the Paris Agreement. Key areas of focus include renewable energy investments (e.g., hydropower, solar), sustainable agriculture via climate-smart practices, forest conservation through REDD+ initiatives, and improved urban planning. These strategies aim to reduce emissions, safeguard biodiversity, and create green jobs. However, challenges persist; limited institutional capacity, financial constraints, and low public awareness hinder the full implementation of green policies. Strengthening governance, expanding green financing, and integrating private sector and community participation are essential to overcome these barriers. Tanzania's transition to a green economy is possible but requires coherent policy alignment, strategic investments, and inclusive development models. With sustained effort, the country can achieve green growth that ensures both intergenerational equity and current social welfare, positioning itself as a regional leader in sustainable development. The paper highlights that the green economy (GE) has the potential to maximize value and economic growth across the whole economy while managing natural resource assets. To that effect, inclusive green growth and shared prosperity by policymakers are indeed called for.

Keywords: Green growth, Shared prosperity, Inclusive growth, Welfare gain

Conservation Education as a Tool for conserving Kinyongia magomberae and the Magombera Forest Reserve, Tanzania

Kelvin Ngongolo

The University of Dodoma
Corresponding Author: kelvinkngongolo@yahoo.com

Abstract

This study examines the contribution of conservation education to raising awareness and promoting community involvement in the protection of *Kinyongia magomberae*, a threatened chameleon species endemic to Tanzania's Magombera Forest. A mixed-methods approach was employed, incorporating structured questionnaire surveys, interactive workshops, and pre- and post-training assessments to evaluate changes in knowledge, attitudes, and behavior among community members. The results revealed an increase in understanding of the ecological importance of K. magomberae and the threats it faceschiefly habitat loss driven by deforestation and human encroachment. Conservation education not only enhanced knowledge but also motivated action. Notably, there was at least a 40% increase in the number of individuals willing to participate in conservation activities such as community patrols, tree planting, and reporting illegal activities. These outcomes underscore the pivotal role of targeted education in empowering local communities to become active stewards of biodiversity. The findings demonstrate that combining awareness-raising with practical engagement strategies can significantly strengthen the conservation of endangered species and ecosystems. The study recommends replicating similar educational initiatives in other biodiversity hotspots to promote long-term conservation through community ownership and involvement.

Keywords: Conservation, Education, Community, *Kinyongia magomberae*

Implementation of the ecological mitigation measures by tourism accommodation facilities in protected areas: a case of Arusha national park

P. Mpanzo[1], A, Machumu[1*], J. Machibya[1], R. Mremi[1]

[1*] College of African Wildlife Management, Mweka P. O. Box 3031 Moshi, Tanzania
*Corresponding author: alodia.machumu@mwekawildlife.ac.tz

Abstract

The expansion of tourism accommodation facilities within protected areas has been linked to several negative ecological impacts, including habitat degradation, biodiversity loss, and ecosystem fragmentation, if mitigation strategies are inadequately implemented. This study investigated ecological mitigation measures implemented by tourism accommodation facilities within Arusha National Park, Tanzania, assessing their extent to which they are being implemented and challenges associated with their implementation. Using a mixed-methods approach, including semi-structured interviews, document reviews, and systematic field observations, data were collected from eight tourism accommodation facilities. Content analysis and descriptive statistics examined some key ecological impacts, including waste generation, water consumption, habitat alteration, and wildlife disturbance. Mitigation measures were analysed under the

mitigation hierarchy framework (avoidance, reduction, compensation). The findings revealed that reduction measures were predominantly implemented due to lower operational costs and ease of monitoring, while avoidance measures were less common due to challenges in redesigning or relocating infrastructure. Compensation measures were least applied due to complexities in long-term enforcement and financial commitments. The need for a strong unified system for joint monitoring and reporting, highlighting for the need of coordinated monitoring as a critical for improving mitigation effectiveness. The study concludes that while efforts exist, gaps remain in proper mitigation implementation. It recommends strengthening policies on environmental accountability, stakeholder collaboration, and monitoring to enhance sustainable tourism within protected areas. The findings provide practical insights for policymakers, conservation managers, and tourism operators aiming to balance ecological integrity with tourism growth.

Keywords: Ecological impacts, Environmental Impacts Assessments, mitigation measures, sustainable tourism, tourism accommodation facilities

SUB THEME: SUSTAINABLE TOURISM

Categorizing domestic tourists in Tanzania's national parks: Types of tourists' theory approach

Kezia Mkwizu

Corresponding author: kmkwizu@hotmail.com

Abstract

Innovation in tourism can also include building on theories that guide understanding of a phenomenon. In this paper, understanding domestic tourists in the context of Tanzania is crucial to improve domestic tourism as well as sustain the industry and thus have sustainable tourism. Application of the types of tourism in tourism was used in past studies to determine the tourists' categories. Therefore, to expand literature and build on the types of tourists' theory, this paper's main objective is to examine the categorisation of domestic tourists in Tanzania's national parks using the types of tourists' theory. This study was conducted in Nyerere National Park, Tanzania. Data collected from 360 domestic tourists was analysed using descriptive statistics. The findings show that most of the domestic tourists were characterised as first-time visitors to Nyerere National Park (61.4%) and visited mostly through package tour (58.9%). Guided by Cohen's category of tourists, this implies that these domestic tourists are seeking familiarity with the park since they are unfamiliar with the park and its activities due to them being first-time visitors. In addition, many domestic tourists also visit the park on package tours implying that they are visiting on pre-determined itinerary hence, these domestic tourists can be categorized as organized mass tourists who seek familiarity rather than novelty. Future research can explore longitudinal design to understand the patterns of domestic tourists in visiting national parks.

Keywords: Domestic tourists, National Parks, Types of tourists' theory, Tanzania

Assessing Tourist Vehicles in Accommodating Tourists With Disabilities at Ngorongoro Conservation Area; Tour Guides Perception

Juliana Maganga

College of African Wildlife Management, Mweka
Corresponding author: oswaldnathalia@gmail.com

Abstract

The Ngorongoro Conservation Area (NCA) is observing a rise in tourism among individuals with various physical disabilities, needing an assessment of the suitability of existing services, such as vehicle accessibility and guide readiness. This study aimed to investigate the physical disabilities of tourists encountered by guides, assess the presence of disability-friendly features in tourist vehicles and identify the challenges faced by tour guides when assisting tourists with disabilities. A cross-sectional strategy was employed to gather data from 150 tour guides through questionnaires and interviews conducted over two weeks. The SPSS software was utilized for quantitative data analysis, including descriptive statistics and Chi-square tests to investigate connections between

variables Findings indicated that guides often interact with tourists with sensory, mobility and neurological disabilities; yet many stated that cars inadequately fulfill accessibility requirements. Although 86.7% of guides recognized the existence of disability-friendly features in automobiles, hardly 30% deemed them entirely appropriate for all sorts of disabilities. Challenges like communication hurdles between disabled individuals and tour guides, inadequate specialized training programs for tour guides, and restricted vehicle accessibility were frequently observed, despite 74% of guides having received some training. The report underscores a disparity between training initiatives and the practical preparedness to adequately assist disabled travelers. These findings indicate a distinct necessity for enhanced and continuous specialized training programs for tour guides, superior vehicle adaptations adhering to universal design principles, and inclusive policies that engage those with disabilities in the planning process. Improving these aspects will foster a more accessible, polite, and pleasurable tourism experience for all visitors at NCA.

Keywords: Accessibility, Impairments, Ngorongoro Conservation Area, Specialized training Tour guides, Tourism, Vehicle adaptations

'We are Here but not Here': Coastal Residents' Perception of Tourism Impacts

Nelly Maliva

Corresponding author: nmaliva@yahoo.co.uk
Business School, University of Dar es Salaam

Abstract

Local resident inclusion in tourism development is part and parcel of sustainable tourism. Residents' perception is one of the key factors influencing residents' inclusiveness in tourism, and thus the success of the industry in the locality. This study aimed at appraising residents' perception of tourism around Saadan national park in Tanzania along the shores of Indian Ocean. Both quantitative and qualitative approaches were utilized to capture holistically the perceptions of residents; a structured questionnaire was used to collect quantitative data while in-depth interviews and observations were used in collecting qualitative data. The quantitative data were descriptively analysed while content and thematic analyses were used for qualitative data. Generally, the residents around Saadan have low level of education, are small entrepreneurs, and have lived most of their lives in the area. Locals consider tourism to have a great economic potential which is not realized due to challenges like more decision power vested on TANAPA and foreign investors, low marketing of the attractions, their culture being ignored, and poor infrastructure. The level of local involvement appears to be tokenism in nature which leads to low contribution of tourism to the locals and the area with respect to economic, socio-culture, and environmental; thus, the local perception of 'we are here but not here'. The results send signals to other tourism stakeholders like government, private investors, and non-profit organizations in trying to include the locals as a means towards inclusive tourism development. The findings provide insights into the Social Exchange Theory and Equity Theory that were used as the backdrop of the study. Moreover, practical insights to wildlife and nature tourism management organizations are provided that can be used to further enhance inclusiveness of the residents that will propel tourism into further sustainability levels.

Keywords: Coastal, Inclusiveness, Perceptions, Residents, Tourism impact

Ecological Impacts of Vehicle-Based Tourism at Wildebeest River Crossings in the Mara-Serengeti Ecosystem

Merikinoi Kimirei

Tanzania National Parks (TANAPA)
Corresponding author: merikinoi.kimirei@gmail.com

Abstract

Tourism generates vital revenue for the conservation of protected areas, but vehicle-based tourism can degrade sensitive habitats through vegetation loss and soil erosion. This study assesses how vehicles affect grass biomass and soil erosion along the Mara River in Serengeti National Park while accounting for the role of rainfall, fire, and topography. We established 12 transects with 60 sampling plots along the river that were divided between wildebeest crossing sites and control sites and were repeatedly measured from August 2021 to June 2023. Vegetation biomass, signs of erosion, and vehicle disturbance were recorded, and remotely sensed data on rainfall, fires, and slope were included in the analysis. Generalized linear mixed models revealed that grass biomass declined with increasing vehicle activity. Moreover, tourist vehicles diminished the otherwise positive effect of rainfall on vegetation. Although vehicle tracks were generally associated with higher erosion risk, in grazed areas, they were paradoxically linked to reduced erosion, possibly due to rapid vegetation recovery stimulated by nutrients from animal excreta. These findings highlight the ecological costs of vehicle-based tourism in riparian zones. To mitigate these impacts, park managers should consider regulating vehicle density near riverbanks, especially in erosion-prone areas, to ensure that tourism remains ecologically sustainable.

Keywords: Riverbank degradation, soil compaction, sustainable tourism, trampling and wildebeest migration

Impact of Audio-Visual Content on Domestic Tourist Visit Intention: Case of Tanzania National Parks

Paul Pastory

Business School, University of Dar es Salaam
Corresponding author: paulabel4@gmail.com

Abstract

The growing competition among tourist destinations and uncertainties such as COVID-19 pandemic have had effects on international tourists' arrivals. Henceforth, Destination Management Organizations (DMOs) must come up with innovative marketing strategies to encourage and attract domestic tourism to achieve sustainable tourism businesses. Unfortunately, audiovisual marketing strategies, particularly in the context of nature-based tourism have received less attention. The purpose of this study was to investigate the impact of audiovisual content on domestic tourists' visit intention in Tanzania National Parks (TANAPA). Employing a one-shot case study experimental research design, a total of 125 experimental units randomly assigned to four (4) experimental groups yielded data for the study. The data was analysed using mean comparison tests. Results show that: (i) Audio content has a strong influence on the behavior intention and attitude towards domestic tourism as it resulted in greater cognition.

(ii) The visual stimulus and verbal produce a more effective positive arousal, behavioral intention and attitudes. (iii) Combined sounds and videos have a greater influence on tourists' intention by increasing one's level of happiness and attractiveness (arousal). Finally, recommendations are provided to tourism promoting agencies on the means to effectively promote tourism destinations through audiovisual marketing.

Keywords: Domestic tourism promotion, Tourists' visit intention, Wildlife tourism

Community Involvement in Conservation: Assessing Threats, Benefits, and Challenges to Visitation at Dar es Salaam Zoo, Tanzania

Naza Mmbaga

The University of Dodoma
Corresponding author: nazaemmbaga@gmail.com

Abstract

Zoos play a vital role in conservation education and community engagement, yet barriers to visitation can limit their impact. This study assessed community involvement, perceived benefits, threats, and challenges to visitation at Dar es Salaam Zoo, Tanzania, to inform strategies for enhancing local participation in conservation efforts. A cross-sectional survey was conducted among 105 adult residents (35 per village) in Tumaini, Chengeni, and Mwasonga, near Dar es Salaam Zoo. A structured questionnaire collected data on demographics, zoo visitation, conservation awareness, and perceived benefits. Chi-square tests examined associations, Mann-Whitney U and Kruskal-Wallis tests were used. High awareness (74.3%) contrasted with low visitation (39.0%). Awareness varied by education ($\chi^2 = 8.45$, $p = 0.038$, $df = 3$), with tertiary-educated respondents showing higher awareness (76.0%). Educational benefits were cited by 84.8%, but visitation did not enhance benefit perceptions. Traffic issues were significant cited threat ($\chi^2 = 11.90$, $p = 0.003$, $df = 2$) compared to the rest. Time constraints were the primary barrier, and significantly ($\chi^2 = 6.72$, $p = 0.01$) more cited by non-visitors (53.1%) than visitors (29.3%), with higher rankings among non-visitors ($U = 490.5$, $p = 0.032$). Lack of information was significantly cited by informally educated respondents ($\chi^2 = 8.30$, $p = 0.040$, $df = 3$). Zoo visitation remains low, driven by time constraints and lack of information, particularly among non-visitors and less educated groups. Traffic concerns dominate perceived threats, highlighting the need for infrastructure improvements. Implement community focused initiatives, such as free entry days, evening hours, and targeted educational outreach for informally educated residents, to reduce barriers and enhance engagement with conservation programs.

Keywords: Awareness, Education, Engagement, Time Constraints, and Wildlife conservation

Factors Influencing Tourists' Satisfaction: A Case Study of Homestays in Tanzania

Selela Mwakalila

University of Dar es salaam
Corresponding author: selelam53@gmail.com

Abstract

Sustainable destination necessitates tourist satisfaction including accommodation. However, research on tourist satisfaction with accommodation, particularly homestays that offers authentic cultural experience apart from the core accommodation, is missing. This study explored factors that influence tourist satisfaction with homestay experience in Tanzania. Specific dimensions considered in the study included Reliability, Assurance, Tangibility, Empathy, and Responsiveness. Data were systematically sampled from AirBnB and were qualitatively analyzed through content analysis and thematic analysis. Findings indicate a generally high level of tourist satisfaction, notably driven by Tangibility and Reliability. Tourists placed a substantial emphasis on tangible factors, such as environmental quality, cleanliness, facility conditions, and consistent, reliable service delivery, which significantly influenced their positive experiences. Conversely, Empathy and Responsiveness, though less frequently mentioned, were critical when unmet, often leading to dissatisfaction. Recommendations for homestay operators include prioritizing enhancements in physical accommodation and the reliability of service provision to better align with tourist expectations. Furthermore, effective social media engagement emerges as a strategic recommendation for fostering sustainable tourist satisfaction and long-term business success. For Tanzania as a country and a similar context, the results imply homestay satisfaction to be an important component of sustainable tourism.

Keywords: Tourist, satisfaction, Homestays, Reliability, Rater model, Service

Important Drivers of Nature-Based Tourism Satisfaction in Northern Tanzania

Beatrice Kessy

Tanzania National Parks (TANAPA)
Corresponding author: bettykessy2014@gmail.com

Abstract

Nature-based tourism is a rapidly expanding sector that significantly contributes to national economies, particularly in biodiversity-rich states such as Tanzania. Despite its national significance, limited empirical studies have assessed drivers of satisfaction levels among tourists. This study examined tourist satisfaction in the protected areas (PAs) of northern Tanzania, with a focus on biodiversity attractions and tourism services. Adopting a quantitative approach, we collected data from 620 randomly selected tourists at PA exit gates after their visits. Data were analyzed using R (version 4.4.1) to identify key drivers of satisfaction. Results indicated that 82.5% of tourists expressed satisfaction with biodiversity attractions, while 83.1% reported satisfaction with the tourism services. Findings revealed that wildlife encounters, lodge accommodations, an average three-day stay, female tourists had significantly higher satisfaction with biodiversity attractions. Furthermore, tourists visiting Tarangire National Park reported significantly higher satisfaction with tourism services. While the overall satisfaction was high, we highlight the

importance of sustainable tourism practices to protect biodiversity, recognizing that wildlife plays a critical role in enhancing visitors' experiences. Moreover, we recommend future research to explore strategies to optimize tourist satisfaction, enhance revenue generation and minimize ecological impacts on the PAs.

Keywords: Biodiversity attractions, Nature-based tourism, Protected areas, Tourist satisfaction

Tourists' Motives and Satisfaction in Tanzania: A Case of South Korean Volunteer

Robert Suphian

University of Dar es Salaam
Corresponding author: reshaki@hotmail.com

Abstract

Volunteer tourism has become an integral part of sustainable tourism. A thorough understanding of volunteer tourists motives is crucial to ensure efficiency and effectiveness of the operation. Efficiency and effectiveness in the operations depends on volunteers' motives. This study aimed at evaluating different volunteers' motives altruism and egoistic and their consequential effects on satisfaction and their future intentions towards volunteering in a different country. A self-administered questionnaire was used to collect data from South Korean voluntourists who were posted in Tanzania. The data was subjected to a series of one-sample t-tests and multiple linear regression to assess the most significant motives to undertake volunteering and testing the effects of the motives on their satisfaction and future intentions. The mean comparison results indicate motives to experience the country of volunteering (Tanzania), adventure, and altruistic motives to be the top three relevant motives. Adventure, social, and experience motive were noted to significantly explain the Korean voluntourists' satisfaction and revisit intentions. Surprisingly given the focus of the volunteering agency having an altruistic motive, the voluntourists motive do not coincide with agency's motives. Overall, the voluntourists indicated higher levels of satisfaction and intentions to participate in similar volunteering activities through humanitarian agencies. The results offer insights into the value congruence between volunteer tourists and the respective humanitarian agencies. Results indicate incongruence between the two with egoistic dominating the volunteer tourists motives rather than altruism, which is the core of most humanitarian agencies, thus offering practical implications to the agencies in recruiting and training of the volunteers. Furthermore, the study offers theoretical implications of the value congruence theory in the context of volunteer tourists in humanitarian agencies operating in sub-Saharan African countries.

Keywords: Congruence, Humanitarian, Motives, Satisfaction, Voluntourist

Modernizing visitor experience through sustainable tourism innovations: A Case study of Serengeti National Park, Tanzania

Lengai, G. A.

National College of Tourism, P.O. Box 6127, Arusha, Tanzania
Corresponding author: lengai.godlisten@nct.ac.tz

Abstract

In 2024, Serengeti National Park hosted 589,300 visitors, a rise of 11.2% from the previous year, reinforcing its status as the most visited national park in Tanzania. This study examines how digital tools, Eco-innovation, and community-based models can elevate visitor satisfaction, mitigate ecological strain, and support sustainable growth, especially as annual park traffic peaked at 600 vehicles per day in key northern zones. A mixed-methods approach was employed, consisting of field surveys of 120 tourists, interviews with 40 park staff and local stakeholders, and a comprehensive review of tourism policy documents. Quantitative data from the survey responses were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26, employing descriptive statistics, cross-tabulations, and frequency distributions to identify trends and patterns. Results revealed that 82% of tourists using mobile interpretation apps reported higher engagement and learning outcomes. Eco-friendly waste management in pilot zones led to a 45% reduction in waste volume compared to control areas. Meanwhile, only 54% of vehicles adhered to designated routes, leading to wildlife disturbance and jeopardizing the integrity of the Great Migration. Qualitative data from stakeholder interviews (e.g., park managers, TATO representatives) underscored concerns that traffic congestion is "diminishing wildlife viewing quality" and "harming animal behavior patterns." This research concludes that integrating smart tourism tools, enforcing ethical vehicle zoning, and involving communities in conservation governance can balance tourist satisfaction with environmental stewardship. Recommendations include Expanding mobile and kiosk-based interpretation platforms; Implementing data-driven visitor tracking to cap vehicle numbers in hot spot zones; and Strengthening community co-management and benefit-sharing initiatives. These strategies offer an adaptable blueprint for enhancing sustainable tourism across African protected areas.

Keywords: Community co-management, Digital tourism, Sustainable tourism, Vehicle zoning

To be 'Awed' or 'Not to be': Exploring Western Tourists' Thematic Associations of Tanzania and Sustainable Tourism

Zaheer Munshi

The University of Chicago
Corresponding author: rikmunshi24@gmail.com

Abstract

Tanzanian tourism industry has been substantially engaging in sustainable activities, does the world know though? This research aims to examine perceptions towards Tanzania and its tourism industry in a global context. Eighty-one travelers (51% male) from the United States were surveyed via an online panel. Participants responded to questions regarding recent travels, knowledge and attitude towards Tanzania, awareness of Tanzania's sustainable practices, and family travel. To start, 85% knew where Tanzania is,

only 6% have visited Tanzania. When asked to list one word that comes to mind when they think of Tanzania, interestingly although 40% of the participants described nature-related thematic associations (e.g., landscape, beach, wild, etc.), 34% literal meanings like Africa-related connections, none mentioned sustainable tourism activities or eco lodges. The latter is true even for those who have visited Tanzania. The majority did not bring up local communities in their discussions. Note, 63% would like to visit Tanzania for nature-related experiences while only 9% wanted to visit for educational and volunteering experiences. With regards to memorable experiences, 36% (10%) were in awe about nature (wildlife) in their most recent travels, for individuals who visited Tanzania, they were in awe as expected with the landscape (migration). Once again, sustainable engagements were not mentioned. On a 1-7 point Likert scale, when asked about considering family holiday gatherings at far-away destinations contrasting traditional home settings, participants agreed it would be enjoyable (5.58 vs. 4, scale midpoint, $p < 0.001$), but didn't consider Tanzania as a potential destination (4.30 vs. 4, n.s.), despite being interested to visit Tanzania in the future (4.56 vs. 4, $p < 0.01$). Study findings indicate Tanzanian tourism industry needs to be more informative in their messaging geared towards western tourists not only with regards to their rich wildlife and awe-inspiring nature experiences but also their sustainable activities and eco-tourism.

Keywords: Awe, Eco-lodges, Literal Connections, Nature Connections, Sustainable Tourism, Tanzania

Sustainable Tourism and Women in Higher Education: Perspectives on visits to National Parks

Kezia H. Mkwizu[*], Zakia M. Ituja[1]

[1]The Open University of Tanzania
[*]Corresponding Author kmkwizu@hotmail.com

Abstract

Sustainable tourism is a trending phenomenon, and past scholars have connected sustainability and national parks in the post pandemic. In addition, past studies have shown that there are less females compared to men that visit national parks in Tanzania. To expand literature on this topic, the main objective of this paper is to explore sustainable tourism and women in higher education from the perspective of visits to national parks. Guided by the motivation theory, the specific objective is to conceptualize sustainable tourism and female academics in higher education focusing on visits to national parks from the context of Tanzania. A literature review approach is applied as the methodology. The findings reveal that existing literature continues to show less females visiting national parks. The practical implication is for the tourism stakeholders to encourage females including female academics to visit national parks more often as a way for relaxing but also a retreat incentive. This paper is limited to the literature review approach only and therefore; future studies may use mixed methods and arrange for primary data collection to further understand sustainable tourism and female academics in higher education within Tanzania.

Keywords: Eco-lodges, Literal Connections, Nature Connections,

SUB THEME: WATER RESOURCE AND WETLAND CONSERVATION

Genetic barcoding uncovers hidden diversity of haplochromines cichlids in Shirati Bay, Lake Victoria

Faraja Kakulwa

Sokoine University of Agriculture
Corresponding author: farajasau2408@gmail.com

Abstract

Haplochromine cichlids in Lake Victoria have undergone significant population declines following the introduction of the predatory Nile perch (Lates niloticus). These declines have been further exacerbated by eutrophication, overfishing, and habitat degradation, which have collectively contributed to the disappearance of many haplochromine species from the catch. However, recent studies suggest that some species previously thought to have disappeared may be recovering, possibly due to the recent decline in Nile perch populations. Despite these indications, data on the current abundance and distribution of haplochromine species across the lake remain limited. To address this gap, the present study amplified a 620-base pair fragment of the cytochrome oxidase subunit I (COI) gene from 94 haplochromine individuals collected from Shirati Bay, Lake Victoria to assess species composition and distribution. Seven species were identified: *Haplochromis nyererei, H. alluaudi, H. erutus, H. simpsoni, H. sauvagei, H. nubilus, and H. pyrrhocephalus. However, H. nubilus* could not be matched in the NCBI database, highlighting the need to update existing genetic reference libraries. Phylogenetic analysis confirmed the accuracy of morphological identifications, emphasizing the value of genetic barcoding in clarifying taxonomy and supporting fisheries monitoring. Among the identified species, *H. erutus* and *H. simpsoni* are recorded in Tanzania for the first time, significantly expanding the known geographical range of these species. Similarly, *H. nyererei* was the most widespread, occurring at all sampling sites. In contrast, *H. erutus* and *H. simpsoni* were rare, despite being classified as Least Concern by the IUCN. The detection of rare species, including those not yet evaluated by the IUCN highlight the need to reassess their conservation status. To safeguard these vulnerable populations, it is recommended to promote sustainable fishing practices, raise awareness among local fishers on sustainable fishing techniques and establish protected areas within Shirati Bay to support the recovery of threatened haplochromines.

Keywords: DNA barcoding; Haplochromines cichlids; Lake Victoria; Mitochondrial,Species diversity;

Incidental Catch of Endangered Marine Turtles along the Coast of Dar es Salaam: A Pilot Survey

Japhet Mwanang`ombe, [1]Upendo Lyimo, [1]Salum Bakar Saad

Japhet Jonas Mwanang`ombe. Blue Ventures Conservation Tanzania.
P.o. Box.10950 Dar es Salaam, Tanzania. Tell: +255 755 662 681
japhet.mwanangombe@blueventures.org; japhetmwanangombe@gmail.com

Abstract

Marine turtles in Tanzania face multiple anthropogenic threats, including subsistence harvesting, incidental capture in gillnets and prawn trawlers, habitat degradation, and insufficient enforcement of conservation measures. Coastal erosion and natural predation also contribute to population declines. Past studies have highlighted the severity of these threats. For example, a 1996 survey near Simaya Island reported ten turtles caught in gillnets over four days, half of which drowned. In 2004, a monitoring program in Mafia Island Marine Park indicated that 45–60% of gillnet fishing trips resulted in turtle bycatch. Similarly, 105 turtle carcasses were recorded on Buyuni beach between July and November 2004, with beach stranding highly correlated with prawn trawling activity. Despite this evidence, no recent data exist for Kigamboni's coast, necessitating a comprehensive survey to assess the magnitude and status of incidental turtle capture. This study adopted a mixed-methods design using four case beaches of Yaleyale Puna, Buyuni, Pembamnazi, and Mulwani in Kigamboni. Methods included literature review, identification keys, direct beach surveys, structured and unstructured questionnaires. Data collection tools were integrated into ArcGIS Survey123. Five BMU trained members supported data collection process. A sample of 250 individuals (40 fishers and 10 BMU members per village) out of a population of 345 was analyzed using Yamane's formula. Probability sampling was employed to eliminate bias during sampling, and stratified sampling was used for target BMU members based on experience and gender. Preliminary results confirmed a high incidence of turtle carcasses, particularly endangered Green turtles (*Chelonia mydas*) and Hawksbill (*Eretmochelys imbricate*) species, with gillnet fishing identified as a major threat. Likert-scale responses showed statistically significant trends in fishers' observations of turtle bycatch. The study underscores the urgent need for long-term monitoring and mitigation strategies, including regulatory enforcement and alternative gear promotion, to safeguard Tanzania's marine turtle populations.

Keywords: Anthropogenic, Beach, Erosion, Endangered, Marine Turtles

Biodiversity Conservation in Wetlands through Integrated Water Resources Management: Key Challenges, Opportunities, and Lessons from the Katuma Catchment, Tanzania

Philemon Mneney[1*], Fadhili Njilima[1], Thadeus Ndeseiyo [2], Siya Mamiro[2], Juma Maziku[3], Germanus J. Hape[4], Baraka Naftal[5], Simula Maijo[5], and Doyi Mazenzele[1].

[1]International Union for Conservation of Nature, P. O Box 13513, Dar es Salaam, Tanzania,
[2]Lake Rukwa Basin Water Board, P. O. Box, 762, Mbeya, Tanzania,
[3]Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, P.O.Box 1519; Dar es Salaam, Tanzania,
[4]Katavi National Park, P. O. Box 89, Mpanda, Tanzania,
[5]Tanzania Wildlife Research Institute, P. O. Box 661, Njiro, Tanzania.
*Corresponding: philemon.mneney@iucn.org

Abstract

Wetlands are globally recognized as critical ecosystems that support biodiversity, regulate hydrological cycles, and sustain human livelihoods. In the Katuma catchment of western Tanzania, wetlands serve as essential habitats and resources for surrounding communities. However, wetland degradation driven by unsustainable water use, land use pressures, and fragmented institutional governance poses serious threats to their ecological integrity. This study assessed the major challenges and potential opportunities for integrating biodiversity conservation into the framework of Integrated Water Resources Management (IWRM) in the Katuma catchment. Data were collected through key informant interviews, field-based observations, and analysis of hydrological records over the past decade. The data were analysed using a mixed-methods approach: stakeholder perspectives were thematically coded to identify governance and ecological challenges, while temporal hydrological trends were assessed to examine changes in river flow patterns. The findings revealed that reduced water availability, primarily due to upstream abstraction and seasonal variability, has significantly disrupted the natural hydrological regime of the Katuma catchment. This, in turn, has degraded wetland habitats and threatened local biodiversity. Additional challenges include the expansion of irrigated agriculture along riparian zones, weak coordination among managing institutions, and limited community engagement in conservation planning. Nonetheless, the study identified opportunities for ecosystem-based restoration, adaptive water governance, and improved stakeholder collaboration. Lessons from the Katuma case highlight the need for integrated, inclusive, and locally grounded approaches to wetland conservation and water resource management. Aligning local efforts with national commitments to Sustainable Development Goal 6, 14, and 15 may enhance policy coherence and implementation.

Keywords: Biodiversity, Wetland, Resources, Katuma catchment, Climate variability

Biometry, hatching efficiency, growth performance and survival of the brine shrimp Artemia franciscana from Tanzania

Augustino Jacob

College of African Wildlife Management, Mweka
Corresponding author: augustino.jacob@mwekawildlife.ac.tz

Abstract

This study determined the biometry, hatchability and growth performance of a strain of the brine shrimp Artemia franciscana, a species now widely introduced globally, obtained from salt farms in the Tanga Region, Tanzania. The cysts were collected from salt pans using a 100–150-µm mesh net, and then processed and packed in airtight containers. In the laboratory, cysts were incubated in beakers at 28 °C, 35 ppt and pH 8. After 24 hours, newly hatched nauplii were transferred to rearing tanks, in triplicate, and cultured for 15 days while fed the microalga Nannochloropsis oculata. Cysts of a strain of A. franciscana from Vĩnh Châu, Vietnam, were cultured as the control. The cysts from Tanga showed greater mean capsulated cyst diameter (213.4 µm) and chorion thickness (9.7 µm) than cysts from Vĩnh Châu (208.3 µm, 8.3 µm). A higher hatching percentage and hatching efficiency were recorded for the Vĩnh Châu Artemia ($p < 0.05$). Nevertheless, nauplii of the Tanga Artemia exhibited a significantly higher growth rate and survival percentage (74.56%) than the Vĩnh Châu Artemia (53.85%). These findings highlight the potential of the Tanga strain for pond culture, suggesting their suitability as a live feed to enhance larviculture outputs.

Keywords: Artemia cysts, chorion thickness, cyst size, hatching percentage, live feed, nauplii

Key Threats Facing Mara River Wetland in Tanzania

Emmanuel Pagiti

Tanzania Wildlife Research Institute
Corresponding author: emmanuel.reuben@tawiri.or.tz.

Abstract

The Mara River Wetland is a vital ecosystem that provides essential services to both the Mara River and Lake Victoria. However, it is increasingly threatened by both natural and human-induced factors. This study aims to identify and assess the major challenges facing the Mara River Wetland in Tanzania. A mixed-methods approach was employed, combining structured questionnaires and participant observation. A total of 123 respondents were randomly selected from four purposively chosen villages, reflecting cultural diversity along the wetland. The findings revealed that the key threats include invasive species particularly water hyacinth (74%), pollution (61.8%), climate change (53.7%), agricultural expansion (38.2%), overgrazing (19.5%), and deforestation (17.9%). Among these, water hyacinth infestation and pollution emerged as the most severe, significantly disrupting the ecological balance of the wetland which contribute to biodiversity loss and ecosystem services. This study provides critical insights into the nature and extent of threats facing the Mara River Wetland. The findings serve as a valuable foundation for informing conservation strategies, guiding sustainable management practices, and supporting restoration efforts within the region.

Keywords: Threats, Wetlands and Mara river Tanzania

Steps to change: Applying evidence-based conservation measures for the conservation of the Endangered Grey Crowned Crane (Balearica regulorum) in Kenya

Damaris Kisha

International Crane Foundation
Corresponding author: damarisk@savingcranes.org

Abstract

Evidence-based conservation measures are urgently needed to reverse the declining populations of globally threatened species. The Grey Crowned Crane, Balearica regulorum, an African endemic listed as Endangered in the IUCN Red List of Threatened Species, is facing rapid population decline across its range, with an estimated reduction of 71% in Kenya from 1985 to 2023. This decline is primarily due to habitat loss and degradation, human disturbance, and illegal removal of eggs and birds for trade and domestication. To address these threats while empowering communities coexisting with cranes, International Crane Foundation/Community Action for Nature Conservation partnership implemented three conservation interventions in Western Kenya between 2018 and 2025: (a) spring protection and rainwater harvesting (b) establishment of Enriched Buffer Zones around focal wetlands and, (c) promotion of regenerative agriculture to reduce wetland overdependence and crane disturbance. Sites were selected based on cranes' presence, especially their use as breeding and/or foraging areas, and the willingness of the local community to adopt crane-friendly conservation approaches. Overall, eight springs and nine-10,000 liters rainwater harvesting tanks supporting 5,340 households and 2,600 people were constructed around critical crane breeding/ foraging hotspots in Nandi and Homa Bay, respectively. A 6.8 km stretch of King'wal wetland's riparian zone was enriched with 16,740 indigenous tree seedlings, 8,746 fruit trees, and 26,100 cuttings of super napier grass. Additionally, 49 households were supported to adopt best agroecological practices through farmer field school approach. Preliminary results in King'wal wetland in Nandi show successful breeding of 11 pairs of cranes raising 23 chicks during 2023/2024 breeding season, removal of eucalyptus trees from 5 acres, reduced cultivation on 51.2 acres and a 50% increase in community income from organic farming. Conservation efforts are long-term undertakings whose impact unfolds gradually, requiring continuous commitment, adaptive management and patience to ensure success and sustainability.

Keywords: Endangered, Evidence-based, Grey Crowned Crane, Sustainability, Wetland Conservation

Modeling the hydrological benefit of Nature-based Solutions on freshwater resilience in the Mbarali river catchment

Nyemo Chilagane

Corresponding author: chilagane.nyemo@trco.or.tz

Abstract

Despite extensive biodiversity conservation and restoration efforts, freshwater resources remain under severe stress due to climate change, land-use change, and human pressures. Nature-based Solutions (NbS) offer cost-effective and sustainable approaches to enhance water security, yet their hydrological benefits remain understudied in many African

catchments. This study assessed the impacts of multiple NbS strategies on hydrological processes in the Mbarali River catchment, Southern Highlands of Tanzania. The study employed the Soil and Water Assessment Tool (SWAT) to simulate hydrological responses under five NbS counterfactual scenarios relative to a 2020 baseline. Model performance was satisfactory (NSE = 0.70–0.74; R^2 = 0.72–0.76). Scenario simulations revealed that integrated NbS implementation reduced annual surface runoff and sediment yield by 3.6% and 19%, respectively, while marginally increasing groundwater recharge (0.4%) and soil water percolation (0.3%). Notably, average dry-season (June–October) river flows increased by 17%, indicating improved baseflow and drought resilience. These findings highlight the potential of NbS to enhance water availability and ecosystem resilience in data-scarce, semi-arid catchments. Scaling such interventions could support climate adaptation, safeguard ecosystem services, and promote water and food security in the Mbarali catchment and similar landscapes.

Keywords: Nature based Solution, counterfactual scenarios, Sediment yield, Surface runoff

Double trouble: aquatic invasive plants can promote mosquitoes

Strange, E.F., Chikodza T., Veldhuis M.P., Cuthbert, R., Schrama, M., Wasserman, R. Coetzee

Institute of Environmental Sciences, Leiden University, Einsteinweg 2, 2333CC, Leiden, The Netherlands

Abstract

Invasive aquatic alien plants (IAAPs) are rapidly spreading across freshwater ecosystems in Tanzania, threatening biodiversity, increasing flood risk, and restricting access to clean water. By altering aquatic habitats, IAAPs such as water hyacinth and water lettuce may also facilitate the proliferation of disease vectors, particularly mosquitoes. Despite the significant ecological and public health concerns posed by both IAAPs and mosquitoes separately, their interactions remain poorly understood. Our new global and multidisciplinary initiative, *MOZiMAC*, aims to bridge this gap by integrating both taxa into a unified framework. This presentation will share our newly published study [Ecology Letters] where we synthesize current knowledge on the co-occurrence of aquatic invasive plants and mosquitoes, identify key research gaps and present a conceptual framework underpinned by testable hypotheses on how aquatic invasive plants may influence immature and adult mosquito populations. This paper outlines new directions for invasive aquatic plant research and control in Tanzania, with implications for biodiversity conservation and public health.

Key words: Alien, aquatic, Invasive, mosquito, plants, water hyacinth and water lettuce

Water quality and reintroduction outcomes: A case study of the Kihansi Spray Toad

Felix Shayo

Tanzania Wildlife Research Institute
Corresponding author: felix.shayo@tawiri.or.tz

Abstract

Low post-release survival of captive-bred Kihansi Spray Toads (Nectophrynoides asperginis) may be linked to their abrupt exposure to untreated water in the wild after

being raised under treated conditions. To explore this hypothesis, we assessed the feasibility of establishing an experiment at the Kihansi Captive Breeding Facility to raise toads under untreated water conditions. Prior to conducting the experiment, water quality was evaluated at 15 sites including spray wetlands, the captive breeding facility, and nearby water sources along the Kihansi River, the Kihansi gorge spray wetlands, and water sources feeding the breeding facility. The data were collected during wet and dry seasons in 2022. Field measurements of pH, temperature, salinity, dissolved oxygen, and conductivity were recorded using a Multi 3430 SET F probe, and preserved samples were analyzed in the laboratory for ammonia, nitrates, phosphates, and other parameters following standard protocols. Most parameters were within amphibian-tolerable limits; however, ammonia concentrations exceeded safe thresholds at all wetland sites in both sampling periods. Although based on two seasonal snapshots, these findings suggest elevated ammonia may pose a risk to released toads. Given potential temporal fluctuations in water quality, we recommend implementing a more frequent and long-term monitoring program to better characterize water conditions and guide adaptive management. These preliminary insights highlight the need for controlled trials assessing toad acclimation to untreated water and contribute valuable information to improve reintroduction strategies for this critically endangered amphibian.

Keywords: Kihansi Spray Toad, reintroduction, water quality, ammonia toxicity, captive breeding

Effect of pond fertilization on growth performance and nutritional composition of Artemia franciscana

Augustino Jacob

College of African Wildlife Management, Mweka
Corresponding author: augustino.jacob@mwekawildlife.ac.tz

Abstract

Inadequate supply of quality live food is among the limiting factors for aquaculture production. *Artemia franciscana*, is one of the sources of quality live food in different commercial aquaculture production systems. However, *A.franciscana* is currently not produced for aquaculture or commercial purposes in Sub Saharan Africa, partly due to limited knowledge on optimal production conditions. This study investigated growth performance and nutritional composition of *A.franciscana* which aimed at determining optimal production conditions in fertilized ponds. A total of (30g) cysts were hatched in 6 buckets of 20 liters each receiving 5g of cysts, at 28 □, 35 ppt and pH of 8. Thereafter, newly hatched nauplii stocked at a density of 100 nauplii/litre were inoculated in the fertilized and non-fertilized ponds in triplicates and cultured for 28 days. The growth performance and nutritional composition of *A. franciscana* were significantly higher in fertilized ponds. Plankton communities were also more abundant in fertilized ponds compared to non-fertilized ponds. All the environmental parameters monitored were within the recommended range. The results suggest that pond fertilization is of great importance for optimal and quality production of A. franciscana in ponds.

Keywords: Artemia, nauplii, nutritional composition, growth, plankton

SUBTHEME: WILDLIFE DISEASES AND ECOSYSTEM HEALTH

How Do Molecular and Community insights inform a Decade of Coenurosis at the Wildlife-livestock interface in Northern Tanzania

Barakaeli Ndossi[1], Emmanuel H. Masenga[1], Mary Zebedayo[1], Maulidi Mdaki[1], Ernest Eblate Mjingo[1]

[1] Tanzania Wildlife Research Institute, P.O.Box 661 Arusha
Corresponding author: barakaeli.ndossi@tawiri.or.tz

Abstract

Over the past decade, *Taenia multiceps* and its larval form (*Coenurus cerebralis*) have remained endemic in northern Tanzania, posing a persistent threat to small ruminant health and productivity. This study assessed the molecular epidemiology, ecological risk factors, and sustained transmission dynamics of coenurosis across pastoral villages within Ngorongoro District. A total of 651 animals were examined, including 200 goats, 174 sheep, and 277 domestic dogs. The overall prevalence of cerebral coenurosis was 17.5% in goats and 22.5% in sheep, with Malambo village exhibiting the highest infection rates for both species. Risk factor analysis revealed widespread gaps in community-level preventive practices. A large proportion of respondents (90%) allowed dogs to roam freely, while only 6% reported regular deworming. Feeding raw offal to dogs and improper disposal of infected organs were strongly associated with increased transmission risk. Shared grazing lands and frequent livestock-wildlife interactions, intensified by seasonal livestock movements linked to disease outbreaks. Molecular characterization of *T. multiceps* isolates revealed high intra-regional genetic similarity (99.8%–100%), and close phylogenetic clustering with Saudi Arabian isolate. Comparative analysis with global strains indicated the presence of region-specific haplotypes, suggesting localized microevolution within Tanzanian populations likely influenced by ecological and host-related factors. These findings confirm that coenurosis remains a complex, ecologically sustained parasitic challenge in northern Tanzania, driven by the wildlife-livestock interface, poor dog management, and seasonal herd movements. This study emphasizes the need for integrated, community centered control strategies including routine domestic dog deworming, proper offal disposal, wildlife-livestock risk mapping to disrupt transmission at the wildlife-livestock interface.

Keywords: Coenurosis, Domestic dogs, Northern Tanzania, *Taenia multiceps*, Wildlife

One Health Surveillance: Migratory Little Stints (Calidris minuta) as Bioindicators of Antimicrobial Resistance in the Kenyan Rift Valley

Catherine Mbuthia[1]

Corresponding author: katieymbuthia@gmail.com
[1]Sokoine University of Agriculture, P.O. Box 3019, Morogoro, Tanzania

Abstract

Antimicrobial resistance (AMR) is a growing global health concern, frequently driven by human-mediated environmental contamination. Migratory birds such as the little stint (*Calidris minuta*) can acquire and disseminate resistant bacteria, potentially influencing cross-species and cross-regional AMR transmission. This study investigates the prevalence of multidrug-resistant (MDR) and extended-spectrum beta-lactamase (ESBL)-

producing Enterobacteriaceae in *C. minuta* across two Rift Valley lakes in Kenya-Bogoria and Magadi. Despite similar biochemical profiles, these lakes differ in anthropogenic impact, providing a natural context to assess human influence on environmental AMR acquisition. A total of 184 samples from *C. minuta*, 57 from goats, and 46 surface water samples were collected over two years, during the birds' migratory arrivals and departures. Bacterial isolates were identified using MALDI-TOF MS and subjected to antimicrobial susceptibility testing using the Kirby-Bauer disc diffusion method. Findings revealed higher MDR prevalence in samples from Lake Magadi, where human activity is more pronounced. Notably, *C. minuta* displayed the highest AMR frequencies among all sampled groups. *C. minuta* (33.1%) vs. Bogoria (15.4%), goats (27% vs. 1.3%), and water (14.8% vs. 11.4%). ESBL-producing isolates were similarly elevated: *C. minuta* (16.0% vs. 16.7%), goats (20.4% vs. 3.9%), and water (18.5% vs. 17.1%). The predominant MDR profile included resistance to ampicillin, tetracycline, and trimethoprim-sulfamethoxazole. This is the first study to implicate *C. minuta* as a vector in environmental AMR circulation within a One Health framework. Our findings underscore the need for integrated AMR surveillance across wildlife, livestock, and environmental reservoirs in the Kenyan Rift Valley and advocate for environmental stewardship to mitigate anthropogenic AMR pressures. Furthermore, we recommend incorporating whole-genome sequencing to pinpoint the origin and spread of these AMR strains in *C. minuta*.

Keywords: AMR, Anthropogenic activities, *C. minuta*, Enterobacteriaceae, One Health

Environmental Factors Influencing Anthrax Distribution in an East African Protected Area

Ines Machelle[1]

Corresponding author: ines.machelle@tanzaniaparks.go.tz
[1]Tanzania National Parks P.o.Box 3134, Tanzania

Abstract

Anthrax outbreaks caused by the soil-borne bacterium Bacillus anthracis have been known to occur often in Africa, impacting both wildlife and livestock and occasionally infecting humans. Modelling the current distribution and predicting suitable habitats for this bacteria species is therefore critical for supporting effective planning and control measures for anthrax outbreaks. Despite its impact, the knowledge of the ecology of this pathogen is still limited. This can be due to intricate interactions between anthropogenic and environmental factors and the variety of species it affects. Therefore, detailed, site-specific analyses are essential for contributing to the understanding of the ecology of anthrax. This study used the maximum entropy modelling algorithm (MaxEnt) method to predict suitable habitat and environmental conditions that may support anthrax distribution and spore survival in Tarangire National Park, in Tanzania. Model inputs included 14 predictors from World Climatic, Landsat satellite, and World Soil Information datasets, as well as 636 presence-only occurrence data from park records from 2013 to 2023. The predicted suitable area favoring anthrax spores encompassed most of the savannah and open grassland in the northern part of the park, as well as narrow patches in the park's central region. The mean test AUC score was 0.91, and the predicted probability was 0.98 for anthrax presence. On average, the predicted probability of suitable conditions substantially improved with increasing levels of extractable phosphorus, exchangeable

potassium, mean annual temperature, and soil pH. Furthermore, the probability of suitable habitat was highest at lower levels of fire frequency, exchangeable sodium, and extractable aluminium. The extensive track record of anthrax outbreaks in the area may be explained by the presence of these favorable soil characteristics and climate, which point to the long-term occurrence of anthrax spores in the park. However, the existence of suitable habitat in the northern part of the park presents opportunities for mobilising resources to mitigate the situation through activities such as targeted disease surveillance and the use of controlled fire.

Keywords: *Bacillus anthracis*, Disease ecology, Maximum entropy modelling algorithm, Species distribution, Tarangire National Park

What Does the Researcher need to Consider when Planning for Capture and Collaring of Carnivores in Nyerere National Park and Selous Game Reserve?

***Mikidadi Mtalika[1] and Haruna Ramadhani[2]**

[1]Tanzania Wildlife Research Institute, Kingupira Wildlife Research Centre, P.O. Box 16, Utete-Rufiji, Tanzania.
[2]Tanzania National Parks, Nyerere National Park, P.O.Box 468, Morogoro, Tanzania
*Corresponding author email: mikidadi.mtalika@tawiri.or.tz

Abstract

The Nyerere National Park (NNP) and Selous Game Reserve (SGR) are two large protected areas (PAs) covering about 50% of the Nyerere-Selous–Mikumi Ecosystem (NSME) which is the Tanzania's largest ecosystem, Africa's largest remaining wilderness and the largest faunal reserves in the world. From the eastern to southern Tanzania, the ecosystem is the world's stronghold for wild dogs (Lycaon pictus) and large populations of African lions (Panthera leo) and Spotted hyaena (Crocuta crocuta). Through field experience of working in the PAs we have prepared this article with the aim of providing the highlights on some factors that we think will be of helpful to researchers who plan to work on chemical capture and collaring of wild dogs and lions in this area. For the successful field activities, the factors of considerations include season of the year (wet and dry), time of the day (night over day-time), drugs (combinations and dosage), number of competitive predators like hyaena at capture site, and capture success per animal per day. The use of Tiletamine-Zolazepam (Zoletil) alone for wild dogs is not recommended in this ecosystem, always combine with sedative. The period used to capture the same number of animals is almost two times longer in wild dogs compared to lions. Anytime of the day, lion can be captured while morning hours are best for wild dogs. These factors are of consideration due to a dry sub-humid climate in these PAs, with average annual precipitation of 1025mm and maximum temperature of up to 41°C. These climatic conditions influence both body physiology of animals and accessibility in this ecosystem differently in the country compared to others. Therefore, understanding these factors in details during planning will contribute to successful field activities, and achieve the project purpose while maintaining the safety of project team, equipment and animals.

Key words: African lions, GPS collaring, Immobilization, Nyerere-Selous, Wild dogs

Surveillance of Zoonotic Diseases in Wild Chimpanzee Populations: Lessons from the Greater Gombe Ecosystem, Tanzania.

Priscilla Shao

Jane Goodall Institute Tanzania; Email: pshao@janegoodall.or.tz

Abstract

Dr. Jane Goodall first started her research on wild chimpanzees in 1960, and over the years, infectious diseases have been identified as a significant threat to the population. Historical outbreaks, including polio and recurrent respiratory events, have increased chimpanzee mortality and jeopardized their long-term survival. Recognizing the likely zoonotic origin of many outbreaks, the Gombe Ecohealth Project was established in 2004. This initiative employs non-invasive health surveillance through quarterly fecal sample collection, which is analyzed using molecular techniques to detect a wide range of pathogens. This is done onsite in Gombe National Park in the established molecular Laboratory, making the data more available and actionable for local conservation action. Integrating clinical observations and post-mortem examinations, the project has successfully established a comprehensive health baseline for the population. Our findings have identified numerous known zoonotic pathogens in the chimpanzee communities (e.g., Streptococcus pneumoniae, Shigella spp, and Entamoeba histolytica), highlighting the critical role of a One Health approach for early outbreak detection. Ultimately, this long-term surveillance program highlights the value of continuous health monitoring in wild primate populations and offers a good model for preventing spillover events that threaten both wildlife conservation and human public health.

Keywords: Gombe National Park, One Health, Zoonotic Diseases

Risk Factors and Patterns of Treponema Infection Affecting Olive Baboons in Gombe National Park

Dismas E. Mwacha [1,2]*., Anthony Collins[2], Jane Raphael[3], Philemon Wambura[1] and Abubakar Hoza[1]

[1]Department of Veterinary Microbiology, Parasitology and Biotechnology, College of Veterinary Medicine and Biomedical Sciences, Sokoine University of Agriculture,
P. O. Box 3015, Chuo Kikuu, Morogoro, Tanzania; [2]Gombe Stream Research Centre, The Jane Goodall Institute – Tanzania, P.O. Box 1182, Kigoma, Tanzania
[3]Gombe National Park, Kigoma, Tanzania P.O. Box 185, Kigoma, Tanzania.
*Corresponding author: dmwacha@janegoodall.or.tz

Abstract

Treponema pallidum subsp. *pertenue* (*TPE*) causes yaws, a chronic, nonvenereal treponematosis characterized by contagious cutaneous lesions in early stages and destructive bone involvement in the tertiary stage. In the latency stage, the infection is asymptomatic with only serologic markers. Analysis of health, demographic and behavioral records retrospectively to assess disease risk, trends, and recurrence patterns from January 2019 to December 2024 of wild *Papio anubis* at Gombe National Park revealed, through visual observation, an overall clinical prevalence of 11.3% *(2018/17925*) across the eight studied troops (i.e., AC, BA, BB, BC, DA, DB, DC & DD). Females were disproportionately affected (1,264 (63%), $P < 0.001$), with adults in general comprising 83% (1,680) of the

cases. Troops had significant effects, with the newly formed troops BC accounting for 22% and DD 19% of all the infections (P <0.001). Sex was significantly associated with Treponema infections, where Males (7,842 (44%)) had a 31% reduction in odds of developing the clinical signs compared to females (OR 0.69, 95% CI: 0.62–0.76, p < 0.001). Pregnancy was strongly protective, with pregnant individuals demonstrating an 80% reduction in odds of infection (OR = 0.20; 95% CI: 0.13–0.30; p < 0.001). Temporal trends showed a marked increase in infection risk over time, with a 29% increase in odds of infection each subsequent year (OR = 1.29; 95% CI: 1.25–1.33; p < 0.001). General interactions between troops did not show any significant association with infection risk (OR = 1.12; 95% CI: 0.92–1.34; p = 0.2), and there was no significant difference based on Troop treatments (OR = 12,202,306; 95% CI: 0.00–NA; p > 0.9). This study presents the first long-term dataset on (TPE) infection in wild baboons from Tanzania and East Africa. Understanding risks has an overall goal to understand disease patterns and provide practical solutions to disease management and mitigate cross-species transmission risks, particularly to the endangered chimpanzees and nearby human populations highlighting the critical role of disease surveillance in guiding evidence-based conservation strategies and shaping effective health management policies for wild primate populations.

Keywords: Gombe National Park, Non-Human Primates (NHP), Troop, Tanzania, Yaw

Preliminary survey of ectoparasites associated with rodents and shrews on Mount Kilimanjaro

Alphonce D. Echumba[1, 6 *], Abdul S. Katakweba[3], Vedasto G. Ndibalema[2], Genet B. Gebrezgiher[4] Suzana M. Thomas[5], Raymond Okick[6], Arnold Shao[6] and John Bukombe[6]

[1]African Centre of Excellence for Innovative Rodent Pest Management and Biosensor Technology Development Project, Sokoine University of Agriculture, Morogoro, Tanzania.
[2]Department of Wildlife Management, Sokoine University of Agriculture, Morogoro, Tanzania.
[3]Institute of Pest Management, Sokoine University of Agriculture, Morogoro, Tanzania
[4]Department of Biology, Mekelle University, Tigray, Ethiopia
[5]Department of Biology, University of Dodoma, Dodoma, Tanzania
[6]Tanzania Wildlife Research Institute

Abstract

Rodents and shrews play a pivotal role in the transmission of zoonotic diseases, acting not only as reservoirs of pathogens but also as hosts for ectoparasites that spread diseases such as plague and typhus, posing significant risks to both wildlife and human populations. This study aimed to investigate ectoparasitic infestations in rodents and shrews along an elevational gradient on Mount Kilimanjaro, ranging from 1,700 to 3,200 meters, to explore how altitude influences the abundance, intensity, and prevalence of ectoparasites. A total of 814 ectoparasites were recovered from 155 out of 287 individual rodents and shrews sampled, including 555 mites and 259 fleas. Among the ectoparasite species identified, mites included *Echinolaelaps echidninus* (1.09) and *Laelaps nuttalli* (0.84). Fleas were represented by *Dinopsyllus lypusus* (0.54), *Ctenopththalmus calceatus* (0.34), and *Xenopsylla brasiliensis* (0.01). Host species such as *Pelomys fallax*, *Lemniscomys zebra*, and *Mastomys natalensis* exhibited particularly high parasite loads, with some individuals reaching 100% prevalence. Statistical analysis showed no significant differences in mean abundance ($(F_{3, 44} = 2.082$, P = 0.09) or intensity ($F_{3, 44} = 2.161$, P = 0.08) across elevations. However, prevalence varied significantly ($F_{3, 44} = 2.885$, P = 0.04), and a strong negative correlation

($R^2 = -0.93$, $P = 0.03$) between prevalence and altitude was observed. The infestation indices for medically relevant fleas (*X. brasiliensis*, *D. lypusus*) and mites (*E. echidninus*) were 0.55 and 1.93, respectively, highlighting the potential for significant disease transmission particularly murine typhus via mite vectors. These findings underscore the need for at least one year-round surveillance cycle to capture seasonal and climatic variations influencing host–ectoparasite–endoparasite dynamics across multiple altitudinal zones, while incorporating modern molecular methods for accurate species identification. Such surveillance is essential for assessing the ecological and public health risks posed by parasitism in this region.

Keywords: Abundance, Altitude, Mites, Fleas, Prevalence, Rodents, Shrews

Thomson's Gazelles' movement and habitat selection shape infection risk in the Serengeti ecosystem

Peace Sabuni[1]

[1]University of Glasgow; Corresponding author: sabunipeace27@gmail.com

Abstract

In seasonal systems, animals often move large distances to acquire resources. These seasonal movements have important implications for disease dynamics, potentially increasing or decreasing exposure to infectious disease. For example, movement into new areas may expose animal hosts to new pathogens. Conversely, dispersal could enable animals to escape areas of high contamination, particularly in group-living species. Thomson's gazelles (*Eudorcas thomsonii*) in Serengeti live in large herds and seek short-grass habitats rich in nutrients, often making long-distance seasonal movements to track high-quality food. These movements help satisfy their energy needs, but how space use impacts Thomson's gazelles' exposure to infective disease is largely unknown. Here, we explore how (1) movement patterns and (2) habitat selection affect parasite load in Thomson's gazelles in the Serengeti. We fitted GPS collars to 10 adult males to monitor their spatial movements and habitat preferences. Fecal samples collected twice a month from each collared animal and used to assess egg density of gastrointestinal parasites (parasite load). Each sample was GPS-tagged to relate parasite load with movement and habitat metrics (e.g., grass height, grass greenness, previous months' rainfall, time since last fire). Preliminary results suggest (1) parasite burden decreased as individuals moved more quickly and (2) gazelles found in recently burned landscapes had lower parasite loads than those that grazed in unburned areas. Our results suggest that increased movement might reduce parasite load, potentially because movement enables escape from highly contaminated areas. Moreover, gazelles that successfully located burned patches seemed to carry fewer parasites than unburned areas, fitting previously work that shows fire helps to decontaminate grasslands from parasites. Given the health impacts of parasites, these findings emphasize the importance of maintaining connectivity and heterogeneous landscapes as means of reducing disease in large migratory herbivores.

Keywords: Gastrointestinal nematodes, Habitat selection, Movement ecology, Parasite burden, Thomson gazelle.

Blindness in free ranging common elands in Ngorongoro Conservation Area

Dickson Wambura[1]

Corresponding author: dwambura2010@gmail.com

[1]Ngorongoro Conservation Area Authority.P.O.Box 1,Tanzania

Abstract

Ngorongoro Conservation Area (NCA), famous for its incredible abundance of wildlife, including the largest spiral-horned African antelope a common Eland (Taurotragus oryx). This antelope specie is widely distributed and inhabit the open savanna of eastern and southern Africa. In March 2023, cases of isolated common Elands in Ndutu area of NCA were observed with abnormal gait accompanied by unidirectional movement when running, stumbling and hitting objects. Ten (10) common Elands with these signs of blindness were found and careful captured chemically. All captured animals closely observed and blood, swabs for eye discharge and fecal sample were collected, and then the eyes were cleaned and treated. Set of collected samples preserved in transport media, absolute ethanol and some were frozen before laboratory analysis. Samples were sent to three diagnostic laboratories for disease investigation. Bacteriological and molecular tests were conducted for Infectious Bovine Keratoconjunctivitis (IBK) and Malignant Catarrhal Fever (MCF) respectively. However, Ormilo and Polioencephalomalacia were among the disease considered in differential diagnosis. The results of detailed physical examination revealed excessive bilateral oculo-nasal whitish materials discharge, severe reddening of the conjunctiva, centripetal corneal opacity and fever. Two laboratory tests were conducted and the results revealed the presence of Moraxella bovis as the causative agent of the blindness condition observed in elands. Hence, the disease condition affecting the common elands was IBK. Moraxella bovis in common bacterium causing eye disease (Infectious Bovine Keratoconjuctivitis) in ruminants globally especially in farms with poor husbandry. The cattle in NCA are commonly affected observed and treated on eye disease condition, despite the condition being common and treatable in cattle, but it causes a huge economic impact when the bacterium is transmitted to wildlife.This study recommends on the improvement of disease surveillance in livestock and wildlife in the conservation area especially in area with livestock- wildlife interaction.

Keywords: Eland, Disease surveillance, Infectious Bovine Keratoconjuctivitis, Ngorongoro Conservation Area

SUB THEME: WILDLIFE ECOLOGY, CONNECTIVITY ECOLOGICAL INTERACTIONS

Transboundary movement and management of elephants at the northern Tanzania and southern Kenya borderland

Julius Keyyu[1]

[1]Tanzania Wildlife Research Institute, P. O. Box 661, Arusha, Tanzania.
Corresponding Author: julius.keyyu@tawiri.or.tz

Abstract

This study was conducted to determine cross border or transboundary movement and management of elephants between the northern Tanzania and southern Kenya. A total of 13 elephants (10 males and 3 herds) were fitted with Vertex Plus-13 (+2) Iridium elephant Global Position (GPS) collars in Longido Game Controlled Area and Lake Natron game Controlled Area located in Longido District in northern Tanzania. Movements of collared elephants were monitored for five years from 2018 to 2024. Results showed that movement and distribution patterns by individual elephants varied, with some having more activity patterns than others. The study provided more evidence on active movement of elephants between Longido-Lake Natron and Amboseli National Park in Kenya. Overall collared elephants spent 78% of their time in Tanzania and 22% of their time in Kenya. One collared elephant was killed in Kajiado District in Kenya during human-elephant conflict management. The results have indicated that there is cross border movement of elephants between northern Tanzania and southern Kenya. The more time spent in Tanzania by elephants has indicated that habitats in northern Tanzania are safer for elephants than in southern Kenya. Ground truthing of places where elephants spent more time in Tanzania indicated more resources especially food and water. Joint cross border monitoring and management of elephants is important for sustainable transboundary conservation of the species.

Keywords: Elephant, Northern Tanzania, Southern Kenya, Transboundary Movement

Landscape genetics of lions in the multi-use Ngorongoro Conservation Area, Tanzania: insights from Single Nucleotide Polymorphisms genotyping and long-term monitoring

Ingela Jansson, Laura D. Bertola, Bernard M. Kissui, 2George G. Lohay, 3Ernest E. Mjingo, Craig Packer, Camilla Sandstrom, Robert Spitzer, Goran Spong

[1]Swedish University of Agricultural Sciences, [2]Grumeti Fund, P.O. Box 65, Mugumu, [3]Tanzania Wildlife Research Institute, P. O. Box 661, Arusha, Tanzania.
Corresponding Author: ingela.jansson@slu.se

Abstract

Loss of connectivity due to anthropogenic pressure and habitat fragmentation isolates subpopulations and reduces genetic resilience. The lions (*Panthera leo*) of the Ngorongoro Crater in the multi-use Ngorongoro Conservation Area (NCA) exemplify this problem, exhibiting genomic erosion from extended isolation. We assessed genetic differentiation, variation, dispersal, and relatedness of 196 individuals sampled

opportunistically (tissue, faeces, hair) across the NCA and adjacent Serengeti using SNP genotyping. We detected significant genetic differentiation between Crater and Serengeti lions. Crater lions exhibited markedly lower genetic diversity, indicating of inbreeding and genetic drift. Almost all lions sampled in the connecting landscape were assigned to either the Crater or Serengeti subpopulation, revealing minimal admixture and few instances of successful dispersal. Analyses of pairs of first-degree relatedness identified several parent-offspring links from the Crater, but none into the Crater, indicating current lack of dispersal with gene flow into the Crater. Limited gene flow into the Crater lions threatens their long-term viability and resilience to environmental change. In addition to geographic and human□driven barriers, lions' own competitive behaviors, with dominant male coalitions in the Crater maintain this isolation. Given the adjacent large Serengeti population and lion presence in the intervening landscape, we recommend strategies that both facilitate sustained natural migration and mitigate human–lion conflict. The corridor-of-tolerance approach applied in NCA, integrating community involvement with targeted conflict mitigation, shows promise for enhancing connectivity. Our findings underscore the need to maintain and monitor genetic diversity and connectivity in fragmented large-carnivore populations.

Keywords: Connectivity, Human-driven barriers, Landscape, Geneflow, Resilience

Demographic drivers of population dynamics reveal subpopulation-specific conservation needs for giraffes in the Serengeti Ecosystem

George Lohay

[1]Grumeti Fund
Corresponding Author: georgel@grumetifund.org

Abstract

Survival, reproduction, and movement are the key demographic parameters that drive population dynamics. Factors affecting these demographic parameters in large, long-lived, extinction-threatened mammals are diverse and may differentially affect subpopulations in disparate parts of an ecosystem. We conducted annual photographic surveys to uniquely identify 1,520 giraffes at 4 subpopulations around the Serengeti Ecosystem in Tanzania to estimate demographic parameters of age- and sex-specific survival probabilities, reproduction, population densities, group sizes, and long-distance movements. In the Seronera (central) subpopulation, we combined 15 years of data from 3 independent survey schemes, developed a Bayesian hidden Markov model to estimate demographic parameters, and conducted a retrospective population analysis to elucidate the demographic drivers of temporal changes in population growth rate. We collected data over 4–5 years for 3 other subpopulations, and used frequentist methods to estimate demographic parameters. We compared our results with historical estimates from the 1970s and 2000s to examine long-term population trends and demographic drivers. We found significant differences in adult and subadult survival probabilities among subpopulations, with lower adult survival associated with declining subpopulations. Retrospective population analysis for the Seronera subpopulation reiterated that adult survival is a critical demographic driver of population dynamics for giraffes. The 2 subpopulations adjacent to the protected area boundary declined over 48 years, whereas the Seronera subpopulation stabilized since 2008. Only one individual moved between subpopulations, providing evidence for subpopulation insularity and potential genetic structuring of the overall population. These factors underscore the need for subpopulation-specific conservation

strategies aimed at raising adult survival within the western and northeastern parts of the Serengeti Ecosystem. Communit-based conservation efforts adjacent to protected areas have been effective in raising adult survival and density elsewhere. Our findings highlight the importance of understanding subpopulation dynamics and their demographic drivers for evidence-based conservation and management to recover endangered giraffe populations.

Keywords: Demography, *Giraffa camelopardalis*, *Giraffa tippelskirchi*, Multistate mark-recapture analysis, Robust design

Effects of grassland fragmentation and precipitation on Secretary bird (Sagittarius serpentarius) reproduction in the Serengeti ecosystem

Elena Ramella Levis[1]

[1]Eurafrica Conservation Projects
Corresponding Author: elena.ramellalevis@gmail.com

Abstract

Accurate demographic data are essential for understanding population dynamics and developing effective conservation strategies for threatened raptor species. This study provides the first quantitative assessment of how grassland fragmentation at landscape scale, driven by woody plant encroachment, and interannual variation in precipitation affect the secretary bird (*Sagittarius serpentarius*) reproduction within the Serengeti ecosystem in Tanzania. Through nest density estimation models based on nest survival and detection probabilities, and generalized additive mixed models, we estimated nesting success and productivity across three habitat types with different grassland fragmentation levels and rainfall regimes during the 2023 and 2024 breeding seasons. Highly fragmented habitats (<50% grassland cover) exhibited the lowest nesting success (18.9%) and productivity (0.8 successful nests/100 km²), possibly due to increased exposure to edge effect. In contrast, habitats with moderate to low grassland fragmentation (50–<90% cover) supported the highest nest densities (7.6 nests/100 km²) and the greatest average productivity (2.5 successful nests/100 km²), despite moderate nesting success (29%). Habitats with minimal grassland fragmentation (≥90% cover) showed significantly higher nesting success (71%) but lower nest densities, resulting in intermediate productivity (1.7 successful nests/100 km²). Wet-season rainfall emerged as dominant driver of nest abundance across all habitat types. Substantially higher precipitation in 2024 than 2023 correlated with a nearly three times higher nest abundance in 2024 compared to 2023, positively influencing productivity (2.2 vs. 0.8 successful nests/100 km²). Additionally, lower long-term dry-season rainfall negatively affected nesting success. These findings highlight the secretary bird vulnerability to habitat and climate change, which may disrupt predator-prey dynamics and reduce nesting site quality and the number of breeding attempts. Conservation efforts in fragmented habitats should prioritize limiting the effects of woody plant encroachment and actively protecting nests to mitigate predation risks, thereby enhancing productivity and sustaining steady populations of this African savannah raptor.

Keywords: Birds, Climate change, Encroachment, Edge effect, Nesting success

Monitoring of wildlife composition, abundance and diversity in relation to habitats in Msolwa Sector Nyerere National Park, Tanzania

Emmanuel H. Masenga[1]*, Matana Levi[1], Lucas Ndakize[1], Ellen Ponsian[1], Hamenya Mpemba[2], Brandon Kemp[2] & Eblate Mjingo[1]

[1] Tanzania Wildlife Research Institute, P. O. Box 661 Arusha, Tanzania
[2] Six Rivers Africa, P. O. Box 105849, Dar-es-Salaam, Tanzania
* *Corresponding author email:* emmanuel.masenga@tawiri.or.tz

Abstract

Camera trapping is an objective and non-invasive technique that generates substantial data on the presence or absence of wildlife species, as well as on anthropogenic activities. Four grids, each containing 30 stations, were developed using ArcGIS version 10.8 software. In every station, a single camera trap was deployed resulting in a total of 120 cameras in the Msolwa sector. The cameras were deployed for over 60 days between September and November 2024 to maximize detection, including the most elusive species. PAST Version 4.03 software was used to calculate diversity indices (i.e. Shannon-Wiener, Simpson's Index) and relative abundance. The results showed that a total of 6,549 images were recorded representing 16 orders, 31 families, and 56 species. The open woodland exhibited high species diversity (H'=3.06), then wooded grassland (H'=2.69) and grassland habitat (H'=0.61). Furthermore, elephants exhibited the highest naïve occupancy at a value of 0.60, followed by both common duiker and warthog who had the naïve occupancy value of 0.50. Illegal human activities, including wildlife poaching and unauthorized fishing were recorded during the survey. The study concludes that diverse habitats in the Msolwa sector support different mammal species. Therefore, the need for strengthening conservation efforts is important for improving biodiversity and making the area an important tourist destination within the park.

Keywords: Camera trapping, Composition, Diversity, habitats, Naïve occupancy, Species richness

Restoring a meta-ecosystem: how to functionally reconnect Serengeti National Park to Lake Victoria

Vera Thijssen[1]

[1]University of Groningen
Corresponding Author: v.thijssen@rug.nl

Abstract

Expanding human pressures globally disrupt ecological connectivity, reducing ecosystem resilience by limiting access to key environmental resources. Restoration of wildlife corridors is vital to stop this loss and maintain ecosystem functioning. Serengeti National Park (SNP) is in the process of undertaking a large restoration project that will extend its boundary to Lake Victoria, incorporating the Speke Gulf Game Controlled Area (SG-GCA), to secure an alternative freshwater source for its annual mass migration of >2 million ungulates. This project will provide the opportunity to recover important ecological connections between these two flagship ecosystems, restoring a historical savanna-freshwater meta-ecosystem. To successfully reconnect the Serengeti to Lake

Victoria, both habitat restoration of degraded parts of SG-GCA and monitoring of its ecological recovery are essential. Here, we present our ongoing research and monitoring of this pivotal restoration project. We will discuss our monitoring strategy, which incorporates multiple indicators across both the terrestrial and aquatic system, and present initial differences between SNP and SG-GCA and early changes since the start of our project. With this study we aim to contribute to the ecological recovery of savanna-freshwater connections in this region and thereby to the resilience of both ecosystems, as well as to learn lessons that can be applied to restoration projects in other areas.

Keywords: Ecological connectivity, Lake Victoria, Restoration, Serengeti National Park

Long-term changes in dung beetle community structure in the Savanna grassland of the Serengeti ecosystem

Mecklina Mbundi[1]

[1]University of Glasgow
Corresponding Author: 2500913m@student.gla.ac.uk

Abstract

Dung beetles are insects that feed, breed, and nest on vertebrate dung, making them the most effective accelerators of dung removal from the ground surface. As they do this, they perform various ecological functions, including secondary seed dispersal, nutrient cycling, and controlling the infection risk of faecal-orally transmitted parasites. Dung beetle communities have been recognized as a group to indicate anthropogenic disturbance. However, until recently, little has been done to understand long-term changes in dung beetle communities in protected areas, which makes it even more difficult to trace the drivers of spatial and long-term community change in populations. To address this information gap, we used a survey data set combining quantitative samples collected between 1991 and 1992 and the present samples collected in 2024 to show that the community structure of dung beetles has dramatically changed over time in the Ndutu area bordering the Serengeti National Park and Ngorongoro Conservation Area. During a one-year sampling period (1991–1992), we discovered that the dung beetle community stayed largely stable, indicating that despite variations in abundance, the community structure was comparable. This could be due to minimal short-term environmental variation. However, over three decades, both asymptotic taxonomic diversity and richness declined, indicating long-term ecological shifts affecting dung beetle assemblages in the Serengeti ecosystem. This loss in species richness over a long time may reflect the disappearance of specialist or habitat-sensitive species, which are typically the first to be lost under environmental pressure. In conclusion, the dramatic shifts in dung beetle community composition, proportional abundance of functional groups, and loss in species richness over sampling years reflect broader ecological changes occurring even within protected landscapes. Ensuring the persistence of these vital insect communities is integral to maintaining ecosystem integrity and resilience in the face of ongoing environmental change.

Keywords: Community, Diversity, Dung Beetle, Functional group

A Theory of Change for effective policy-level intervention in an Action Plan for conservation of lions in Tanzania.

Dennis K. Ikanda[1,3], Eligi Kimario[2], Sophia Francis[2], Revocatus Shirima[2]

[1] Tanzania Wildlife Research Institute, 206 Njiro road, 2113 Lemara, PO Box 661, Arusha Tanzania
[2] Ministry of Natural Resources and Tourism, Wildlife Division, Government City Mtumba, Prime Minister St, PO Box 1351, Dodoma, Tanzania
[3] WWF Tanzania, Plot 252 Kiko St, Mikocheni, PO Box 63117, Dar es Salaam, Tanzania

Abstract

African lions *Panthera leo,* are a threatened species under the IUCN Red list, with range state governments mandated to steer national conservation efforts. In Tanzania, policy-level efforts are guided by the National Carnivore Action Plan (CAP) (*2009*), and subsequent Tanzania Lion & Leopard Action Plan (LLAP) (*in review*), providing strategic framework for securing and sustaining the two species through the set of desired outcomes. We used the CAP framework in a critical review of the first Plan (2009) against the stipulated goals and objectives using theoretical and empirical techniques. Although the CAP helped to secure the nominal lion population, insights indicate that outside core protected areas lion numbers have staggered, requiring greater policy engagement at the human-lion interface. Informed by the analysis of the CAP, we developed a Theory of Change (ToC) which could support effective policy-level interventions for lion conservation through the next LLAP. The ToC is intended for application at the policy-level, by identifying, articulating various pathways which may be pursued in order to attain the desired outcomes of securing the lion population through habitat protection, perpetual connectivity and promoted coexistence. We predict that the policy-level approach will provide a firm Action Plan framework, and enhance lion conservation in Tanzania through multiple pathways for the next 10 years.

Keywords: Conservation, Lions, Policy, Tanzania, Threatened

Analysis of Changes in Elephant Population in Tarangire National Park, Northern Tanzania.

Agriphina Machaninga

Frankfurt Zoological Society
-: agripinacletus@gmail.com

Abstract

Elephant populations have fluctuated across Asia and Africa for centuries, historically declining due to ivory poaching and habitat loss. However, recent studies indicate signs of population stability and growth in certain regions, including Tanzania, despite ongoing threats such as climate change and rapid human population expansion. In the case of Tarangire National Park (TNP), anecdotal reports from local communities and wildlife experts suggest an increase in African elephant numbers, yet empirical data has remained limited since 2016. Ecologically, TNP is a critical refuge for African elephants in northern Tanzania. This study aimed to estimate the current elephant population in the park and assess population structure and trends over time. Using Conventional Distance Sampling (CDS), we analyzed data collected during both wet and dry seasons in 2022 and 2024. The results indicate a population predominantly composed of mature individuals, with a

statistically significant difference between mature and infant age classes ($p = 0.045$), suggesting an aging population structure. Population estimates, based on a 95% credible interval, range from 8,999 to 11,343 individuals, with a mean of 10,152 elephants equating to approximately 3.5 elephants per square kilometer of park area. The observed growth is largely attributed to enhanced conservation measures, including strengthened anti-poaching enforcement and improved human-elephant conflict mitigation strategies that promote coexistence. These findings provide important insights into the conservation status of African elephants in TNP, underscoring the success of recent protection efforts. However, sustaining this positive trend requires a deeper understanding of the ecological and anthropogenic factors driving population dynamics. Continued monitoring and adaptive management will be essential to address persistent threats such as habitat degradation, climate change, and expanding human activities, thereby ensuring the long-term survival of this iconic species.

Keywords: African elephant, Dynamics, Population, Tarangire National park

Integrating ecological and social insights to inform African pangolin conservation around Minziro Nature Forest Reserve, Tanzania

Fenrick Msigwa

Tanzania Research and Conservation Organization
Corresponding Author: fenrick.msigwa@trco.or.tz

Abstract

Pangolins are among the most trafficked mammals globally, yet data on their ecology and human interactions in Tanzania remain scarce. This study aimed to assess the distribution of pangolin species, local perceptions, and illegal trade flows around the Minziro Nature Forest Reserve in northwestern Tanzania, a critical area of the Guinea-Congo biome. Using semi-structured household interviews, key informant interviews, and focus group discussions, we captured community perspectives on human-pangolin interactions, local use, and trade involving the three pangolin species found in Tanzania's Minziro Nature Forest Reserve. During the conference, we will discuss the application of occupancy models and social network analysis to study three sympatric pangolin species. Key topics include species distribution, trade dynamics, conservation attitudes, and strategies to promote awareness and sustainable alternatives. Our findings underscore the value of integrating ecological and social data to understand pangolin-human interactions and guide transboundary anti-trafficking efforts, while supporting community-led monitoring and contributing to Tanzania's national pangolin conservation strategy.

Keywords: Conservation, Dynamics, Modelling, Occupancy, Pangolin

Mammalian Species Composition, Diversity, And Abundance in Arusha National Park, Northern Tanzania

Elizabeth Mwakosya[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: moseselizabeth1999@gmail.com

Abstract

Mammals are crucial components of global biodiversity. Therefore, understanding the diversity of mammalian species and their habitat associations is the baseline for developing a conservation plan. This study investigated the mammalian species composition, distribution, diversity and abundance in the Arusha National Park (ANAPA) in June 2025. Both direct and indirect observation methods were employed, utilising ground vehicle and walking transect surveys, as well as the distance sampling technique for data collection. The results from the direct observation method revealed that a total of 1,079 individual mammals, representing 16 species, 8 families, and 6 orders, were recorded in the area. Only 9 other species were recorded through the indirect observation method. The order Artiodactyla contributed the most species (n = 8). Out of the 16 species recorded, only the cane rat (*Thryonomys swinderianus*) and the African savanna hare (*Lepus victoriae*) were small mammals; the remaining species ranged from medium to large mammals. Despite the African Buffalo (*Syncerus caffer*; n = 414; 38.37%) being the most abundant species, compared to others at different habitat types, their differences were not statistically significant (P = 0.3785). Moreover, woodland habitat exhibited the highest mammalian diversity (H' = 1.684), compared to others and the difference was statistically significant (P = 0.04695), because some species are highly restricted habitat specialists in the area. Additionally, results also show that the mammalian species diversity decreases as the altitude increases in the area since, high species diversity and abundance of mammals was recorded at low altitudes (1,400 – 1,767 m) asl (n = 1045; H' = 1.877) and less diversity in high altitudes (2,135 – 2,500 m) asl (n = 10; H' = 0.950) and their difference was statistically significant (P = 0.03638). In conclusion, these findings offer valuable insights for enhancing tourism potential and underscore the importance of ongoing conservation efforts in the area.

Keywords: Abundance, Biodiversity, Conservation, Habitats, Location, Mammals

An updated review on the status and threats to Tanzania's vultures

Claire Bracebridge

North Carolina Zoo
Corresponding Author: clairebracebridge@gmail.com

Abstract

The Conservation and Management Plan for Vultures in Tanzania was launched at the 2023 TAWIRI conference. This details the status and threats to vultures from long-term research predominantly from southern Tanzania. Here, we provide updated information over the past two years using data from telemetry work conducted by North Carolina Zoo, The Peregrine Fund and TAWIRI. This, details alarming cases of poisoning in northern Tanzania, with vulture body parts being removed for belief-based use. We present

mortality rates of tagged vultures from our telemetry study, together with population abundances from standardized transects in three national parks in southern Tanzania. We also use our data to look at other threats such as lead from ammunition, which can cause long-term deleterious effects on vulture's health. The vulture action plan recognizes pesticide poisoning as the primary cause of vulture declines, echoed across much of Africa. However, it also has a wider impact – with serious and mostly unrecognized long-term consequences to human and environmental health. We need to think about these Highly Hazardous Pesticides from a One Health perspective and address the issue as a multi-faceted and multi-sectoral problem. We will discuss some of the suggestions in the vulture action plan, as well as provide an overview of the strategic objectives for this 10-year plan.

Keywords: Mortality, Poison, Toxins White-backed vultures

Baseline Assessment of Butterfly Diversity and Distribution in Western Usambara, Tanzania

Devolent Mtui[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: devolent.mtui@tawiri.or.tz

Abstract

This study assessed butterfly biodiversity in Magamba Nature Reserve (MNFR), located in the western Usambara Mountains, part of the Eastern Arc Mountain range. The objective was to establish baseline data to support future evaluations of forest restoration efforts through tree planting. Specifically, the study aimed to document butterfly species richness, abundance, and diversity prior to afforestation activities. Fieldwork was conducted in 2023 across two forest patches totaling 30.3 hectares. Surveys took place during two seasonal transition periods: February (from short to long rains) and September (from long to short rains). The two sampling events took place over 14 days by using sweep nets for sight-collecting and deploying van Someren traps across 42 plots (5 m × 5 m × 5 m), distributed along two elevational transects (300–600 m). Butterfly abundance, species richness (S), and Shannon-Wiener diversity index (H′) were analyzed in R, with statistical comparisons performed using the Kruskal-Wallis test. A total of 1,551 butterflies representing 38 species were recorded. Of these, 293 individuals from 26 species belonged to the family Nymphalidae, 187 individuals from 5 species to Papilionidae, and 1,071 individuals from 7 species to Pieridae. Abundance was significantly higher during the transition from short to long rains, while species richness and diversity (H′) showed no significant variation across habitats, seasons, or elevation. These findings provide critical baseline data for long-term ecological monitoring and evaluation of forest regeneration impacts on butterfly communities. Future surveys will enable assessment of biodiversity responses to ongoing restoration interventions over the next decade.

Keywords: Butterflies, Forest, Nypmhalidae, Restoration, Species diversity

The distribution ground-dwelling mammals in the Minziro Nature Forest Reserve, Tanzania

Emanuel Martin[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author: emanuelgingi@gmail.com

Abstract

Mammals perform numerous functions that influence the composition and structure of plant communities, including acting as seed dispersers, pollinators, herbivores, and predators controlling herbivory rates. Unregulated human activities can have a significant impact on wildlife communities, altering their diversity and structure. Monitoring how mammal communities relate to habitats is key for the success of conservation measures and wildlife sustainability. For example, Minziro Nature Forest Reserve (MNFR) in Tanzania is heavily disturbed by illegal logging, poaching, burning, livestock grazing, and fishing. The increase of these activities during the past years is likely to negatively affect biodiversity, but little information is available on this. To fill this knowledge gap, we set 40 camera traps in two arrays in MNFR and surveyed two periods: from October to December 2023 and from January to March 2024, using the TEAM protocol. We further compared the newly gathered data with existing observations from 2018-19. We found a decline of 43% of mammal species between 2018-2019 and 2023-2024. The survey from 2018-19 recorded 23 different mammal species, in contrast to 13 mammal species observed in the recent survey (2023-24). Despite the overall decrease in species, the African Golden Cat (*Caracal aurata*) was recorded for the second time in MNFR. Proximity to the edge of the protected area had a negative effect on overall species richness and on the occurrence of specific species such as the Blue Duiker (*Philantomba monticola*). While some differences in mammal species richness can relate to survey effort due to flooding in the second survey period, there is some evidence that changes can be traced back to human activities (e.g., burning charcoal, poaching, snares, fishing, livestock grazing). While topography was not significantly related to species richness, it did influence species composition. For example, bushbuck (*Tragelaphus scriptus*) was more likely to occur in areas where topography was more varied, while African buffalo (*Syncerus caffer*) was more likely to occur in flatter areas. Occupancy modeling was only possible for the Blue Duiker as it was the most abundant species recorded. It showed that distance to the protected area edge was the most important control on distribution. Our findings support the need for continued monitoring to improve conservation in the MNFR, as there is a decline of species potentially due to the increase in human activities.

Keywords: Mammals, Human activities, Habitat, Species richness, Occupancy modelling

Promoting rhinoceros welfare during transit: veterinarians' perspectives on transportation practices.

Emmanuel Macha[1]

[1]Tanzania National Parks
Corresponding Aunthor: dremmacha@gmail.com

Abstract

Despite translocation being a useful conservation strategy in rhinoceros management, morbidities and mortalities occurring during transportation pose a significant concern to rhinoceros managers, veterinarians, and scientists. The objectives of this study were to better understand the effects of transport on rhinoceros and to gain insights from veterinarians involved in rhinoceros translocations about current practices and potential interventions that could improve welfare. A weblink and QR code to an online questionnaire with a total of 46 questions in Google Forms was sent to veterinarians who had experience in African rhinoceros transportation, through personal emails and social network forums. Results demonstrated that despite dehydration and negative energy balance being reported as the major causes of morbidities and mortalities during transport and post-release, most veterinarians (30/35; 86%) involved in rhinoceros translocation did not offer water, parenteral fluids, or feed to transported animals, for logistical reasons and the knowledge or perception of rhinoceros resistance to taking ad lib food and water during transport. However, 52% (15/29) and 41% (15/34) of participants suggested that parenteral fluids could be used as an intervention to mitigate dehydration and negative energy balance respectively. To reduce stress, 94% (33/35) of respondents suggested the use of tranquilisers and sedatives. This study is the first to systematically investigate and report on practices by veterinarians involved in rhinoceros translocations globally. The study highlights that further research is required to explore optimal and pragmatic techniques in the field to mitigate reported welfare challenges in rhinoceroses during transport.

Keywords: Rhinoceros, Survey, Transport, Veterinarian, Welfare

Brothers and peers disperse together in spotted hyenas

Eve Davidian

Institute of Evolutionary Science of Montpellier
Corresponding Author: davidian.ceve@gmail.com

Abstract

Why do some individuals coordinate their behaviour in space and time and settle in the same breeding group? Is it an active decision that is driven by the selective advantages of settling with kin and social allies? Or the mere consequence of similarities in needs, capacities and available destinations? Addressing these questions is key to better understand how decisions made by free-ranging animals can shape their own survival and reproductive success, and have far-reaching implications for the connectivity and resilience of the social groups and populations they live in. We examined the likely drivers of the coordination in breeding-group choice among male spotted hyenas. We used 24 years of continuous demographic and social monitoring of the eight hyena social groups inhabiting the Ngorongoro Crater in Tanzania. We compared the choices of 148

pairs of same-cohort males that varied in similarity (i.e., maternal and socio-ecological background and genotype) and kinship. We found strong support for both active and passive processes! Twin brothers who share most cumulative similarity were most likely (70%) to settle in the same group, followed by distantly-related but familiar peers (36%), and by strangers originating from different groups (7%). Also, coordination among twins and other closely-related males increased when population density and associated benefits of kin cooperation increased. I will further cover the implications that these patterns likely have for cooperation between males after clan settlement in their new group.

Keywords: Breeding, Carnivore, Ecology, Movement, Ngorongoro

Revealing the Hidden Patterns: One-Year Monitoring of Mammalian Diversity across a Multi-Use Landscape in the Kitendeni Wildlife Corridor

Emmanuel Kivuyo[1]*, Frank Damson[1], Baraka Naftal[2], and Noah Sitati[1]

[1]WWF Tanzania Country Office, P.O.Box, 63117, Mikocheni, Tanzania
[2]Tanzania Wildlife Research Institute, P.O.Box, 661, Njiro, Arusha, Tanzania
*Corresponding Author: emichael@wwftz.org

Abstract

Understanding species abundance, richness, and diversity across human-modified landscapes is essential for effective wildlife management and conservation planning. This study presents a year-long assessment of medium- and large-bodied mammal communities in the Kitendeni Wildlife Corridor, a key ecological link in northern Tanzania that connects protected areas while supporting multiple land uses, especially grazing. We deployed 36 passive infrared camera traps over 12 months across varied habitat types including woodlands, grasslands, forests, and shrublands. Species abundance was estimated using the Relative Abundance Index (RAI). Richness was determined by counting the total number of distinct species in each land use type. Diversity was assessed using the Shannon-Wiener (H′) and Simpson's (1-D) indices to compare ecological complexity among different zones. Over 35,000 detection events recorded 32 mammal species. Giraffe (*Giraffa camelopardalis tippelskirchi*), buffalo (*Syncerus caffer*), African elephant (*Loxodonta africana*), and eland (*Taurotragus oryx*) were frequently observed across habitat types. Diversity patterns differed significantly among land uses, with higher richness and diversity in woodland-buffered areas compared to high livestock grazing zones. Our findings emphasize Kitendeni's critical role as a biodiversity reservoir and demonstrate the value of camera traps for monitoring wildlife in multi-use landscapes. These insights are vital for guiding land use planning, adaptive corridor management, and community-based conservation in the Greater Kilimanjaro ecosystem.

Keywords: Camera traps, Corridor, Diversity, Multi-use landscapes, Wildlife

Birds as indicators of rangeland health in northern Tanzania

Edward Jenkins

Independent researcher
Corresponding Author: edward.jenkins@briwildlife.org

Abstract

Globally, many rangelands are being degraded due to overuse and exacerbated by climate change. As rapid rotational grazing of livestock is implemented across areas of Longido and Monduli Districts, Tanzania, as part of the Longido and Monduli Rangelands Carbon Project, carbon sequestration and biodiversity are expected to respond positively. Providing a relative measure of biodiversity with the power to estimate change over time is a requirement for effective conservation decision making. Additionally, identifying indicator taxa that might be predicted to respond to project activities is valuable when designing a long-term monitoring effort. We employed 178 point count surveys in 2024 to assess baseline avian diversity, distribution and abundance across multiple environmental gradients in 970,000 ha of arid to semi-arid savanna. Point counts were conducted using a randomly stratified transect method across three communities and timed to coincide with peak productivity in May-June. Over 214 species from 62 families were detected across point counts, with species richness ranging from 2-33 (mean 16.9) and Shannon-Weiner diversity values of 0.14-3.16 (mean 2.31). Communities (Longido, Monduli, Enduimet WMA) differed significantly for both species richness (ANOVA, $F_{2,170}=4.42$, $p=0.01$) and diversity (ANOVA, $F_{2,170}=9.14$, $p=<0.001$). Four bird families that may respond to changing grazing patterns were selected for further occupancy modelling based on relevant ecological traits including foraging guild (ground-feeding granivores or insectivores), habitat preference (savanna), and high abundance and broad distribution across point counts. Indicator families include Columbidae (414 individuals in total with species detected across 86% of point count locations), Cisticolidae (n=296, 79%), Alaudidae (n=593, 75%), and Ploceidae (n=5,177, 56%). With continued regular surveys planned for the proceeding 40-year lifetime of the project, including other associated biodiversity sampling, this dataset provides a valuable baseline to underpin predicting and quantifying change over time looking into the future.

Keywords: Birds, Community ecology, Rangeland, Savanna

Factors Influencing Community Awareness of the Endangered Rungwecebus kipunji

Hefsiba Mawazo[1], Janemary Ntalwila[2], and Franco P. Mbise[1]

[1]Department of Biology, University of Dodoma, P.O. Box 338, Dodoma, Tanzania.
[2]Tanzania Wildlife Research Institute, P.O. Box 661, Arusha, Tanzania.
Corresponding Author: francombise@gmail.com

Abstract

Understanding the factors that influence community awareness is crucial for designing conservation approaches that effectively involve local populations. This research determined the level of awareness about the *Rungwecebus kipunji* among residents of villages near the Mount Rungwe Forest Nature Reserve (MRFNR) in Tanzania. Data were gathered from four villages situated at varying distances from the reserve boundary:

Ilolo, Kibisi, Syukula, and Lupoto. A household survey was conducted with 160 participants (40 from each village) using a structured questionnaire consisting of closed-ended questions. Binary logistic regression was applied to identify key factors affecting awareness, while a generalized linear mixed model was used to analyze predictors influencing perceptions of the Kipunji as a pest. "Awareness of the Kipunji was significantly influenced by proximity to the forest (<3 km; $p = 0.016$), ethnicity ($p = 0.044$), and age ($p = 0.013$), with younger respondents (18–25 years) and Nyakyusa communities showing higher awareness levels. Perceptions of the species as a pest were strongly associated with education ($p < 0.001$) and distance from the village ($p < 0.001$). These results highlight the influence of spatial, cultural, and demographic factors on conservation awareness and attitudes.

Keywords: Awareness, Community, Conservation, Endangered species, Mount Rungwe Forest

Seasonal Dynamic of Habitat Use by Wild Bovids and Cattle in Western Tanzania - Issa Valley: Insights from Motion-Triggered Cameras

Ivorda Mhakilicha

Greater Mahale Ecosystem Research and Conservation
Corresponding author: ivordamhakilicha95@icloud.com

Abstract

Pastoralism and wildlife (especially wild bovids) have a complex relationship, with sympatry resulting in natural resource competition due to overlapping diets. In western Tanzania, both cattle and wild bovids share a heterogeneous landscape comprising miombo woodlands, riparian forests, and grasslands. Despite extensive study of cattle-wildlife competition in grasslands across equatorial Africa, there is remarkably little known about how this spatial overlap manifests in more mosaic habitats with diverse vegetation and fauna. This study aims to examine the seasonal dynamics of habitat use and spatial overlap between cattle and wild bovids using motion-triggered camera traps deployed across 28.6 km² from January 2023 to April 2024. We analyzed 1,921 videos from 13 camera traps across vegetation types. Preliminary findings indicate that cattle and wildlife exhibit spatial overlap ($X^2 = 740.27$, $df = 12$, $p < 0.001$), with the greatest overlap occurring in grasslands, and especially during the late dry season (92%) compared to the wet season (8%). With reduced grazing land for herders due to settlement expansion, instances of cattle-wildlife overlap have increased over the last decade, resulting in increased conflict due to increased competition between cattle and wild bovids. Due to its high-quality pasture production, grassland vegetation exhibits a high intensity of bovid species overlap (64%). The consequences for wildlife include disease exposure, resource depletion, and mortality due to hunting from domestic dogs. We make recommendations to local authority law enforcement based on areas of known cattle-wildlife conflict.

Keywords: Anthropogenic, disturbance, Cattle, Coexistence, Habitat, Katavi region

Assessing Long-Term Recovery and Management Strategies for Tanzania's Black Rhino Population

Grant C. Hopcraft[1], Eblate Ernest Mjingo[3], Robert Fyumagwa[2], Philbert Ngoti[2], Emmanuel Kaaya[2], Deogratis Maige[2], Jackson Lymo[2], Dan Haydon[1], Barbara Mable[1], Ronald Vincent Mellya[1,2]

[1]School of Biodiversity, One Health and Veterinary Medicine,
University of Glasgow, Glasgow, G128QQ, United Kingdom
[2]Tanzania National Parks, Arusha, Tanzania
[3]Tanzania Wildlife Research Institute, Arusha, Tanzania
Corresponding Author:

Abstract

Tanzania's black rhino (*Diceros bicornis*) population experienced a catastrophic decline between the 1960s and mid-1990s, leading to the species' extirpation from much of its historical range. Intensive conservation efforts, including armed protection of remnant populations and reintroductions from captive sources, have resulted in a partial recovery. Using long-term ranger-based monitoring data from 1990 to 2023, we conducted a count-based Population Viability Analysis (PVA) to evaluate which management strategies most effectively reduce the risk of extinction. We examined population performance indicators, including age at first reproduction and inter-calving interval, across sub-populations and assessed whether inbreeding has affected the recovery. We then compared the outcome of rhino under two management scenarios: (1) rhinos kept in closed, intensively protected sub-populations, and (2) rhinos in open systems that facilitate the natural movement between sub-populations. Additionally, we examined if translocations changed the probability of extinction. The results suggest that inbreeding has not prevented population recovery but may delay the age of first reproduction and could extend inter-calving intervals, resulting in a slower recovery in some populations. Furthermore, while translocations are useful for establishing new sub-populations, they have not had a major contribution to the growth of existing ones. Maintaining large, connected landscapes that allow for natural dispersal among sub-populations appears to be the most effective strategy for long-term recovery. Efforts to reduce poaching-related mortality, combined with strong recruitment, have played a central role in recent recovery of rhino. These findings underscore the importance of landscape-scale conservation and coordinated anti-poaching interventions in securing the future of black rhinos in Tanzania.

Keywords: Black rhino, Connectivity, Landscape, Management, Population

A Distinct Partial Migratory Herd in the Enashiva Nature Refuge in the Eastern Serengeti

Benjamin Battersby[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: bentan777@gmail.com

Abstract

A significant number of publications have focused on the primary Serengeti migratory population and the migratory circuit these animals follow annually, in search of suitable grasslands to sustain up to 1.5 Million wildebeest. We have also observed and recorded other subpopulations within the Serengeti-Mara Ecosystem; both migratory

and resident populations. One particular wildebeest population observed by our team has not been mentioned in any publications; the Loliondo wildebeest population. To date, the Loliondo wildebeest were considered to be a resident population, however recently through the deployment of GPS collars in the Loliondo's Angata Kheri demonstrated a migration of these wildebeest between Angata Kheri and Kenya's Maasai Mara Plains. However, there is another herd of wildebeest that resided just north of Loliondo's Angata Kheri in the Sukenya Plains. There is a sizeable herd of wildebeest that existed in the Enashiva Nature Refuge, which is a refuge owned by Thomson's Safari Camp. Ten GPS collars were deployed on female wildebeest to determine if they were resident or migratory in the Enashvia Nature Refuge. Tracking of these collars has suggests that the majority of the wildebeest in Enashiva Nature Refuge belong to a resident population. However, in consecutive years (2022 & 2024) there have been migratory movements of these wildebeest between Enashiva Nature Refuge and Lobo's Serengeti National Park, during the peak of the dry season (September).

Keywords: GPS, Ecology, Movements, Serengeti-Mara Ecosystem, Wildebeest,

Coexistence through sustainable conservation strategies for sitatunga (*Tragelaphus spekii*) in African ecosystems

Gabriel Mayengo[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author: mayengogabriel@gmail.com

Abstract

Sitatunga (*Tragelaphus spekii*) is an antelope species adapted to the dense swamps and marshes of Sub-Saharan Africa, where traditional population survey techniques have been ineffective and encountered difficulties in making estimations. The species formerly occurred alongside waterways throughout the lowland forest zone of West and central Africa, extending into swamp systems in the savanna zones of central, East, and southern Africa. In most parts of Africa, the sitatunga population is declining, and attracting the attention of conservationists. Furthermore, its geographical range has been recorded to have shrunk. The present study reviewed major threats to sitatunga, assessed previous and current management approaches, and proposed new approaches to effectively manage its declining populations in Africa. To achieve the study objectives, published literature, reports, online information, expert knowledge, and personal experience were reviewed to acquire relevant information. Results indicated that sitatunga are threatened due to increased habitat loss, population isolation, political instability, water level changes, habitat fragmentation, illegal hunting, and diseases. Current wildlife management approaches raise many doubts as to their effectiveness. National-level management may unsustainably segment management actions while the protected area approach manages only part of the range of wildlife. The current tenure system in most parts of Africa discourages human–wildlife co-existence, whereas human–wildlife conflict management approaches only treat the symptoms and not the root cause of the problems. If wildlife, including sitatunga, are to persist in Africa, management approaches should be changed and include re-focusing of the management context at the ecosystems and landscape level; assessing the genetic diversity of sitatunga; promoting better wetland management, including the aspect of human dimension in management; using non-invasive techniques to genetically estimate the minimum population size; assessing inbreeding; and enhancing the implementation strategy of wildlife policy in African countries. Changing the attitude of

the local community may take time, but it is a pivotal point if humans and wildlife are to coexist.

Keywords: Biodiversity, Conservation, Human, Increase, Illegal activities, Population

Mammal diversity and distribution for enhancing visitors experience and conservation in Ruaha National Park

Cecilia Leweri[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: cleweries@yahoo.com

Abstract

Ruaha National Park (RUNAPA) is among the renowned national parks in southern Tanzania inhabited by charismatic and megafauna species. However, RUNAPA is among the less visited protected areas, perhaps due to less information on wildlife status, distribution and other attractions found therein. Using aerial census data from 1990 to 2020 and ground surveys data from October to December 2021 collected by the Tanzania Wildlife Research Institute (TAWIRI). We determined; the species richness, evenness and diversity of medium to large-sized mammals in RUNAPA; the spatial-temporal distribution of mammals in RUNAPA for the past 30 years; and spatially link mammal distribution to the existing park roads network. A total of 29 medium to large mammal species were directly observed during the road transect and encountered signs of 7 species during the walking transect. The 30 years (1990 – 2020) aerial data indicated a skewed distribution of browsers, grazers and mixed feeders to the northern and central part of the park during the 1990 to 2010, and extended to the southern part of the park during the 2010 – 2020 census period. The south-east and south-west of the park had wildlife species but do not have all weather roads, implying that they are inaccessible during the wet season. Medium to large mammals are evenly distributed in RUNAPA, however, the limited access to the south-east and south-west of the park could negatively impact the parks tourism potential and consequently the country's economy. Investing in road infrastructures would support sustainable tourism in places which had seasonal roads.

Keywords: Distribution, Mammals, Spatio-temporal, Southern Tanzania, Tourism

Fifteen years of captive management of a population of Kihansi spray toad (*Nectophrynoides asperginis)* in Tanzania: trends, challenges, and conservation lessons from Kihansi breeding facility in Morogoro

Bukombe Kija

Tanzania Wildlife Research Institute
Corresponding Author: bukombe.john@tawiri.or.tz

Abstract

The Kihansi Spray Toad (*Nectophrynoides asperginis*), a live-bearing amphibian once endemic to Kihansi Gorge in the Udzungwa Mountains of Tanzania, was declared extinct in the wild in 2009 due to habitat alteration and the emergence of infectious disease. In response, captive breeding programs were established in the United States in 2000,

followed by the creation of facilities at the University of Dar es Salaam in 2010 and the Kihansi Captive Breeding Facility (KCBF) in 2011. This study analyses population trends from 2011 to 2025 using census data from the KCBF to evaluate population size, growth rate, age structure, and reintroduction outcomes. A linear regression of annual population size showed a significant exponential growth trend ($R^2 = 0.70$, $p < 0.001$), with a growth rate of 0.248 per year. The population increased from 48 individuals in 2011 to 3,056 in 2025, with oscillation trend account for individuals born within the facility and those introduced from other facilities including the University of Dar es Salaam and U.S.-based institutions (Bronx zoo and Toledo). It also accounts for individuals harvested for reintroduction into the Kihansi Gorge the species' natural habitat, and mortalities during release experiments. Age structure analysis indicated stable adult-to-juvenile ratios, with an increasing juvenile fraction in later years, reflecting reproductive success. Nonetheless, population growth experienced setbacks due to the mortalities linked to disease outbreaks and habitat changes, irregular food supply, inadequate facility maintenance, and limited technical capacity challenges largely driven by low and inconsistent funding and fluctuating institutional support. Despite these constraints, the KCBF has proven effective in sustaining a viable captive population and supporting reintroduction efforts. These findings offer important lessons for amphibian recovery and conservation strategies.

Keywords: Captive breeding, Conservation, Kihansi Spray Toad, Population dynamics

Habitat selection by an extraordinary savannah raptor: environmental factors driving abundance of the Secretary bird (*Sagittarius serpentarius*) in the Serengeti National Park (Tanzania)

Federico Romani[1]

[1]University of Pavia
Corresponding Author: federico.romani01@universitadipavia.it

Abstract

We estimated the population size of the Secretary bird in the Serengeti National Park and identified ecological factors characterizing the high-density areas, which should be established as high-priority conservation zones. To estimate the abundance and density of Secretary bird within the Serengeti National Park (SNP) and investigate environmental variables driving its abundance. In 2023, Secretary birds were counted along 52 transects (average length = 15.3 ± 1.8 km), replicated at least three times outside of the breeding season. Twelve transects with the most observations were repeated up to eight times. Abundance and density were estimated through multiple-covariate distance sampling, while habitat selection was assessed using generalized additive mixed models and generalized linear models. We estimated an average density of 1.3 secretary birds/10 km2 and an abundance of 1,513.3 individuals. Areas of the highest density averaged 2.3 secretary birds/10 km2 and 622.5 individuals. The greatest abundances occurred in transition zones between extensive grassland with high vegetation cover and habitats characterized by open woodlands or treed shrublands. secretary birds preferred flat environments with relatively more seasonal rivers and an annual precipitation of < 900 mm. Abundance decreased in grasslands with low vegetation cover and where open grassed woodland coverage was >20%. The probability of spotting single individuals versus pairs was higher in the western and central SNP and in more heterogeneous habitats with greater

coverage of open grassed woodland and dense treed grassland. Closed treed shrublands were preferred by pairs. Secretary bird abundance was lower where the proportion of habitat burned for prescribed fires exceeded 60%. These results for the Secretary bird's demography and ecology in the Serengeti ecosystem are essential for a long-term monitoring programme and conservation actions in Tanzania.

Keywords: Birds, Distance Sampling, Ecosystem, Management, Wildlife.

Functional and Structural Connectivity Modelling for Transboundary Wildlife Corridors between Tanzania and Kenya

Noah Sitati[1], Martin Mulama[2]

[1]WWF Tanzania Country Office, P.O.Box, 63117, Mikocheni, Tanzania, [2]WWF Kenya Country Office P.O Box 62440-00200, Nairobi, Kenya
Corresponding Author:

Abstract

The Southern Kenya–Northern Tanzania (SOKNOT) transboundary landscape is one of the most ecologically significant regions in Africa, supporting globally important populations of elephants, lions, giraffes, zebras, and other iconic species. Over 60% of these wildlife populations range outside formal protected areas, predominantly on community lands that are increasingly fragmented and under human pressure. Habitat loss and restricted movement corridors threaten long-term coexistence and the ecological integrity of the region. To address this, we modelled both structural and functional connectivity across key ecosystems—including Serengeti–Maasai Mara, Amboseli–Kilimanjaro, Mkomazi–Tsavo, and Tarangire–Manyara—using spatial data for seven focal species: African elephants, plains zebras, wildebeest, Masai giraffes, lions, cheetahs, and African wild dogs. Structural corridors were identified based on minimal human impact, while functional corridors were designed using empirical species movement and occurrence data to reflect the specific ecological needs of each species employing focal species-specific datasets and landscape variables, combined with advanced GIS and remote sensing techniques. CircuitScape, a tool based on electrical circuit theory was used to simulate species movement across diverse landscapes. Additionally, the least-cost path algorithm was employed to generate Cost Weighted Distance (CWD) maps, which identified the optimal movement routes taken by species. This approach provided a comprehensive understanding of how the corridors facilitate wildlife movement and ensured their long-term viability in maintaining ecological connectivity. Of the 24 structural corridors assessed, 13 were confirmed as functionally viable for the focal species, providing critical connectivity between fragmented habitats. These corridors represent priority areas for conservation action to maintain population viability and ecological resilience. Our findings underscore the urgency of preserving and restoring transboundary connectivity in the face of rapid land-use change. Recommendations include adjusting corridor alignments to avoid densely settled areas, implementing ongoing monitoring using habitat quality indicators, and integrating corridor planning into national and regional land-use frameworks. Ensuring long-term wildlife movement and genetic flow will depend on collaborative, science-based corridor protection across borders.

Keywords: Conservation, Fragmentation, Habitat, SOKNOT, Wildlife

Lessons from the Serengeti for Rewilding

Rene Beyers[1]

[1]The University of British Columbia
Corresponding Author: rene.beyers@ubc.ca

Abstract

More than six decades of scientific research in the Serengeti have provided fundamental insights into how ecosystems work. We have identified a set of principles that govern the Serengeti ecosystem and enable it to persist. These include bottom-up and top-down population regulation and species diversity, which provide resilience against natural disturbances, migration, alternative stable states, and long-term change. These principles are not exclusive to the Serengeti and can be observed in other ecosystems. When these governing principles are broken, ecosystems unravel, degrade and may even collapse, which is what we are witnessing all over the world. To reverse this global downgrading, we need to restore these governing principles in ecosystems that have been degraded, including those in protected areas. We can do this through rewilding, which is the "process of rebuilding, following major human disturbance, a natural ecosystem by restoring natural processes and the complete or near complete food web at all trophic levels as a self-sustaining and resilient ecosystem with biota that would have been present had the disturbance not occurred." The IUCN Rewilding Thematic Group (RTG) was established to develop a conceptual and methodological framework for rewilding. This resulted in the development of ten guiding principles of rewilding, a Handbook of Rewilding, and an IUCN publication on Guidelines for Rewilding, presented at the IUCN World Conservation Congress in October 2025. The Serengeti served as a key case study, and the lessons learned significantly contributed to the scientific foundation of these guidelines. This highlights the importance of long-term ecological monitoring and research, which has been vital in understanding the ecosystem's recovery and the complex processes that unfold over time.

Keywords: Ecology, Monitoring, Restoration, Rewilding,

Natural dispersal is better than translocation for reducing risks of inbreeding depression in eastern black rhinoceros (*Diceros bicornis michaeli*)

Ronald Mellya[1]

[1]Tanzania National Parks
Corresponding Author: ronald.meela@tanzaniaparks.go.tz

Abstract

Due to increasing anthropogenic impacts, many species survive only in small and isolated populations. Active conservation management to reduce extinction risk includes increasing habitat connectivity, translocations from captive populations, or intensive surveillance of highly protected closed populations. Advances in sequencing technology mean that it is now possible to consider the genomic impacts of such strategies, as a proxy for variation in individual fitness. Using whole genome sequences from critically endangered eastern black rhinoceros (*Diceros bicornis michaeli*), we compare the consequences of different types of conservation efforts, based on cohorts of offspring resulting from parents

from different sources. Based on the fraction of the genome in runs of homozygosity (ROH) of different lengths, we found lower inbreeding in offspring of individuals that had either been translocated from ex-situ populations (FROH>1Mb = 0.047) or dispersed between proximate native populations (FROH>1Mb = 0.065) compared to the intensively managed closed population from which the migrant moved (FROH>1Mb = 0.112). However, the benefit of such movement was removed after only a few generations of closed breeding (FROH>1Mb = 0.149). Although sample size restricted power to detect significance of differences, the relative abundance of highly deleterious mutations was higher for offspring resulting from translocation compared to the other cohorts and this load was sheltered by higher heterozygosity, which could increase risks of inbreeding depression if inbreeding subsequently occurs. In contrast, native dispersers reduced the negative effects of inbreeding without compromising the benefits of past purging of deleterious mutations. Our study highlights the importance of natural dispersal and reiterates the importance of maintaining habitat corridors between populations.

Keywords: Inbreeding depression, Natural dispersal,

Migratory wildebeest respond to resources and risks when crossing rivers in the Serengeti-Mara Ecosystem

Shaya van Houdt[1], J. Grant C. Hopcraft[1], Luca Nelli[1], Christopher L. Dutton[2,3], Emilian S. Kihwele[4], Merikinoi Kimirei[4], Amanda L. Subalusky[2,3], Thomas A. Morrison[1]*

[1]School of Biodiversity, One Health and Veterinary Medicine, University of Glasgow, United Kingdom: [2]Department of Ecology and Evolutionary Biology, Yale University, New Haven, United States; [3]Department of Biology, University of Florida, Gainesville, United States

[4]Tanzania National Parks, Arusha, Tanzania

*Corresponding author: thomas.morrison@glasgow.ac.uk

Abstract

Wildebeest (*Connochaetes taurinus*) in the Serengeti-Mara Ecosystem (SME) famously cross several major rivers during their annual migratory cycle. While river crossings are clearly hazardous in terms of drowning and predation, it remains unclear whether crossing behaviors depend on attributes of the river and the surrounding environment. Using GPS-telemetry data from 82 migratory wildebeest monitored between 2013-2024, we examined wildebeest crossing behavior along Serengeti's three major rivers (Mara, Grumeti, Mbalageti). We expected that river crossings would be most likely at sites with little tourism infrastructure, when grazing resources were relatively high on the opposite side, when river discharge was low and where predation risk was low. We also tested whether the number of crossings per year had changed over time along the Mara River. We observed 1,211 crossing events during the study period. River crossings were most likely between 0600 and 1000 AM, and along river stretches with relatively complex geomorphologies, such as at confluences or meandering sections. Crossing probability increased when grasses were greener on the opposite side. Wildebeest crossing sites were also associated with relatively low woody cover and high tourism pressure. River discharge, as measured by satellite remote sensing and in-river sensors, was unrelated to crossing probability, though most opportunities to cross occurred during periods of relatively low river flow. Finally, crossing probability along the Mara River decreased across years. Our results suggest migratory wildebeest are selective about where and when they cross rivers, with time of day and the complexity of river morphology being the strongest determinants of crossing, among

attributes that we considered. Because rivers and the land adjacent to them are increasingly manipulated for human uses, protecting the attributes around preferred crossing sites may be an important conservation goal for ensuring migratory animals continue to cross rivers.

Keywords: Connectivity, Migration, Movement, Semi-Permeable Barrier, Tourism

Spatial avoidance and behavioral adaptation of chimpanzees to human disturbances in a savanna-mosaic habitat: a case study of Issa Valley, Tanzania.

Simula Maijo[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: simula.maijo@tawiri.or.tz

Abstract

Understanding how chimpanzees respond to human-caused disturbances is crucial for conserving this endangered species, especially as their habitats face increasing human impact. This study investigates how disturbances like cattle grazing, fire, and dogs affect chimpanzee ranging and nesting behaviors in the Issa Valley, western Tanzania. Field data were collected through systematic reconnaissance surveys, recording signs of chimpanzees, such as nests, vocalizations, tracks, and faeces, alongside disturbances, using handheld GPS devices. Spatial analysis employed Kernel Density Estimation to assess the overlap between chimpanzee presence and human disturbance levels. Statistical methods, including Chi-square tests and multiple linear regression, examined the relationship between disturbance types and chimpanzee nesting. Results indicated that grazing cattle and fire were the most frequent disturbances, accounting for 57.3% and 33.3% of events, respectively. Chimpanzee nests were the most frequently observed sign, making up nearly 60% of all chimpanzee-related records. Spatial analysis indicated a clear separation between zones of high disturbance and chimpanzee nest hotspots, implying avoidance behaviour. The Chi-square test confirmed a significant association between disturbance type and chimpanzee presence ($\chi^2 = 70.98$, $p < 0001$), while regression analysis identified cattle density as the only disturbance factor with a modest yet significant positive correlation with nest occurrence ($B = 615$, $p = 036$). These findings underscore the need to reduce high-intensity land uses like fire and unmanaged grazing near critical chimpanzee habitats. The study advocates for establishing buffer zones, fire management strategies, and community-based conservation initiatives to promote ecological health and support local livelihoods. This research enhances understanding of how chimpanzees adapt behaviorally while remaining vulnerable in landscapes with mixed land uses.

Keywords: Behaviour, Chimpanzee, Disturbance, Human, Nesting,

Encounter Rates and Their Influence on Nest Occurrence in the Masito Ugalla Ecosystem, Tanzania.

Paul Mjema[1]

[1]Jane Goodall Institute Tanzania
Corresponding Author: pmjema@janegoodall.or.tz

Abstract

Understanding how anthropogenic threats affect great ape habitat use is critical for developing effective conservation strategies. This study analyzes data from three largest chimpanzee (*Pan troglodytes schweinfurthii*) surveys ever conducted in Tanzania by the Jane Goodall Institute, focusing on the relationship between threat encounter rates and chimpanzee nest occurrence. Using georeferenced transect data, we modelled threats—such as farming, logging, camps, livestock and livestock enclosure, fire, and snares—recorded within 50 meters of line transects, assessing their spatial and temporal patterns across survey areas. We applied spatial analysis and statistical modelling techniques, including kernel density estimation and logistic regression, to determine if the presence and frequency of threats had a significant influence on chimpanzee nesting patterns. Results show localized clustering of high-threat zones and reveal a negative association between high encounter rates of certain threats (e.g., active farming and fire) and nest density. However, in some areas, chimpanzees continued nesting in close proximity to low-level threats, suggesting varying levels of tolerance or habitat pressure. This study demonstrates how field-collected threat data, when analyzed spatially and temporally, can provide insight into behavioral responses of chimpanzees to human activities. By integrating spatial modelling into monitoring frameworks, this approach supports data-driven decision-making for conservation interventions and protected area management. The findings underscore the need for adaptive strategies that reduce high-risk human activities in priority chimpanzee habitats and demonstrate the value of long-term ecological monitoring in navigating wildlife conservation in a changing landscape.

Keywords: Chimpanzee, Habitat, Mapping, Survey, Threats

Camera trap insights: elephant activity and occupancy in protected areas

Lameck Mkuburo[1], **Edward M.Kohi**[2], **Athuman M. Abdallah**[1], **Nalaila J. Gabriel**[1]

[1]Tanzanian Elephant Foundation, P.O Box 6502, Moshi, Kilimanjaro, Tanzania
[2]Ministry of Natural Resources and Tourism, P.O Box 1351, Dodoma, Tanzania

Abstract

Elephants are the only surviving megafauna with three extant species, two native to Africa and one to Asia. Known for their complex brains, elephants exhibit highly intelligent social structures and adaptive behaviors that enhance their survival. Variations in their activity patterns and habitat use have been observed across different times and locations. Mkomazi and Arusha National Parks host approximately 1,273 and 100 elephants, respectively, yet no prior studies have examined their ecology in these areas. This study investigates elephant activity patterns and habitat utilization through occupancy analysis in both parks. Over two years, camera traps were deployed in areas with elephant signs—such as dung piles, footprints, tree rubbings, and frequent sightings and visited

monthly. Activity patterns were analysed for spatio-temporal variations within and between the parks, while occupancy models assessed habitat preferences. A total of 2,484 independent sightings were recorded, with significantly more in Mkomazi (2,150) than in Arusha (334) ($\chi^2 = 1.5$, p = 1.23E-6). Elephant activity density varied notably throughout the day ($\chi^2 = 10.143$, df = 1, p = 0.001449) and slightly between parks. During the dry season, activities like walking, drinking, feeding, and wallowing were more frequent than in the wet season ($\chi^2 = 2.4$, df = 1, p = 0.0041). Spatial occupancy differed significantly in Arusha (p = 0.012) but not in Mkomazi (p = 0.88), with higher occupancy in resource-rich areas. Temporal occupancy also varied significantly ($\chi^2 = 3.7511$, df = 1, p = 1.91E-4), particularly within the same season across different years in Mkomazi. A Generalized Linear Model indicated that precipitation inversely predicted elephant occupancy in Mkomazi. These variations may stem from risk avoidance, resource dependency, differing disturbance levels, and temperature fluctuations. We recommend continued park protection to minimize human encroachment and disturbances. Long-term monitoring of elephants in these parks is essential for their conservation.

Key words: Activity patterns, Arusha, elephants, Mkomazi, occupancy

Community Perspectives and Illegal Hunting of Masai Giraffe in Muyowosi Game Reserve, Tanzania

Leon Vitalis[1]

[1]Tanzania Research and Conservation Organization
Corresponding Author: leon.hermenegild@trco.or.tz

Abstract

Masai giraffe (Giraffa tippelskirchi), is an endangered species with alarming population declines due to habitat loss, illegal hunting and human-wildlife conflict. In Tanzania, while recent trends suggest stabilization in some ecosystems, the western Tanzania ecosystems continue to face severe threats diagnosed from the decline of giraffe populations. To effectively address the challenges of illegal hunting and trade of giraffe derivatives, it is essential to understand the underlying drivers within local communities. In this study, we began by determining key informants, then applied chain referral methods to investigate human-giraffe interactions and the dynamics surrounding giraffe use and trade among communities near Muyowosi Game Reserve in western Tanzania. The insights gained aim to inform targeted, community-centred strategies for the long-term conservation of giraffes.

Keywords: Community, Conservation, Masai giraffe, Wildlife, Hunting

Habitat Suitability for Puku (*Kobus vardonii*) Across Various Climate Scenarios in Tanzania

Maureen Francis Daffa[1*], Barnabas Philip Malila[2], Michael Mutaka Muganda[1], Robert Modest Byamungu[1], Alfan Abeid Rija[1]

[1] Department of Wildlife Management, College of Forestry, Wildlife and Tourism, Sokoine University of Agriculture, P. O. Box 3073, Morogoro, Tanzania

[2] Department of Ecosystems and Conservation, College of Forestry, Wildlife and Tourism, Sokoine University of Agriculture, P. O. Box 3010, Morogoro, Tanzania

*Corresponding Author: maureen.daffa@sua.ac.tz

Abstract

The geographical distribution of species is primarily determined by climatic factors. Projections indicate that climate change is expected to significantly affect both the abundance and distribution of species, particularly those dependent on specialized habitats. Puku (*Kobus vardonii*), similar to other antelopes, serves a pivotal role in ecosystem dynamics. In the face of climate change and anthropogenic disturbances, accurately predicting habitat suitability for this species becomes imperative. This study used Maximum entropy (MaxEnt) model to forecast puku's habitat suitability. Occurrence data was obtained through field surveys that employed line transects in Kilombero and Rukwa game reserves, Tanzania. We selected elevation and 19 Bioclimatic variables as environmental factors that may influence puku population distribution. This study used downscaled future climate projections of shared socio-economic pathways (SSPs) 245 and 585 at a spatial resolution of 30s (*ca*.1 km²) for the year 2070 and 2090 which were obtained from Coupled Model Intercomparison Project (CMIP6). The model performance gave excellent evaluations with AUC of 0.995. This study discovered that the important environmental factors determining puku habitat suitability are isothermality (Bio3), precipitation seasonality (Bio15), temperature annual range (Bio7) and elevation. The findings of this study exhibited that in both scenarios there is a decrease in high potential areas and a tremendous increase in least potential areas. This looms the risks of extinction to puku, following its habitat specificity. Therefore, conservation authorities can use the findings from this study to identify and safeguard areas ideal for puku translocation, introduction, and protection, as a response to the challenges posed by climate change.

Keywords: Climate change, Distribution, Habitat, *Kobus vardonii*, MaxEnt, Species.

Revealing the effects of anthropogenic structures on the spatial distribution of migratory wildebeest

Majaliwa Masolele[1]

[1]University of Glasgow

Corresponding Author: majaliwa117@gmail.com

Abstract

The increasing interaction between wildlife and humans, both within and outside protected areas, highlights the importance of understanding how migratory animals respond to anthropogenic disturbance. To effectively safeguard migratory populations, we must understand their habitat use, particularly in response to the expanding presence of human-

made structures in their environments. In this work, we employed a multiscale step selection model within a Bayesian framework to explore the impact of human-made structures on the movement patterns and habitat preferences of migratory wildebeest in the Serengeti. Our findings reveal that wildebeest tend to avoid areas near these structures, even in the core of the protected area where tourist infrastructure is the most prevalent. Although buildings do not entirely exclude wildebeest, they do reduce the amount of time wildebeest spend in their vicinity. Individuals weigh multiple trade-offs in deciding whether to remain or move during migration, and if animals forego access to key resources in the areas around buildings, this could lead to reduced fitness and demographic consequences that may not be immediately apparent. We further find that increasing numbers of co-located buildings have a diminishing rather than a compounding effect on the spatial distribution of wildebeest, meaning that clustering buildings away from key grazing areas could be a beneficial strategy. Synthesis and Applications: In light of these findings, we recommend careful regulation and spatial planning of infrastructure development within ecosystems that considers the nuanced effects human-made structures can have on the behavior and habitat use of migratory animals.

Keywords: Animal migration, Anthropogenic disturbance, Serengeti National Park, Step selection model

The Cercopithecus Monkey Hybrid Zone in Gombe National Park: A Unique Case Study of Natural Hybridization

Kate Detwiler

Florida Atlantic University: Corresponding Author: kdetwile@fau.edu

Abstract

Guenons (Cercopithecus monkeys) are endemic to Sub-Saharan Africa and represent the continent's most speciose and colourful radiation of nonhuman primates. Reports of viable and fertile hybrids from sympatric guenon populations indicate that selection pressures against hybridization have not been strong enough to result in complete reproductive isolation between species pairs. The Gombe hybrid zone (*Cercopithecus mitis x C. ascanius*) is the only known site where Cercopithecus hybridization is frequent and ongoing. This presentation reviews three decades of research documenting the structure, stability, and evolutionary origins of the Gombe hybrid zone. Three decades of field research (1994-present) reveal a stable mosaic hybrid zone where mixed-phenotype social groups coexist adjacent to parental species groups. Phenotypic hybrids comprise approximately 15% of the population, with hybrid females demonstrating fertility and hybrid males becoming resident breeding males. Mitochondrial DNA analyses provide compelling evidence for asymmetric introgressive hybridization, with all surveyed individuals—including those with *C. mitis* parental phenotypes—carrying *C. ascanius* mitochondrial haplotypes unique to Gombe. Y-chromosome analysis reveals hybrid males carry both mitis and ascanius Y-DNA lineages, yet no Y-DNA gene flow is detected, suggesting variation in hybrid male fitness. The likely scenario assumes *C. ascanius schmidti* was the first species to successfully colonize Gombe's lower elevation, fragmented riverine forest habitat. The distributional limit of female C. mitis doggetti groups was likely close to the Gombe region in continuous canopy montane forest that occurred east and northeast of current park borders. Repeat events of dispersing male *C. mitis* doggetti encountering only female groups of *C. ascanius schmidti* created

conditions of restricted mate choice, resulting in rare heterospecific matings followed by extensive backcrossing. The long-term stability of this system establishes Gombe as an exceptional model for investigating speciation mechanisms and mate choice behaviours. This isolated yet intact ecosystem provides a unique opportunity to examine how phenotype-genotype-environment interactions shape hybridization dynamics in a system where changes in floral and faunal communities can be tracked over time.

Keywords: Cercopithecus, Gombe National Park, Hybrid monkeys, Speciation

Colobus Monkey (Piliocolobus tephrosceles) in Community Forests in Biharamulo District, Northwestern Tanzania

Kaiza Kaganzi

School for international Training
Corresponding Author: kaiza.Kaganzi@sit.edu

Abstract

The Ashy red colobus monkey (*Piliocolobus tephrosceles*) is classified as endangered by the IUCN. It faces threats from ongoing habitat destruction due to agriculture and charcoal burning in unprotected community forests. This study aimed to estimate the population and spatial distribution of the Ashy red colobus monkey within three community owned forests in Biharamulo District of North-western Tanzania. Conducted in 2024, the study utilized active observation searches and geospatial surveys to gather data on monkeys' abundance and their spatial distributions. A total area of 404.357 square meters across the three forests was surveyed, resulting in the observation of 108 individuals. Employing negative binomial regression results to inform Bayesian negative binomial model prior, we estimated a total of 180 individuals, distributed across Nyamahanga (40), Karundi (47), and Mabila (93) forests. For spatial distribution we used ArcGIS Pro version 3.3.0. The spatial analysis revealed that the monkeys' distribution was largely confined to gullies and dense canopy patches, indicating significant habitat fragmentation and degradation. These findings underscore the urgent need for targeted conservation strategies to prevent further population decline, particularly in under-protected community-owned forests. Implementing habitat restoration and protection measures is essential to ensure the survival of this endangered primate species.

Keywords: Conservation, Degradation, Habitat, Population, Red colobus monkey, Distribution

ABSTRACTS FOR POSTER PRESENTATION

Influence of Kongwa Weeds on Honey Production and Physico-Chemical Characteristics in Kongwa District, Dodoma Region

Lukiko S.B*, Kagosi P.J, Lesio N.P, Richard A.K, and Msemo S.E.

[1] Tanzania Forestry Research Institute, P. O. Box 1854, Morogoro
*Corresponding Author Email: sblukiko@gmail.com

Abstract

Ecologists and biocontrol scientists are increasingly exploring the economic opportunities from invasive species, shifting their focus from merely chemical or mechanical controls to beneficial uses. Kongwa weeds have been criticized for contributing to low crop production and exacerbating food deficiencies. This study aims to investigate the role of Kongwa weeds on honey yield and physico-chemical characteristics in Kongwa District. The experimental apiary was established with nine frame hives and nine top bar hives of varying volumes. The study was carried out over a three-year period, from June 2022 to June 2025. Botanical surveys and mellisopalynology were employed to assess the coverage of Kongwa weeds in the experimental apiary, which also helped in identification of authentic sources of honey. High-performance liquid chromatography was used to characterize honey from Kongwa weeds. The findings revealed that honey produced in frame hives averages 7.3 kilograms, whereas top bar hives yield significantly more, with an average of 19.7 kilograms per harvest. The honey was characterized by its white color (24.939 mm) and demonstrates high-quality attributes. Notably, the analysis indicates a rich presence of 13 important phenolic compounds, with Sinapic acid being abundant (118.314 mg/kg) of all, suggesting a potential enhancement in the nutritional and health-promoting properties to human being. This research underscores the crucial role that Kongwa weeds is influencing honey production outcomes and quality in Kongwa District, by highlighting the benefits of these invasive species. This study contributes to a broader understanding of how ecological management practices can turn challenges into opportunities, ultimately benefiting local producers and the ecosystem alike. More exploration is required in acidic areas which do not favor agricultural crops to be areas for growth of Kongwa weeds purposely for beekeeping.

Key word: **Honey; Influence; Kongwa-weeds; and Kongwa District**

Impact of lantana camara on bee's distribution

Mohamed M. Jovinary*[,1], Julius V. Lasway[1]

[1]Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania
Corresponding author: Mohamed M. Jovinary; email: michaeljovin286@gmail.com

Abstract

Invasive plant species can profoundly affect native bee communities in wide range. This study evaluated the impact of the invasive plant *Lantana camara* on the distribution of bees. Thirty plots (two comparable sites 3km apart, elevation 1350-1600), arranged over six transects, comprising both invaded and non-invaded sites. Pan traps, sweep nets and random transect walk were used to measure the abundance and diversity of bee species.

Linear model and Generalized Linear Model was used to assess the impact of *Lantana camara* invasion on bees' diversity and abundance. A total of 478 bee individuals from 13 species were collected: 321 individuals from 13 species in the invaded site and 157 individuals from 6 species in the non-invaded site. Bee abundance was significantly higher in Lantana-invaded plots ($F(1, 28) = 9.99$, $p = 0.0018$). The Shannon diversity index also differed: invaded areas exhibited lower bee diversity ($H' = 1.5$) than non-invaded areas ($H' = 2.4$) ($W = 43$, $p = 0.0032$). Floral resource diversity, showed significant difference between sites (H' invaded = 1.51 vs non-invaded = 2.95; $W = 0.71$, $p < 0.001$). Furthermore, bee abundance decreased with increasing elevation and precipitation but increased with higher temperatures (all $p < 0.0001$). Bee diversity showed positive associations with elevation and precipitation and a negative association with temperature (all $p < 0.001$). *Lantana camara* appears to change the habitat's structural complexity and floral richness, making it less conducive for bees' survival. Floral resources including pollen, nectar supplies and larval host plants, which are essential for the survival and reproduction of bees, were probably less available as a result. In order to maintain the balance of the ecosystem, bees' distribution must be preserved, which is why controlling invasive species is crucial. Subsequent investigations ought to concentrate on the adaptations made by bee species to endure in the lush surroundings of *Lantana camara*.

Keywords: Bees' distribution; Floral resources; Invasive plant; *Lantana camara*

Impact of urbanization on butterfly species assemblages

Ramadhan I. Mwiko[1,*] and Julius Lasway[1]

[1]Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania

Corresponding author: Ramadhan I. Mwiko; email: ibramwiko742@gmail.com

Abstract

Urbanization poses significant challenges to biodiversity, including insect communities such as butterflies. This study investigates the impact of urbanization on butterfly abundance, species diversity, and floral resource utilization across three habitat types: urban, peri-urban, and rural areas. Data on butterfly and floral resources used by butterflies was collected in thirty study plots equally distributed along three categories (urban, peri-urban, and rural areas). A one-way ANOVA was conducted to assess differences among these habitats. Results revealed a significant decline in butterfly abundance with increasing urbanization, with rural areas supporting the highest number of individuals (106), followed by peri-urban (67), and urban habitats (45) ($F=7.34$, $p = 0.003571$). Similarly, species diversity, measured using the Shannon Diversity Index, was highest in rural areas (3.2201), moderate in urban (2.9663), and lowest in peri-urban habitats (2.8283), with the differences being statistically significant ($F = 5.63$, $p = 0.002071$). Floral resource use by butterflies also varied significantly across habitats ($F = 2.52$, $p = 0.0091$), indicating that urbanization not only reduces butterfly abundance and diversity but also alters their interaction with floral resources. These findings underscore the ecological consequences of urban development and highlight the need for urban planning strategies that support pollinator-friendly habitats to conserve butterfly communities in rapidly urbanizing landscapes.

Keywords: biodiversity; butterfly community; green spaces urbanization; species assemblages

Butterflies composition and diversity in different habitat types of Moyowosi Game Reserve, Western Tanzania

Selemani Moshi[1]

[1]Tanzania Wildlife Research Institute
Corresponding Author: selemanimoshi73@gmail.com

Abstract

The butterflies are very important as they help in plant pollination when they fly searching for food. Despite of that little is known on the butterflies of the Moyowosi Game Reserve (MGR). Therefore, this study aimed at determining butterfly species composition, diversity and distribution of the MGR. The study employed a transect survey with hand-held butterfly sweep nets, visual observations and butterfly baited traps methods for the data collection. The results indicated that about 912 butterfly individuals were recorded belonging to 5 families, 58 genera and 98 species. The higher butterflies' species richness (54.28%), mean abundance (7 ± 1.24), and diversity (H′= 3.51) were found more frequently in the closed miombo woodland habitat type. Moreover, the Nymphalidae family was the common butterfly group dominated the area. Again, the results indicated that more than half (55.1%) of butterfly species were habitat-specific such that (27.6%) showed more specificity to closed woodland habitat than other habitats in the area. Therefore, implying that habitat monitoring was very important for the butterfly conservation in the MGR. Furthermore, future conservation and management plans for MGR should focus conserving these refuge habitats for continued existence of butterfly species for achieving biodiversity conservation at a large scale.

Keywords: Abundance, Conservation, Ecosystem health, Protected areas

Developing a Holistic Climate Change Adaptation Framework for Tourism Resilience in Kilimanjaro National Park

Massay, l.[1], Kaswamila, A.L[2] & Higin Peter, K[2]

[1]*Department of History and Anthropology University of Dodoma P.O. Box 259, Dodoma
[2]Department of Geography and Environmental Studies University of Dodoma P.O. Box 259, Dodoma
*Corresponding author lucasmassay@gmail.com

Abstract

Kilimanjaro National Park (KINAPA), one of Africa's premier tourism destinations, faces escalating risks from glacial retreat, ecosystem degradation, and climate-induced weather variability. Existing adaptation efforts remain fragmented and inadequately aligned with local realities. This paper develops a Holistic Climate Change Adaptation Framework (HCCAF) that integrates resilience and stakeholder theories to build tourism resilience. The framework is a result of a study conducted in KINAPA and adjacent communities which sought to assess the effectiveness of the current climate change adaptation strategies for enhancing a tourism destination. Data were collected through KIIs, household surveys, and physical assessments and secondary data reviews. The bases of the HCCAF were study findings, experts own knowledge, and experiences from elsewhere. The Framework which encompasses five phases addresses both socio-economic and environmental vulnerabilities. The Framework further demonstrates that combining traditional knowledge, adaptive management, and diversified financing mechanisms can

strengthen climate preparedness while sustaining tourism benefits. The study offers a scalable model for other protected areas confronting complex climate threats, advancing both policies and practice in climate-resilient tourism planning.

Key words: Climate, Framework, Kilimanjaro NP, Resilience, Tourism destination

Community Engagement through Outreach Initiatives: A Case Study from Villages Near Tarangire National Park, Tanzania

Franco Mbise and [2]Janemary Ntalwila

[1]The University of Dodoma
[2]Tanzania Wildlfie Research Institute
Corresponding Author: francombise@gmail.com

Abstract

This research explored how outreach initiatives contribute to improving the relationship between park authorities and residents living near Tarangire National Park (TNP) in Tanzania. The study aimed to identify the social factors influencing local satisfaction with community-based conservation efforts and their readiness to report illegal wildlife activities. Data were collected through a structured questionnaire from 200 respondents across four neighboring villages. Statistical analysis was conducted using binary logistic regression. The findings indicated that 78% of participants were content with the conservation activities promoted through the outreach programme, while 49% reported a willingness to notify authorities about poaching. Educational attainment and age were the strongest predictors of satisfaction, with older and more formally educated individuals showing greater support. Similarly, higher education levels were linked to increased willingness to report illegal activity. Although the proximity of villages to the park was not a statistically strong factor, there was a suggestive pattern showing higher engagement among those closer to park boundaries. This study underscores the importance of involving communities in conservation planning and ensuring equitable access to park-related benefits. Tailoring outreach efforts to local demographics particularly education and age groups can foster trust and improve cooperation in wildlife conservation.

Keywords: Benefit, community, conservation, Sharing, Tarangire

The long-term monitoring of livestock predation cases in the Mkomazi sub landscape, Tanzania

Emanuel Kivuyo, Elia Sabula, and Noah Sitati

WWF Tanzania Country Office, P.O. Box 63117, Dar es Salaam, Tanzania
Corresponding author: emichael@wwftz.org

Abstract

Human-wildlife conflict (HWC) and particularly livestock predation is one of the major threats hindering effective wildlife and natural resources conservation. Despite being a challenge in monitoring and data collection on HWC due to several factors, the respective wildlife agencies in collaboration with the local communities have been recording HWC

incidents as a requirement for processing the consolation payments. Now with a team of well-trained community Village Game Scouts (VGS), the District Game Officers, rangers and Protected Areas managers from TAWA, TANAPA and TFS monitoring livestock predation incidents have been undertaken regularly. The collected data shows the scope of HWC, trend, and the economic implications of conflict. The effectiveness of the human large carnivore conflict mitigation measures to reduce livestock attack based on the HWC data collected between 2020 and 2025. Firstly, manually by the VGS from 2020 to 2023 followed by use of mobile phones installed with Miombo or ODK from 2024 to 2025. About 79 livestock attack incidents were recorded, indicating a substantial impact of livestock predation on local communities' livelihoods, with over 549 livestock killed translated to an economic loss of ~Tsh 215 million (83613.28 $) (Tanzania, Ministry of Livestock and Fisheries, Livestock Sector Transformation Plan (LSTP) 2022/23 - 2026/27). The livestock attack incidents occurred both in the field (45%) as well as in the livestock boma or enclosure (55%). Most livestock attacks were by hyena (56%), followed by lion (15%) and leopard (11%) among other wildlife carnivores. These incidents have triggered retaliatory killings and declining support for conservation efforts. Communities should be on the front line of defense for wildlife while benefiting from tourism earnings.

Keywords: Conflict, Large Carnivore, Mkomazi, Livestock, Predation

Local community coping and adaptation strategies on human-wildlife conflict at Kwakuchinja wildlife corridor, connecting Tarangire-Manyara national parks

Emmanuel Ngomuo

Tanzania Wildlife Research Institute
Corresponding author: emmanuel.ngumuo@tawiri.or.tz

Abstract

Human-Wildlife conflicts remain difficult conservation pulse to be solved globally. A deepened human dimension toward conflicts coping and adaptation is yet to be understood. This study was conducted at Kwakuchinja Wildlife Corridor aimed at assessing how local communities cope and adapt to human-wildlife conflict despite repeated conflicts. We conducted this study at three villages in the corridor, i.e., Mwada, Vilima Vitatu, and Mswakini. Both literature reviews, interviews and closed-end questionnaires were purposely used to acquire information from 78 households, 6 key informants and 18 participants in focused group discussion. The community in three villages faces crop raiding, livestock predation, human injury, and property destruction. However, this conflict varies among three villages (X2=18.1, N=78, df (1,6), P=0.006). Despite these conflicts, the community copes and remains resilient by conducting patrols, government support, cooperating with different stakeholders, adequate knowledge about wildlife, resource availability, applying various conflicts control technics e.g., building predators proof livestock bomas, chili bombs, chili blocks, horn, roman candles, high intensity electric torches, and scare crows. In addition, the community learned to opt for alternative sources of income e.g. tourism activities, small businesses, and planting crops that are less attractive to wildlife e.g. sunflowers, onions, ginger, and chilies . On the other hand, the Burunge Wildlife Management Area that managing the corridor area also provides conflict resolution services by deploying a quick respond team of rangers in order to deal with dangerous wildlife e.g., elephants and lion. The WMA also provides dividends to ten villages as a part of income acquired from investment in the WMA. Therefore,

combination of these strategies leads to the community coping and adapting with human-wildlife conflict situation in the corridor area. Compared to the past decade nowadays we observed high community tolerance level led by reporting, complaining, chasing, and scaring away, instead of killing, poisoning and threatening wildlife.

Keywords: Coping, Adaptation, Corridor, Human-wildlife conflict,

Human-Elephant Conflict and Socioeconomic Impacts in Communities Bordering Burigi Chato National Park, Tanzania

Fenrick Msigwa

Tanzania Research and Conservation Organization;
Corresponding author: fenrick.msigwa@trco.or.tz

Abstract

Human-elephant conflict (HEC) poses a significant threat to both rural livelihoods and biodiversity conservation across East Africa. This study examines the nature, causes, impacts, and community responses to HEC and other human-wildlife conflicts in seven villages adjacent to Burigi-Chato National Park in northwestern Tanzania. Using qualitative data from structured focus group discussions, we applied thematic content analysis to assess how conflict with wildlife, particularly elephants, disrupts food security, infrastructure, and daily life. We will share insights into the complex challenges of human-wildlife coexistence, highlighting community experiences, coping strategies, and proposed solutions to mitigate conflicts and strengthen local and institutional responses. The conservation implication of this study is that effective human-wildlife conflict mitigation requires integrating community knowledge, context-specific solutions, and improved institutional support. By addressing local needs and infrastructural gaps and promoting coexistence strategies, conservation efforts can become more inclusive, sustainable, and responsive to the realities on the ground.

Keywords: Human-elephant conflict, Burigi Chato,

Factors influencing the adoption of climate change adaptation strategies in mitigating human-wildlife conflict

Kwaslema Hariohay

Corresponding Author: kwaslema2000@gmail.com

Abstract

This study focuses on the modern and traditional climate change adaptation strategies adopted by the local community at Mwanga in mitigating human-wildlife conflict and also the socio-economic and cultural factors influencing adoption of these strategies. The study was conducted at Kwakoa village and Ngulu village where data was collected from 233 respondent's through questionnaire survey and key informants' interviews from 12th to 24th May 2025. There was gender balance between respondents where by changing farming seasons/crop rotation with 40.6% was the leading observed strategy in the study area, then lcommunity patrols with 27.9% which followed by mixed crop farming at 29.3% and community patrols with 24% as the leading strategies which were individually adopted. About 70.3% respondent influenced by cultural factors where by beliefs

about wildlife protection with 42.4% was the leading factor followed by influence of traditional knowledge with 17.5%. 92.1% of respondents agreed on cultural tolerating strategies. 96.5% of respondents were facing economic difficulties in implementation of adopted climate change strategies while 42.2% of respondents supported the use of affordable traditional methods as the use of climate resilient crops and use of smokes, deterrent materials and the se of animal skin. While socio-economic factors like lack of local market, limited information's, limited support from NGOs and government support. The community shows positive response to the adoption of climate change adaptation strategies in mitigating HWC as long as it considers the local livelihood in cultural and socio-economic aspects. Under the proper support from government and NGOs the smart technology strategies as rain water harvesting, the practical direct cooperation between Tsavo and Mkomazi National Park will help to reduce climate impacts on wildlife and reduce wildlife disturbances.

Keywords: Climate Change, Human-Wildlife Conflict, Adaptation Strategies

Perceived effectiveness of predator-proof bomas in mitigating human-carnivore conflict in Babati district, nothern Tanzania

Kwaslema Hariohay

Corresponding Author: kwaslema2000@gmail.com

Abstract

This study aimed at assessing the perceived effectiveness of predator-proof bomas in mitigating human-carnivore conflict in Babati district, Northern Tanzania. The study adopted a cross-sectional design under a mixed method approach to collect data using purposive and simple random sampling under a household survey questionnaire and key informant interview from 147 respondents including 42 respondents in Minjingu Village, Kakoi Village 44 households, and Olasiti Village 61 households. It was guided by three specific objectives namely; to determine the level of community acceptance of predator-proof bomas as a strategy for reducing human-carnivore conflict, to assess the perceived effectiveness of predator-proof bomas in reducing livestock predation incidents, and to assess the socio-economic factors that influence the adoption of predator-proof bomas. The finding revealed a significant variance in community acceptance (P=0.001), which is strongly correlated with localized carnivore conflict experiences and opinions regarding the effectiveness of the intervention. Adoption decisions were found to be significantly influenced by socioeconomic factors, such as previous livestock losses, herd ownership, education level, and access to material or financial support. The copying mechanisms were more likely to be accepted by households that were directly exposed to predation or that relied more heavily on livestock for financial support. Perceptions of effectiveness, however, varied, with a sizable percentage (25.9%, n=32) of respondents claiming doubt to effectiveness commonly attributed to perceived limitations in areas like community involvement, infrastructure maintenance, and overall quality of implementation. The study, concludes that the success and long-term adoption of predator-proof bomas depend not only on their physical presence but also on culturally appropriate, collaborative methods that prioritize trust-building, observable results, and continuous support. It recommends that there should be community-based awareness campaigns involving peers' educators and local leaders on the importance of predator-proof boma.

Keywords: Effectiveness, Perceived, Predator-proof Boma

Mass Capture and Translocation of Olive Baboons in Geita Forest Reserve in Tanzania

Mikidadi Mtalika

Tanzania Wildlife Research Institute
Corresponding author: mikidadi.mtalika@tawiri.or.tz

Abstract

The Geita Forest Reserve is a home of hundreds of Olive baboons (*Papio anubis*) within Geita Municipal in Geita region. Within two decades, the forest has been replaced with number of human activities for about 50% including gold mining activities from the center and the human settlement and farming from outside which continue to squeeze the forest. However, the baboon population continue to increase in their natural habitat. The expansion of baboon population with decrease in forest reserve, has led to increased human-baboon interaction within and outside the forest. As the community awareness on the health risks and animal welfare concern increase, the need to mitigate the conflict was raised. Therefore, the capture and translocation method were opted as a mitigation measure for the existing human-baboon conflict. The translocation of baboons involved both physical and chemical (immobilization) capture, where some baboons were trapped in the waste disposal cages and then immobilized while others were directly immobilized in open areas outside cages. A combination of Ketamine and Medetomidine at the total dose of 30-150mg and 1-8mg respectively, with Atipamezole reversal of 2-3 times Medetomidine dose was used. The captured baboons were placed in holding cages for two days and then shifted to transfer cages, loaded onto the lorry covered with canvas on top for shade and translocated to Moyowosi Game Reserve. The capture success of 97.6%, with 92% darting accuracy was attained during capture and translocation of 244 baboons. However, baboons are highly intelligent primates to learn from experience and adapt their behavior. This cognitive flexibility allows them to recognize individual humans and cars, and therefore, they adjusted their boldness accordingly to the capture team and environment. Therefore, mass capture of baboons requires also the tactical flexibility of team including vehicles, dressing, baits and darting sharpness.

Keywords: Mass capture, translocation, *Papio anubis*, Tanzania

Understanding the encounters, utilization and Illegal trade of Pangolins in the Mahale-Gombe-Moyowosi Landscape

Nyemo Chilagane

Corresponding author: chilagane.nyemo@trco.or.tz

Abstract

Mahale-Gombe-Moyowosi Landsape is the home of three pangolin species found in Tanzania, yet these elusive mammals remain poorly studied despite facing intense pressures from human exploitation and illegal trade. Understanding how local communities encounter and utilize pangolins, and how trade networks operate across this region, is critical for developing effective conservation strategies. This study conducted to assess pangolin encounters, utilization, illegal trade, and community knowledge across the Mahale-Gombe-Moyowosi Landscape. Using field survey, key informant interviews, and focus

group discussions, the study examines the intersection of human-pangolin interactions, cultural and economic drivers of utilization, and undercover the trade routes that link remote habitats to urban markets and cross-border destinations. Findings reveal that pangolin encounters are concentrated in remote areas, with scales and other body parts highly sought after mostly for traditional medicine. Prices of pangolin scales and other body parts varies considerably. Local communities show varying levels of knowledge whereby some recognize the species' ecological role and legal protection, while others view pangolins primarily as a source of income or important constituent in making traditional medicines, locally known as Kizimba. Trade networks link interior collection points to urban markets and extend into neighboring countries, driven by high regional demand. The study calls for awareness campaigns to shift local attitudes, community-led monitoring to improve reporting, and strengthened enforcement through national and cross-border collaboration.

Keywords: Pangolins, Illegal, Trade, Traditional, Medicine.

Assessment of Human Wildlife Conflicts Effects in the Ngorongoro Conservation Area: A Case Study of Ndutu Conservation Zone

Saipi Moini[1*]; Nangware Kajia Msofe [2,3]

[1]Ngorongoro Conservation Area Authority, P O Box 1, Arusha, Tanzania
[2]Department of Physical and Environmental Science, The Open University of Tanzania, P O Box 23409, Dar es Salaam, Tanzania
[3]School of Environment, Northeast Normal University, Changchun 130024, China; mof742@nenu.edu.cn
* Corresponding author: E-mail: moinisaipi2002@gmail.com

Abstract

Ngorongoro conservation area (NCA) is renowned worldwide for its multiple land use where wildlife coexisting with semi nomadic Maasai pastoralists practicing traditional livestock grazing. This study assessed the effects of human-wildlife conflict (HWC) arose from Ngorongoro conservation area in the area of Ndutu conservation zone. The study used randomly questionnaire survey of 130 households together with statistical secondary data collected from lion project and Ngorongoro ranger post at Ndutu zone. The data were statistically analysed using Statistical Package for Social Sciences (SPSS) version 20 and Microsoft Excel. The study found that human wildlife conflicts including carnivore incidence particulary lions and leopards to livestock raiding and human. The lion's predations normaly occurs early in the morning and late in the evening with most victims being livestock trailing behind the flock when herding back home and those lost in the rangeland, as well as at midnight inside the thorned fenced kraal. These conflicts between human and wildlife are caused by human settlement constructed inside Ndutu forest, competition over resources (including grazing lands and water sources) by human beings, their livestock, and wild animals. The effects of human-wildlife conflicts are extensive, including the destruction of water sources, deforestation, loss of livestocks, damage to infrastructure, and injuries or death for humans. The study recommend enhancement of habitat management by removing livestock's settlement from the Ndutu forest plains and human settlement to be constructed outside or peripheral at eastern side 25Km from Ndutu main road that start at Golini to Makao via Kakesio gate. The rangeland management as a major source of sustainable forage production and utilization for both wild animal and livestock should be emphasized. Lastly, natives in the Ndutu conservation zone need to take precautions to avoid grazing their livestock in areas with a

high degree of predation. The findings of this study demonstrated sustainable conservation and management of the natural resources at Ndutu zone and NCA in large.

Keywords: NCAA, Ndutu conservation zone; Deforestation; Rangeland management

Status of wildlife roadkill in the Ngorongoro Nonservation Area, northern Tanzania

Richard Lyamuya

Tanzania Wildlife Research Institute
Corresponding author: richard.lyamuya@tawiri.or.tz

Abstract

Globally, roads traversing protected areas facilitate the transportation of goods and services. Still, they usually create some negative impacts, such as wildlife roadkill, which has occurred within the Ngorongoro Conservation Area (NCA). An 82 km stretch of gravel main road from Lodoare to Golini was used as the study transect to survey wildlife roadkill in NCA from October 2021 to October 2022 for four consecutive days, twice a day per month for ten months during the wet and dry seasons, to document wildlife roadkill species and their spatial-temporal patterns in the area. The surveys started early in the morning, from 0700 to 1800 hours and employed direct and opportunistic encounter observation methods for data collection. A vehicle with a speed limit of 20km/hr was used during the survey. The results revealed that 85 individual wild animals with encounter rates of 0.016 animals/km belonging to 26 species, including 10 mammalian, 5 reptilian, and 11 bird species, were killed in the area. More birds (69.4%) than mammals (18.8%) and reptiles (11.8%) were found killed in the area. Additionally, the nightjar (*Caprimulgus europaeus;* 30.6%), followed by black rat (*Rattus rattus*; 7.1%) and chameleon (*Chamaeleo chamaeleon*; 3.5%), were the most frequently recorded killed species in the area. Furthermore, wildlife roadkills did not differ significantly between seasons ($p = 0.371$) and time of day (e.g., morning vs. afternoon; $p = 0.652$) but differed significantly between their body size (e.g., small, medium, and large; $p < 0.001$) and habitat types (e.g. grassland, woodland, shrubland, wooded grassland, forest; $p = 0.005$). The study recommends punishments and penalties for overspeeding drivers and installing cameras, speed limits, and signboards along the highway to alert drivers to reduce speed. Also, providing regular education to road users on the impacts of roadkill within the area is critical.

Keywords: Conservation, Habitats, Roads, Vehicles, Wildlife

Can artificial nest boxes offset the loss of tree cavity in human-modified tropical landscapes?: A study along the southern slopes of Mount Kilimanjaro

Charles Luchagula[1], Tamar Kendon[3], Rigobert Joseph[1], Rudolf F. Mremi[2], Hamadi I. Dulle[2]

[1] Tanzania National Parks (TANAPA), Ugalla River National Park, Tanzania
[2]College of African Wildlife Management, Mweka, Tanzania
[3]Zambeze Delta Conservation, Marromeu, Sofala Province, Mozambique
Corresponding author: charles.luchagula@tanzaniaparks.go.tz

Abstract

Our understanding of artificial nest boxes remains controversial and largely derived from temperate regions. Despite high rates of deforestation in the tropics, particularly in Africa, few studies exist on nest box occupancy and these mainly target cavity only birds or protected areas. However, species may respond and adapt differently to local environmental characteristics. In this study, we aimed to examine whether land use type, nest box design, tree size and placement height influence nest box occupancy. We deployed a total of 162 artificial nest boxes (small, medium, and large) in three land use types (conservation in Kilimanjaro National Park, mixed farming, and coffee plantation). The nest boxes were secured on trees of different sizes at breast height (25-100 centimetres) and at different heights (5-10 metres). We found land use type, entrance diameter, and placement height were significant predictors of nest box occupancy, but not tree size. The nest boxes located in the coffee plantation had the highest occupancy (69.8%), as were nest boxes with large entrance diameters (73.3%) and those located at higher heights (61.1%). For any restoration programme aiming to halt or reverse the effects of cavity loss on cavity species, using artificial nest boxes should carefully consider nest box design and placement. If targeting the reversal of the population decline of a particular taxon, species- specific requirements should be taken into account. Accordingly, nest boxes can be applied as a short-term management tool for multiple cavity species. However, we advocate for long-term management practices that will ensure the conservation of trees outside protected areas.

Keywords: Artificial nest boxes, landscapes, Mount Kilimanjaro

Assessing the Dynamics of Agricultural and Settlement Development and its Impact on Mountain Hanang Nature Forest Reserve Using Remote Sensing

Samwel Rashid[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author:samweljohving@gmail.com

Abstract

This study assessed land use and land cover (LULC) changes and their environmental implications in Mountain Hanang Nature Forest Reserve, Manyara Region, from 1994 to 2024. The study aimed to analyze trends in land cover change, quantify forest cover loss and to examine the relationship between forest loss and the expansion of agricultural land and settlements. Landsat satellite imagery from 1994 (Landsat 5 TM), 2004 (Landsat 5 TM), 2014 (Landsat 8 OLI) and 2024 (Landsat 8 OLI) was used for classification, supported by field-based ground truthing and 90 training samples. Supervised classification techniques

were applied to map five land cover classes: forest, cultivated land, settlement, bare land, and water bodies. Data analysis was performed using Google Earth Engine, ArcGIS, and Microsoft Excel. A regression model was used to determine the relationship between agriculture and settlement development on forest loss. The findings show significant land cover changes over the 30-year period. Forest cover declined from 4,955.83 hectares in 1994 to 4,442.12 hectares in 2024, representing a net loss of 10.3%. However, a sharp decline of 25% occurred in the last decade alone (2014–2024). In contrast, cultivated land increased from 1,168.24 ha to 4,531.58 ha, while settlement areas expanded from 264.73 ha to 1,167.82 ha. Regression analysis results revealed that agricultural expansion was the main factor contributing to forest loss, with settlement growth showing a weaker relationship. The study further found that the continued conversion of forest to farmland and built-up areas has resulted in biodiversity loss, habitat fragmentation, increased soil erosion, disrupted water systems, and reduced ecosystem services. The study concludes that human activities, especially small-scale farming driven by maize and sunflower cultivation has intensified land pressure in and around the forest reserve. Without effective intervention, the ecological functions and biodiversity of Mountain Hanang may continue to decline. The study recommends enhanced enforcement of conservation regulations, participatory forest management, sustainable agricultural practices and awareness programs to restore and protect the remaining forest cover.

Keywords: Biodiversity, Deforestation, Ecosystem services, Soil, Satellite

Evaluating Land Use Land Cover in Mramba Forest Reserve Using GIS and Remote Sensing

Gabriel Mayengo[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author: mayengogabriel@gmail.com

Abstract

Understanding land use and land cover (LULC) changes is vital for effective environmental monitoring, resource planning, and the long-term sustainability of protected ecosystems. This study investigates spatial and temporal LULC dynamics in the Mramba Forest Reserve in northern Tanzania using Geographic Information Systems (GIS) and remote sensing over a 30-year period (1995–2025). Dense natural vegetation declined from 30 km² in 1995 to 0.69 km² in 2025, highlighting severe deforestation (a 97% loss). Major drivers include human settlement, agricultural expansion, grazing, charcoal production, logging, and mining. Bare land increased by 70%, and settlements now occupy over 17% of the reserve. The findings emphasize urgent conservation interventions such as law enforcement, community-based forest management, and reforestation. The integration of remote sensing and open-source GIS tools enables cost-effective monitoring and provide a foundation for sustainable land use policies

Keywords: Deforestation, Degradation, Environment, GIS, Land use, Mramba Forest Reserve Remote sensing

Spatial-Temporal Analysis on Forest Cover Change at Kindoroko Catchment Forest Reserve

Gabriel Mayengo[1]

[1]College of African Wildlife Management, Mweka
Corresponding Author: mayengogabriel@gmail.com

Abstract

The forest cover change impairs forest ecosystem functions and threatens the survival of forest-dependent species. This study aimed to show the Kindoroko Catchment Forest cover change for the last three decades (1993-2003, 2004-2014, 2015-2025) and to identify the drivers of change. Three land cover maps were produced for 1995, 2011 and 2024, representing each decade, respectively. The random forest algorithm was used to classify Landsat 5 Thematic Mapper (TM) images, Landsat 7 Enhanced Thematic mapper plus (ETM+) images and Sentinel 2 Surface Reflectance image (S2_SR) into two main land cover types, namely; forest and bare land. The accuracies of 88%, 94% and 95% were obtained with the Kappa Indices of Agreement (KIA) of 0.8, 0.85 and 0.9 for each land cover map respectively. The forest cover percentages were 93.75%, 80.32%, 70.8%; bare land cover percentages were 6.46%, 19.8% and 29.37% for the year 1995, 2011 and 2024 respectively. Overall, the forest cover decreased by 22.952% from 1995 to 2024 and the bare land cover increased by 22.864% from 1995 to 2024, indicating a significant loss of forest cover in Kindoroko Catchment Forest. The decline in forest cover reflects increased human population around the forest area, resulting in land pressure due to increased agricultural expansion, settlement expansion, logging, animal grazing and the occurrence of wild fires. Enforcing the laws, strengthening cooperation with local communities around the forest and promotion of effective conservation policies are crucial for restoring and maintaining the health of Kindoroko Catchment Forest.

Keywords: Conservation, Drivers, Forest, GIS, Remote sensing

Community-Driven Regeneration of Miombo Woodlands and Chimpanzee Corridors in Western Tanzania

Annolbert Mutalemwa

Jane Goodall Institute Tanzania
Email: amutalemwa@janegoodall.or.tz

Abstract

Over the past five years, a unique habitat restoration initiative has emerged in Western Tanzania's chimpanzee landscape. Through the Roots & Shoots (R&S) program under the Jane Goodall Institute's TACARE model, communities from Mtanga, Chankabwimba, Kagongo, and Kiziba villages have voluntarily dedicated 23 hectares of land for natural regeneration. These lands now serve as vital links between village forest reserves, mitigating forest fragmentation and enhancing connectivity within chimpanzee corridors. Following environmental and wildlife awareness campaigns, out-of-school R&S youth groups assumed stewardship over the regenerating lands that different households in the villages offered for regeneration. Rather than conventional planting, this initiative

leveraged Assisted Natural Regeneration (ANR), where areas were protected from disturbance, allowing miombo woodland to recover naturally. The community, in partnership with local government, actively monitors regeneration progress while benefiting from emerging ecosystem services, including soil stability, water retention, and microclimate regulation. Preliminary findings reveal robust vegetative recovery with over 27 native tree species, including key fruit-bearing species for chimpanzees and other wildlife. A 2023 biodiversity survey on Buyombo Hill (6.25 ha) recorded a Shannon-Wiener Index of 2.57 and evenness of 0.79 signs of healthy species diversity. Faunal return includes butterflies, small mammals, and edible mushrooms. These regenerating sites also double as outdoor classrooms for Roots & Shoots youth, promoting environmental learning and local stewardship. The poster illustrates a replicable model of community-led regeneration that strengthens wildlife corridors, supports biodiversity richness, and fosters grassroots ownership in conservation. Insights from the initiative can inform national ecological restoration strategies and contribute to achieving global conservation targets.

Keywords: Biodiversity, Recovery, Chimpanzee, Corridors, Community, Roots & Shoots

The effectiveness of Trash in Trash Out (TITO) policy on waste management practices inside Protected areas: A case of Arusha National Park

Joyce J. Machange[1*], Jane Machange[2], Jumanne Machibya[1]

1. College of African Wildlife Management, Mweka (CAWM)
2. Ifakara Health Institute,
Correspondent author: joycemachange156mm@gmail.com

Abstract

Protected areas, such as Arusha National Park, are crucial for wildlife conservation and tourism. However, waste management in these areas has become more difficult due to the growing number of visitors. To address this, the Tanzania National Parks Authority (TANAPA) introduced the Trash In, Trash Out (TITO) policy, which encourages visitors to take back all the waste they bring into the park. This study aimed to assess how well the TITO policy is working in Arusha National Park by looking at visitor awareness, level of compliance, the impact on waste reduction, and the challenges faced by park staff. Data were collected from 102 visitors through questionnaires using convenience sampling. Quantitative data were analyzed using descriptive statistics and thematic analysis was used for qualitative data. The results showed that 67.3% of visitors were aware of the TITO policy, and most of them followed it by taking their waste with them. However, some challenges were reported, including lack of waste bins (35.3%), difficulty carrying waste over long distances (28%), no waste bags provided (20.6%), and unclear instructions (17%). Park authorities also reported issues such as weak enforcement, low compliance by local tourists, and animals like baboons scattering waste. The study concludes that while the TITO policy has helped reduce waste inside the park, more effort is needed to improve infrastructure, visitor education, and monitoring. Strengthening this policy can help protect the environment and improve the visitor experience in Arusha National Park. The findings from this study are important for park managers and policymakers, as they provide useful insights that can guide improvements in waste management strategies within Tanzania's protected areas.

Keywords: Arusha National Park, Trash In, Trash Out (TITO) policy, visitors, compliance,

Breaking the ceiling of laws on actors' roles in wildlife conservation in Tanzania

Mectrida Kaijage

Sokoine University of Agriculture
Email: meckyb@sua.ac.tz

Abstract

Wildlife conservation laws legally establish various institutions and actors for implementation and enforcement of the laws. However, how legally established actors/institutions function and cooperate to implement and enforce laws within the legal system of the wildlife conservation regime remains unexplored. This study deploys both doctrinal and empirical study methodology to examine the actors and their legally established roles, interactions and potential challenges to understand this conundrum for effective implementation and enforcement of wildlife laws. The study reveals a number of legally established wildlife conservation actors under respective institutions to include training and research institutions, conservators, police, judiciary, ministry responsible for wildlife and associated ministries, parliament, non-governmental organisation, president, community based associations and private individuals. Nevertheless, the laws have not empowered the actors enough to act exhaustively. The study discovers that, wildlife conservation laws are poorly enacted and hardly enable efficient implementation and enforcement. The laws create a myriad of legally connected actors and partners with different mandates, objectives, powers, expertise and procedures across various institutions and merging various actors but lack express legal compulsion and enablers to procure their compulsory cooperation. Every actor focuses on own goals and missions, disregarding the other; despite the connected nature of their roles. Lack of legally compelling cooperation fetters down the strengths in the chain of cooperation among the actors and impede on successful implementation and enforcement of the laws. The study recommends various reforms which empower the actors towards successful implementation and enforcement of wildlife conservation laws.

Keywords: Actors, Laws, Cooperation, Wildlife conservation

Contribution of Community-Based Conservation in Enhancing Wildlife Conservation at Makuyuni Wildlife Park

Naushad Yunus and Julius Vincent Lasway

Department of Wildlife Management, College of African Wildlife Management, Mweka,
P.O Box 3031, Moshi, Tanzania
Corresponding author: naushardy25@gmail.com;

Abstract

Community-based conservation (CBC) has emerged as a vital strategy for promoting wildlife conservation, particularly in regions where biodiversity is increasingly threatened by human activity and environmental pressures. This article examines the effectiveness of CBC initiatives in enhancing wildlife conservation efforts at Makuyuni Wildlife Park in Tanzania. The study highlights how collaborative partnerships between local communities and conservation authorities have led to notable improvements in both ecological preservation

and socio-economic development. Through direct involvement in decision-making, natural resource management, and eco-tourism ventures, local residents have played a key role in protecting iconic wildlife species, such as elephants, lions, and other predators. These conservation outcomes are further reinforced by mechanisms that promote community ownership, environmental education, and the implementation of sustainable resource management practices. Additionally, revenue-sharing models linked to wildlife-based enterprises have provided tangible economic benefits to communities, fostering greater motivation for long-term stewardship of natural resources. Despite these successes, the approach still faces challenges, including persistent human-wildlife conflicts, limited financial resources, and inadequate infrastructure. Addressing these issues requires targeted policy interventions and increased support from governmental and non-governmental stakeholders. The findings from Makuyuni Wildlife Park underscore the critical role of community-led initiatives in fostering durable conservation outcomes. They also demonstrate that integrating local knowledge, values, and livelihoods into conservation strategies not only enhances biodiversity protection but also builds community resilience. Ultimately, the study advocates for the expansion and strengthening of CBC models as a sustainable pathway for conserving wildlife and supporting rural development in Tanzania and beyond.

Keywords: Community-based conservation, Community, Conservation

Exploring local attitudes, beliefs, and knowledge about White-backed Vulture in Northern Tanzania: An implication for conservation and tourism

Nickson P. Mkiramweni

Department of Tourism and Recreation, Sokoine University of Agriculture, P.O. Box 3067, Morogoro
Email: nick_peter@sua.ac.tz

Abstract

This study examined local attitudes, beliefs, and knowledge about the white-backed vulture (*Gyps africanus*) in selected villages of Loliondo Ward, Northern Tanzania. Using a mixed-methods approach that included household surveys and key informant interviews. The study found that respondents generally held positive attitudes toward the species, recognizing its ecological, economic, and cultural significance. Ecologically, all respondents acknowledged the vulture's role in cleaning up the environment. Economically, they appreciated its contribution to supporting tourism. Culturally, some community members reported using vultures to locate lost livestock by observing where the birds gather around carcasses. Although most respondents recognized the species' importance, they also noted its decline, attributing it to factors such as climate change, accidental poisoning, and natural causes. Cultural practices and witchcraft were strongly dismissed as causes. Importantly, there is also growing interest in community participation, especially in conservation efforts and developing related tourism projects. These findings emphasize the importance of involving local communities as active partners in the conservation of White-backed vultures and planning tourism strategies to improve livelihoods through tourism.

Keywords: White-backed vulture, Conservation, Tourism

Diverse motivations underpinning the differential use of Indigenous and Local Knowledge in Chagga homegardens, Tanzania

Sanya, John[a, b,*]; Gross, Milena[a]; Mwampamba, Tuyeni H[c,d].; Krail, Viviane[a]; Pearson, Jasmine[a,e]; Sesabo, Jennifer K[f] and Martín-López; Berta[a]

[a]Social-Ecological Systems Institute, Leuphana University Lüneburg, Universitätsallee 1, 21335 Lüneburg, Germany; [b]College of African Wildlife Management, Mweka, P.O. Box 3031, Moshi, Kilimanjaro,Tanzania; [c]The Nature Conservancy (TNC) - Africa Program, Plot No. 16002 Mawalla Street, 23119 Olasiti, Arusha, Tanzania; [d]Institute for Ecosystems Research and Sustainability Research, National Autonomous University of Mexico, Morelia Campus, Antigua Carretera a Pátzcuaro No.8701, Col. Ex Hacienda de Sán José de la Huerta, C.P. 58190, Morelia, Michoacán, Mexico; [e]School of Global, Urban and Social Studies, Centre for Urban Research, Royal Melbourne Institute of Technology (RMIT) University, Melbourne, Australia
[f] Department of Economics, Mzumbe University, P.O.Box 5, Mzumbe, Morogoro, Tanzania

*Corresponding author: jojusanya@gmail.com

Abstract

Although the integration of Indigenous and local knowledge (ILK) with other knowledge systems in sustainable agroforestry management is growing, significant challenges still exist in combining these knowledge systems. Moreover, the motivation of smallholders to use ILK on their farms remains underexplored. To understand the motivations for applying ILK in different farming practices within the Chagga homegarden—a traditional, pre-colonial farming system—we conducted interviews with 25 Chagga smallholders residing on the slopes of Mount Kilimanjaro, Tanzania. Through hierarchical cluster analysis (HCA) and qualitative content analysis, we found that knowledge system application to homegarden management varied substantially among smallholders and fit into three distinct clusters: 1) those who apply high levels of both ILK and non-ILK (Higher ILK and non-ILK); 2) those who apply low levels of ILK (Lower ILK and non-ILK), and 3) those who mostly only apply ILK and barely non-ILK (Higher ILK). We also found that the implementation of ILK farming practices was motivated by various factors, specifically livelihood supports and inherent moral responsibilities towards nature. These findings reveal that applying knowledge systems other than ILK, i.e., non-ILK, does not necessarily cause ILK erosion. With this research, we gain four lessons to braid ILK with non-ILK for the sustainable management of agroforestry systems: (1) foster the transmission of ILK based on practices and embedded experiential learning, (2) situate the application of non-ILK practices in the social-ecological context, (3) strengthen mutual learning processes that respect cultural identity, and (4) understand ILK as a shared common resource.

Keywords: Braiding knowledge; Chagga; Conservation; Farmers; Traditional food systems

The blessings of Kilimanjaro: perspectives of Tanzanian mountain crews

Kokel Melubo[1], Leslie Hadfield[2], and Festo Mkenda[3]

[1]College of African Wildlife Management, Mweka, Tanzania
[2]Brigham Young University, Provo, USA
[3]Roman archives of the Society of Jesus (the Jesuits), Rome, Italy

Abstract

Mt. Kilimanjaro has fascinated people from all walks of life for over a hundred years. It attracted European explorers, mountaineers, and authors beginning in the mid-19th century and saw a mushrooming mountain climbing industry in mid to late 20th century. The commercialization of high-mountain-climbing tourism coupled with the fact that technical mountaineering gear and experience are not needed to reach Uhuru peak (the highest peak) has led to tens of thousands of climbers ascending the mountain each year. This paper explores the significance of the Kilimanjaro Mountain to the local porters and guides, who perform the most significant tasks on the mountain. The paper highlights the various layers of meaning that mountains hold, including nationalism, masculinity, heroism, and environmentalism. The mountain is seen as a blessing for many porters and guides, providing employment, but also as a source of life and spirituality. It also attracts people from around the world to interact with them. Understanding the perspectives of Kilimanjaro crews offers a comprehensive view of the meaning of mountains and provides insights for mountain tourism.

Keywords: Blessing, Mt. Kilimanjaro, Tourism

Wilderness Medical Emergencies in Key Northern Tanzania's National Parks: Patterns and Management for Sustainable Tourism.

Omary Mvano, MD and Joram Sumawe, RN

ParkDoctor of Tanzania

Abstract

Medical emergencies in Tanzania's Northern Circuit National Parks pose ongoing challenges for wilderness healthcare and sustainable tourism. This study reviewed 546 cases reported between January 2024 and July 2025 across major parks and Karatu lodges to assess occurrence, management, and operational implications. Gastrointestinal illnesses with dehydration were most common (48%), followed by physical injuries from trekking, wildlife encounters, and falls (29%), and severe respiratory distress including altitude-related and infectious conditions (21%). Less frequent presentations included ischemic heart disease (1%) and fatalities (1%). Field observations revealed significant emotional and psychological strain among frontline staff, often compounded by resource limitations and the remote environment, which may indirectly affect care quality and tourist safety. Key recommendations include targeted staff training, provision of portable medical equipment, clear evacuation protocols, and mental health support for field personnel. Strengthening practitioner support systems and emergency preparedness measures can enhance healthcare resilience, reduce morbidity and mortality, and promote safer ecotourism experiences. This study provides practical, field-based insights into wilderness medical emergencies, offering guidance for healthcare providers, park authorities, and tour operators committed to improving safety and sustainability in Tanzania's premier wildlife destinations.

Characterization of bird, reptile, and insect community diversity in constructed wetlands and waste stabilization ponds across Tanzania

Gerubin Liberath Msaki[a,b,*], Karoli Nicholas Njau[a], Anna C. Treydte[c,d], Thomas J. Lyimo[e]

[a]Department of Water Resources, Environmental Science and Engineering (WESE) , The Nelson Mandela African Institution of Science and Technology, P.O. Box 447, Arusha, Tanzania; [b]College of Natural Resources Management and Tourism, Mwalimu Nyerere University of Agriculture and Technology, Musoma Tanzania; [c]Department of Sustainable Agriculture, Biodiversity and Ecosystem Management, School of Life Sciences and Bio-engineering, The Nelson Mandela African Institution of Science and Technology, P.O. Box 447, Arusha, Tanzania; [d]Department of Physical Geography, Stockholm University, Stockholm, Sweden; [e]Department of Molecular Biology and Biotechnology, College of Natural and Applied Sciences University of Dar es Salaam, P.O. Box 35179, Dar es Salaam, Tanzania.

*Corresponding author: msakig@nm-aist.ac.tz, gerubinliberath@gmail.com.

Abstract

Wastewater treatment systems, such as Constructed Wetlands (CWs) and Waste Stabilization Ponds (WSPs), have untapped biodiversity enhancement and development potential. Birds, insects, and reptiles, which are displaced by human development, might find refuge in these ecosystems. However, the lack of a detailed characterization of the biodiversity status of these wastewater treatment systems hinders their widespread adoption. Point counts, direct observations, and camera traps were used to assess bird diversity across five CWs and three WSPs in Tanzania in 2021. For insects and reptiles, pitfall and pan traps were laid along established transects, in addition, direct observations and fishnets were also used to assess the reptiles dwelling within the WSPs. Abundance, Shannon index, Simpson index, Margalef index, and evenness index were the diversity parameters used to analyze the diversity of birds, insects, and reptiles. Our results show that among the studied groups and between WSPs and CWs, birds had high species abundance (n = 1132), richness, Margalef index (D = 4.266), evenness (E = 0.815), Shannon diversity (H = 2.881) and Simpson index (λ =0.903). The abundance and diversity of studied groups differed significantly (P<0.05) between WSPs and CWs. Our study also recorded four reptile species belonging to three orders. Molecular analyses confirmed that insect species belong to nine orders and 13 families, with the order Diptera dominating both CWs and WSPs, followed by Orthoptera, Hymenoptera, and Araneae. We conclude that CW and WSP wastewater treatment systems are important for hosting various populations of birds, reptiles, and insect species.

Key words: Biodiversity, Shannon diversity index, wetlands, wastewater, Hotspots

Freshwater Conservation: A phased approach to designing and management of freshwater community protected and conserved areas in Lake Tanganyika

John Kimaro

Abstract

Lake Tanganyika is one of the world's most biodiverse globally significant freshwater ecosystem supporting over 10 million people through fisheries and related livelihoods. However, escalating threats including overfishing, habitat degradation, and climate change are undermining its ecological integrity and the well-being of dependent communities.

In response, The Nature Conservancy's Lake Tanganyika Program has pioneered a phased, evidence-based framework for establishing and managing freshwater Community Protected and Conserved Areas (CPCAs) along the Tanzanian shores. The objective is to demonstrate how participatory design, legal recognition, and adaptive management can secure fish biodiversity while strengthening community livelihoods. The framework integrates Conservation by Design principles with participatory co-management through Community Management Institutions (CMIs). It is built on triangulated diagnostics stratified socio-economic surveys, participatory GIS mapping, and rapid ecological assessments used to inform SMART conservation targets and guide community-led zoning, boundary delineation, and adaptive monitoring. Legal recognition of CPCAs has been facilitated through multi-level stakeholder workshops, resulting in community by-laws and active enforcement mechanisms. Our Implementation effort is centers on community led zoning schemes, demarcation and delineation, oversight and adaptive monitoring. While the legal recognition of CPCAs was being facilitated through multi-stakeholder workshops at different levels. Triangulated diagnostics including stratified *socio-economic surveys*, *participatory GIS mapping*, and *rapid ecological assessments* with community participation. To date, 23 CPCAs have been established across 10 CMIs in 10 villages around Kipili Archipelago. Early ecological results show signs of fish stock recovery, including increase in Catch Per Unit Effort (CPUE) in some zones, the return of sensitive species and improved benthic habitat conditions. Communities report increased satisfaction and ownership of local fisheries management, indicating strengthened social cohesion and governance. supported by communities' by-laws and active enforcement. Early results are indicating fish production recovery, community satisfactory and ownership their fishing activities within some of the established CPCAs. However, most this information is being collected and analyzed to further inform decision making. These findings demonstrate that, evidence-based, participatory conservation can deliver measurable ecological gains and enhance livelihood resilience. Formal gazettement and broader policy integration are critical next steps for institutionalizing CPCAs. The approach offers scalable lessons for freshwater biodiversity conservation across the African Great Lakes region and beyond.

Restorative Seaweed Aquaculture empowering coastal communities and preserving nature

Ayubu Singoye

Abstract

In Pemba, Zanzibar-Tanzania; seaweed farming is part and parcel to the daily lives of the majority particularly women that empowered them economically as they can access direct funds rather than depending on their men. Despite all the efforts dedicated to the mariculture practices still challenges of obtaining marginal profits from their sweats is left in vain as monopolized seaweed buyers and exporters would always want to impose lowest prices to the seaweed farmers by lying to them that worldwide prices had dropped and hence couldn't buy at higher price which is beneficial to the farmers. Inability of seaweed farmers to transform the raw seaweed into semi-finished products that could be utilized domestically is a main setback encountering them. Due to arising awareness on the significance of using seaweed as food and medicine is becoming at large here in Tanzania; of which that could be the main strategy to uplift the lives of majority engaged in the farming especially women.

Seaweed value chain not only to cosmetics and food alone but a demand for animal feeds and organic manures are very ideally to eradicate poverty and sense of weakness from seaweed farmers in Pemba where more than 90% of seaweed exported from Tanzania is being cultivated/farmed. More investment is urged to be directed in the whole value chain of seaweed from avoiding post-harvest loss as from the farm to the storage areas passing through well-organized drying procedures. Pemba is an island with great potential in Tanzania hence we can maximize its potential with seaweed farming.

Prevalence of Haemoparasites in Rodents and Shrews Trapped from Domestic and Peridomestic Houses in Morogoro Municipality, Tanzania.

Alfred Thadeus Shayo[1]*, Abdul A. Katakweba[2]

[1]Tanzania Wildlife Research Institute (TAWIRI), P.O. Box 661, Arusha, Tanzania
[2]Sokoine University of Agriculture, P.O. Box 3010, Morogoro, Tanzania
*Corresponding author: alfred.shayo@tawiri.or.tz

Abstract

Rodents and shrews are key reservoirs of zoonotic haemoparasites, posing public health risks in human dwellings. This study assessed the prevalence of haemoparasites in small mammals captured from domestic and peridomestic settings in Morogoro Municipality, Tanzania, to evaluate potential zoonotic transmission risks. A total of 200 small mammals, comprising Mastomys natalensis, Rattus rattus, and Crocidura olivieri, were captured using Sherman live traps in households (domestic) and surrounding areas (peridomestic). Blood samples, collected via tail snips, were prepared as Giemsa-stained thin smears and examined microscopically under oil immersion. Prevalence was analyzed by species and environment, with statistical significance tested ($p < 0.05$). We captured 200 small mammals in Morogoro Municipality, including 80 Mastomys natalensis, 70 Rattus rattus, and 50 Crocidura olivieri. The overall haemoparasite prevalence was 32%, with Trypanosoma spp. being the most common, followed by Babesia spp. and Plasmodium spp. Prevalence varied by species: Mastomys natalensis had the highest infection rate at 35% (30% in domestic settings, 40% in peridomestic, p=0.04), followed by Rattus rattus at 22% (18% domestic, 25% peridomestic, p=0.05), and Crocidura olivieri at 20% (15% domestic, 25% peridomestic, p=0.03). Infections were significantly higher in peridomestic areas (36%) than domestic areas (26%), suggesting greater vector exposure outdoors. Ticks (Ixodidae spp.) were linked to Babesia spp., and fleas (Xenopsylla spp.) to Trypanosoma spp., with high vector abundance in Morogoro supporting zoonotic transmission potential. These findings are consistent with a regional study reporting 29.2% haemoparasite prevalence in silvery mole rats. The zoonotic risk is evidenced by documented human trypanosomiasis cases in Tanzania, including a 2019 WHO report noting over 100 annual cases of Trypanosoma brucei rhodesiense in high-risk areas like Kigoma. http://www.who.int/news-room/fact-sheets/detail/trypanosomiasis-human-african-(sleeping-sickness). Rodents and shrews in Morogoro's domestic and peridomestic settings harbor significant haemoparasite infections, with higher prevalence in peridomestic areas, indicating vector-driven zoonotic risks. We recommend enhanced rodent control, vector surveillance, and public awareness to mitigate health impacts.

Keywords: Babesia, Morogoro, Plasmodium, Rodents, Trypanosoma, Zoonotic Risk

From Vector to Mammal: A Cross-System Diagnostic Platform for Real-Time Surveillance of Rift Valley Fever

Obanda Vincent[1*], Mercy Akinyi[2], Edward Kingori[2], Christine Atieno[1], Ruth Nyakundi[2], Dana Mitzel[4]

[1]Department of Wildlife Health and Laboratories, Wildlife Research and Training Institute, Kenya; [2]Kenya Institute of Primate Research; [3]Veterinary Services Department, Kenya Wildlife Service;[4]United States Department of Agriculture, Agricultural Research Services, USA

[*]Corresponding Author: vobanda@wrti.go.ke/vobanda@gmail.com

Abstract

Zoonotic outbreaks often emerge undetected in wildlife, delaying public health response. Diagnostic tools are typically optimized for vectors or domestic animals, leaving wildlife underrepresented in surveillance systems. Here, we report the repurposing of a lateral flow antigen assay—originally developed for Rift Valley Fever virus (RVFV) detection in mosquitoes—for use in mammalian wildlife during an active outbreak in Kenya. We tested 81 individuals from 7 wildlife species and found 43.75% were RVFV antigen-positive using the adapted assay, compared to just 7.41% seropositivity by conventional ELISA. Giraffes showed 100% antigen positivity, while Oryx (76.5%), Impala (66.7%), and Buffalo (53.3%) also demonstrated high acute infection rates. The low concordance between antigen and antibody results (κ = 0.075) indicates early-phase infections, prior to seroconversion. Results were available within 20 minutes in field settings, with no need for laboratory infrastructure. This cross-system diagnostic adaptation demonstrates that repurposed vector assays can provide real-time outbreak intelligence in wildlife. Our approach extends the operational scope of One Health surveillance and establishes wildlife as viable frontline sentinels for emerging zoonoses. By enabling real-time, field-based detection across ecological domains, this strategy enhances anticipatory responses to outbreak threats at the wildlife–livestock–human interface.

Keywords: Outbreak, Vector, Wildlife, Zoonotic

Vector on the Move: Climate and Infrastructure Drive the Spread of Anopheles stephensi in Kenya

Vincent Obanda[1*], Benard Agwanda[2], Tim. J. L Wango[3,4], Olivia W. Lwande[5]

[1]Department of Wildlife Health and Laboratories, Wildlife Research and Training Institute, Kenya: [2]Zoology Department, National Museums of Kenya; [3]Department of Veterinary Anatomy and Animal Physiology, University of Nairobi, Kenya; [4]Conservation Biology Department, Kenya Institute of Primate Research

[5]Umeå Centre for Microbial Research, Umeå University, Umeå, Sweden

[*]Corresponding author: vobanda@gmail.com/vobanda@wrti.go.ke

Abstract

The invasion of *Anopheles stephensi* into Kenya threatens malaria control and potentially introduces arbovirus transmission risks, including O'nyong'nyong virus (ONNV). This urban-adapted, thermally resilient vector, endemic to South Asia and the Middle East, was first detected in Marsabit County (2022) and has since expanded across northern Kenya's arid regions. We integrated national entomological surveillance data (2022–2025) with geospatial predictors to model current and future *An. stephensi* distribution using complementary approaches: Geographically Weighted Regression (GWR)

with presence–absence data and Mahalanobis Distance modeling with presence-only data. Anthropogenic, topographic, climatic, and vegetation variables were analyzed under incremental warming scenarios (+1°C to +5°C). GWR predicted the highest spatial risk in northern counties (Marsabit, Mandera, Isiolo) and lowest risk in southern regions. However, Mahalanobis analysis identified ecologically suitable conditions in southern counties (Kajiado, Makueni) similar to northern high-risk areas. Progressive warming scenarios predict a decline in habitat suitability accompanied by geographic shifts toward central Kenya; however, urban environments may retain suitability through localized thermal effects. *An. stephensi* exhibits broad ecological plasticity, enabling persistence in urban and peri-urban environments. Dispersion in northern Kenya appears to be facilitated by vehicles, as its presence parallels major road networks. Its southerly dispersal into central regions of Kenya is likely hampered by relatively cooler conditions, acting as an ecological barrier.

Keywords: *Anopheles stephensi, Road network, Vector*

Wildlife diversity in the Selous-Nyerere ecosystem: Insights from camera trap surveys

Charlotte Searle[1]

[1]University of Oxford
Corresponding Author: charlotte.searle@biology.ox.ac.uk

Abstract

The Selous-Nyerere ecosystem in southern Tanzania is recognised as one of Africa's most important wilderness areas. From 2020 to 2025, the University of Oxford's Wildlife Conservation Research Unit (WildCRU), Lion Landscapes, the Tanzania Wildlife Research Institute (TAWIRI), Tanzania Wildlife Management Authority (TAWA), Tanzania National Parks Authority (TANAPA), and Frankfurt Zoological Society (FZS) have carried out a series of camera trap surveys in Selous Game Reserve and Nyerere National Park as part of a collaborative large carnivore assessment. Here, we present some of the key findings of these surveys, including mammal diversity, insights into distributions and behaviour, and noteworthy records and absences. Highlights include the first record of a rare strawberry leopard outside India or South Africa, evidence that suggests cheetah have been extirpated from the landscape, and records of rare colour morphs of Meller's mongoose, bushy-tailed mongoose, and genet (spp.).

Keywords: Biodiversity, Camera traps, Distributions, Inventory, Species, Wildlife

Dominance rank and reproductive failure in female baboons at Gombe National Park.

D. Anthony Collins, Z. Kabalika, S.H. Rukamata, F.J. Mkukwe, J.E. Nyirenda, N.J. Rubasha, S.J. Kikwale & I.S. Sabwebwe

Gombe Stream Research Centre, The Jane Goodall Institute, Box 1182, Kigoma, Tanzania.
Corresponding author:

Abstract

In many mammal species, dominant females suppress or inhibit the breeding of their subordinates, or reduce the reproductive success of low-rankers. Prior studies at Gombe showed that higher ranking females achieved shorter interbirth intervals, improved infant survival, and earlier maturation of their daughters, compared with low-rankers, consistent with patterns among many primates where high rank brings reproductive advantage. However, there was one unexpected pattern, which was that higher-ranking females had higher probability of miscarriage, and some individuals suffered reduced fertility. These were interpreted as reproductive costs that can limit the payoff of high rank, and might provide a countervailing selection against aggressive competition among females. More recent reproductive histories of females in eight groups of baboons at Gombe will be used to assess the incidence of reproductive failure (miscarriage, delayed maturation, low birthrate, and sterility) in relation to dominance rank, to confirm whether high-rankers are indeed more prone to these risks. If confirmed, this pattern will be discussed in terms of stress and other factors known to affect female reproduction.

Keywords: Baboons, Behaviour, Reproduction

Bird community response to multiple stressors along urbanization gradient

Frank P. Lyimo*[,1], and Julius V. Lasway[1]

[1] Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania
Corresponding Author *: lymofrank437@gmail.com

Abstract

Urbanization is a major driver of ecological change, reshaping biodiversity patterns and imposing multiple stressors on wildlife communities. This study investigated bird community responses across a rural, peri-urban, urban gradient, focusing on species abundance, diversity, and environmental stressors. A total of 465 individual birds representing 38 species were recorded across the three habitat types. Urban areas showed the highest abundance (53% of total birds), but this was primarily due to the dominance of a few generalist species such as the House Sparrow *(Passer domesticus*) and Little Swift (*Apus affinis*). In contrast, rural areas supported a greater number of habitat specialists, such as the Hamerkop (*Scopus umbretta*) and Grey-headed Kingfisher (*Halcyon leucocephala*), though total abundance was lower. The Shannon-Wiener Diversity Index (H' = 2.75) indicated moderate diversity overall; however, evenness was low in urban sites due to species dominance, reflecting biotic homogenization. Additionally, the study quantified environmental stressors, revealing that birds in urban areas were exposed to

a significantly higher average number of stressors (mean = 2.63) compared to peri-urban (1.01) and rural (0.86) areas. These results confirm that urbanization significantly impacts bird abundance, reduces true diversity, and intensifies environmental stress. The findings underscore the need for biodiversity-sensitive urban planning, including green infrastructure, habitat restoration, and the protection of peri-urban ecological buffers.

Keywords: Birds, Diversity, Habitats, Peri-urban, Stressors

Influence of the elevation on the land snails species richness, abundance and diversity in the afro montane forest of mount Kilimanjaro

Glory Daniel[1] and Tito Lanoy

[1]College of African Wildlife Management – Mweka, Po Box 3031, Kibosho, Tanzania
Corresponding Author:

Abstract

Understanding change in land snails along elevation gradient is very crucial for species conservation in changing world. This study aimed at assessing influence of elevation on land snails richness, abundance and diversity on the southern slope of Mount Kilimanjaro. The land snails data were collected during wet season on 24 plots which were established systematic randomly along the 6 sites whereby each site represents stratum from 1800 to 3000 meters of elevation. Difficulty in getting land snail expertise and resources that clearly explain how to identify land snails results to the failure in identification of the obtained land snails hence the obtained species were grouped into 13 morpho species of 968 species along the whole elevation. Data collected was organized in excel and analyzed using R statistical software, where for the species richness and abundance Generalized Linear Model was used to analyse and Z-test was used to test the data, while for the diversity Linear Model was used to analyse and t- test was used to test the data. Results obtained for the species richness along elevation were ($p < 0.0001$, Z-value = 5.042, Degree of freedom =23 and coefficient of determinant =40%), for abundance ($p < 0.0001$, Z-value =24.02, Degree of freedom =23 and coefficient of determinant =60%), for diversity ($p < 0.0001$, t-value = 3.915, Degree of freedom =23 and coefficient of determinant = 41%). This study concluded that there is a significance influence of the elevation on the land snails species richness, abundance and diversity. This study suggest that further research is needed to specifically investigate the impact of these drivers on land snail populations, also to include dry season and the other side of the mountain leeward side

Keywords: Conservation, Elevation, Kilimanjaro, Richness, Snails

Results and lessons learned from a lion survey in the Ngorongoro Conservation Area using Spatial Capture-Recapture

Dennis Peshut, Roimen Lelya, Ndolok Kilitya, Ingela Jansson

Corresponding Author: ingela.jansson@slu.se

Abstract

The Ngorongoro Conservation Area (NCA) is a vital habitat for lions in Tanzania. It comprises the Ngorongoro Crater—whose high-density lion population has been monitored for over 60 years—and Ndutu, where resident lions have been studied for 15 years. In both areas, every individual is recognized and followed throughout its lifespan. Despite intensive monitoring in these core areas, estimating lion abundance and density across the entire NCA remains challenging: much of the landscape is inaccessible to vehicles, and lions outside study areas are few and very shy. Until now, population estimates beyond the core zones have been educated guesses. To address this, with support from the Lion Recovery Fund, we conducted a survey using a Spatial Capture–Recapture (SCR) framework that allows the use of diverse search methods so long as search effort is quantified and all observed lions are identified. Our goal was to see as many lions as possible, as many times as possible. The objectives were to (1) produce baseline and comparative estimates of lion density and abundance across the NCA, (2) establish an annual survey framework for population trends, and (3) compare SCR estimates with the total counts of the Crater lions. While the overall survey was successful, we encountered several challenges including individual identification of elusive lions in terrain with limited access, and operations of camera-traps for safety and for capturing identifiable lion features. The survey required close coordination of efforts, time-demanding lion identification process, and analytical skills to run the estimation. This work and lessons learned demonstrate the utility—and highlights the challenges—of SCR methods for estimating lion populations in complex, partly inaccessible landscapes and offers practical insights for lion conservation and management in the NCA and similar ecosystems.

Keywords: Abundance, Density, Monitoring, Population trends, SCR estimates

Behind the laugh: Core research topics and methods of the Ngorongoro Hyena Project

Herieth Mkomwa

Corresponding Author: mkomwaherieth202@gmail.com

Abstract

Spotted hyenas (*Crocuta crocuta*) are Africa's most socially complex, abundant and ecologically important carnivores. Living in large, female-dominated clans, spotted hyenas display extraordinary features including dominance hierarchies and alliance formation, as well as unique morphological peculiarities such as the 'pseudopenis' in females. The Ngorongoro Hyena Project is a 30-year research program investigating the behavior, life history, and social and ecological dynamics of spotted hyenas using data from all eight resident clans inhabiting Tanzania's iconic Ngorongoro Crater. Our research framework is built upon three core components: individual identification, behavioural monitoring, and genetic sampling. I will explain (a) that we identify each hyena by its unique spot pattern

and other distinct physical characteristics (b) that we record behaviours of hyenas during social and sexual interactions on video which we later transcribe into sequences of acts and signals using an extensive ethogram (c) how we collect genetic material non-invasively to examine paternity and reproductive success of our study animals and (d) that we developed an R package to extract data from the large database for our statistical analyses. I will then outline how our comprehensive methodological and pluridisciplinary scientific approach allow us to investigate complex fundamental questions in behavioural ecology and evolutionary biology regarding the drivers of female and male mate choice, dispersal and social evolution, as well as applied questions of general relevance to conservation on human-wildlife coexistence, inbreeding, gene flow and population resilience. Our findings underscore the scientific value and the importance to support such long-term, individual-based research. Ultimately, I will show that the laughter of hyenas offers more than eerie night time soundscapes; it opens a window into understanding nature's most unique social systems.

Keywords: Behaviour, Genetic sampling, Identification, Monitoring, Spotted hyenas.

Feeding Ecology and Habitat Use of Pangolins in Tanzania's Wildlife Corridors

Hillary Mrosso[1]

[1]Tanzania Research and Conservation Organization
Corresponding Author: mrossotm@gmail.com

Abstract

Pangolins are among the most elusive and threatened mammals in Africa, facing growing risks from habitat degradation, landscape fragmentation, and illegal wildlife trade. In Tanzania, despite their ecological importance and protected status, there is limited scientific information about their habitat preferences and feeding behavior—especially outside protected areas. This study investigates the feeding ecology and habitat use of pangolins across three key wildlife corridors: Nyerere–Selous–Udzungwa, Kwakuchinja, and Amani–Nilo. The research involved systematic transect walks to locate suitable pangolin habitats and identify environmental conditions supporting their presence. In addition, ant and termite colony surveys were conducted along these transects to understand the availability of food resources and their potential influence on pangolin distribution. This dual approach aims to uncover links between food abundance and habitat selection, which are crucial for informing targeted conservation efforts. Focusing on these under-studied ecological aspects, the study highlights the broader significance of wildlife corridors not only as movement pathways but also as functional habitats that sustain species like pangolins. The research contributes important baseline data that can guide conservation planning, particularly in areas outside formal protection. Moreover, it supports ongoing efforts to develop and implement a national corridor policy that ensures the long-term connectivity of Tanzania's landscapes. Understanding where pangolins are likely to occur—and why—can help prioritize areas for protection and restoration. This work lays the foundation for informed conservation actions that support both pangolin survival and the ecological integrity of wildlife corridors, benefiting a wide range of species that rely on connected natural habitats.

Keywords: Conservation planning, Feeding ecology, Habitat suitability, Pangolins, Wildlife corridors

Species distribution patterns and environmental variability in Mkomazi National Park: A case of oryx and eland

John Erasto Sanare[1]*, Rahabu Makongoro1, Cecilia Leweri1, Loyce Majige1, Machoke Mwita1, Wickson Kibasa1, Hamza Kija, Devolent Mtui1,

Tanzania Wildlife Research Institute (TAWIRI), P.O. Box 661, Arusha, Tanzania.
*Correspondence: e-mail.com johnsanare31@gmail.com, Phone: +255 744854765

Abstract

Understanding how wildlife species respond to environmental variability is key for effective conservation. Changes in factors like rainfall and habitat availability can significantly impact animal populations, thus affecting their spatial -temporal distribution and behavior. This study examined distribution patterns of East African oryx (Oryx beisa) and common eland (Taurotragus oryx) in Mkomazi National Park, Tanzania. Presence/absence data were collected across six spatial blocks in 2017 and 2024 and analysed alongside annual rainfall and anthropogenic activities to explore potential ecological drivers of the oryx and eland distributions. More Oryx were recorded in blocks in 2024, suggesting possible range expansion or stability. However, a chi-square test showed this change was not statistically significant ($\chi^2 = 0.375$, $p = 0.540$). Logistic regression also found no strong relationship between species occurrence and rainfall, likely due to the small sample size. Spatial mapping revealed localized shifts in species presence, pointing to the potential influence of anthropogenic factors. While exploring, these findings highlight the value of repeatable, spatially structured surveys for detecting early ecological patterns. Continued long-term monitoring is recommended to better understand species responses to environmental change and to support adaptive conservation strategies in East African landscapes.

Keywords: Anthropogenic, Eland, Oryx, Rainfall, Species

Demography; a better explanation for the Serengeti elephant population growth.

Juma Minya[1]

[1]Tanzania National Parks: Corresponding Author: jjoseph0079@gmail.com

Abstract

Age and sex are important demographic indicators of wildlife population as they influence population dynamics and signal extinction risk. Elephant monitoring and population surveys are expensive; infrequently done and often omit age and sex data, making it difficult to predict future population trends. While most of the elephant populations across Africa are declining, some populations are steadily increasing indicating success in conservation efforts. Previous studies have suggested that the observed population growth in the Serengeti – Mara ecosystem over the past 20 - 30 years is likely to be the combined result of high in situ population growth, immigration from the Kenya side of the ecosystem, and improved detection during surveys but the relative contribution of these factors were unclear. We conducted Rapid Demographic Assessment (RDA) to understand the age and sex structure of the elephants and determined the effect of age on the log odds of observing a male elephant, via established road transects in the dry seasons of 2017 and 2023 in Serengeti. Population age structure was estimated by classifying

individuals into eight age – class – categories based on visual estimates. Cow – calf groups were the most common association (64%) while calves were the dominant age category (45%). The age – class – specific sex ratio was 0.5 for young individuals (<10 years) but highly skewed for adults in favour of females. Overall, the effect of age on the log odds of observing a male elephant were negative and highly significant (slope = -0.037303, z = 0.006023, $p < 0.0001$). Due to insufficient sample size, it was hard to understand if there are sex drivers behind trunk amputation. Our results suggest that a high reproductive rate is driving the observed increase, and that the study area is an important elephant breeding area.

Keywords: Conservation, Dynamics, Population, Elephant

Community Perspectives and Illegal Hunting of Masai Giraffe in Muyowosi Game Reserve, Tanzania

Leon Vitalis[1]

[1]Tanzania Research and Conservation Organization
Corresponding Author: leon.hermenegild@trco.or.tz

Abstract

Masai giraffe (Giraffa tippelskirchi), is an endangered species with alarming population declines due to habitat loss, illegal hunting and human-wildlife conflict. In Tanzania, while recent trends suggest stabilization in some ecosystems, the western Tanzania ecosystems continue to face severe threats diagnosed from the decline of giraffe populations. To effectively address the challenges of illegal hunting and trade of giraffe derivatives, it is essential to understand the underlying drivers within local communities. In this study, we began by determining key informants, then applied chain referral methods to investigate human-giraffe interactions and the dynamics surrounding giraffe use and trade among communities near Muyowosi Game Reserve in western Tanzania. The insights gained aim to inform targeted, community-centred strategies for the long-term conservation of giraffes.

Keywords: Community, Conservation, Masai giraffe, Wildlife, Hunting

Impact of livestock grazing intensity on beetle species assemblages at Ngorongoro Conservation Area

Loning'o K. Kileto*,[1], Julius V. Lasway[1]

[1]Department of Wildlife Management, College of African Wildlife Management, Mweka, P.O Box 3031, Moshi, Tanzania
Corresponding author: kiletolaizer53@gmail.com

Abstract

Livestock grazing is a dominant land-use practice in the Ngorongoro Conservation Area (NCA), Tanzania, where pastoralism and wildlife conservation intersect. While large mammal responses to grazing have been widely studied, less attention has been paid to invertebrate communities, particularly beetles, which play vital roles in ecosystem functioning through decomposition, nutrient cycling, soil aeration, and food web dynamics. This study examines the impact of livestock grazing intensity on beetle assemblage

abundance, diversity, and richness across a gradient of grazing pressures. Beetles sampled using consistent pitfall traps deployed in replicated plots across different grazing and also the scan searching techniques, which involve randomly walking with the plot to capture and record the species of beetle. Environmental variables such as vegetation cover, Temperature, and Elevation were also recorded to assess habitat potential and correlates of beetle community shifts. A total of 230 beetle individuals representing 2 families and 23 species were identified. The low grazing has high species abundance 109 species, moderate grazing has 83 species and high grazing level has 38 species, species diversity low grazing H=2.4, moderate H=1.9, and high-level H= 0.9 from the Shannon winner index and species richness the low has high richness 9 species and the other two level has 8 species. Statistical analyses including ANOVA, generalized linear model, and linear model revealed significant differences in beetle abundance, richness, and diversity across grazing intensities. High grazing intensity was associated with reduced species abundance, richness, and diversity, contrast to moderate grazing sites supported the highest abundance and diversity, providing a heterogeneity habitat to the specific species tax of beetles, Low grazing areas with unique species, exhibited high overall abundance due to food availability and vegetation cover. These findings underscore the sensitivity of beetle assemblages to grazing pressure and climax their value as bioindicators of ecological condition. Further research should be conducted across different seasons and with a broader range of environmental variables to better understand the long-term effects of grazing on beetle communities and ecosystem health.

Keywords: Abundance, Beetle, Grazing, Livestock, Richness

Spatial and Temporal Dynamics of Illegal Bushmeat Hunting in the Serengeti Ecosystem

Mariam Michael[1]

[1]Tanzania National Parks
Corresponding Author: mariamrichard70@gmail.com

Abstract

Illegal bushmeat hunting remains a major global threat to biodiversity, with wire snares among the most prevalent and destructive hunting methods. The Serengeti ecosystem faces similar challenges, yet large-scale, data-driven investigations into the spatial and temporal dynamics of illegal bushmeat hunting remain limited. This study aimed to analyse temporal trends in snaring and species-specific mortality, predict snaring hotspots over time and species-specific mortality hotspots, and identity environmental and anthropogenic variables influencing snaring and species-specific mortality hotspots. We obtained snare removal and wildlife mortality data collected between 2018 and 2024 from the Grumeti Fund EarthRanger system and the Serengeti de-snaring team. We used trend analyses to examine temporal trends in snaring and wildlife mortality. Kruskal–Wallis test used to assess significant differences in snaring and wildlife mortality across years, months, and various species, followed by Dunn's post-hoc tests for pairwise comparisons. Finally, we employed MaxEnt modeling to predict snaring hotspots over time and species-specific mortality hotspots, as well as to identify the environmental and anthropogenic variables influencing those hotspots. During the study period, our findings indicated a total of 87,027 active snare removals and 1,967 wildlife mortalities directly attributed to snaring. Snaring intensity fluctuated significantly across both annual and

monthly scales ($p < 0.05$). Wildlife mortality also showed significant variation between species ($p < 0.001$), with large mammals and migratory species, particularly wildebeest, being the most affected ($p < 0.05$). Our model consistently revealed high snaring hotspots in northern and western zones of Serengeti National Park and Grumeti Game Reserve, as well as throughout central regions of Ikorongo Game Reserve and Ikona Wildlife Management Area. Elevation, rainfall, and proximity to buildings were the most variables influencing snaring and species-specific mortality hotspots. We conclude that snaring remains a significant and persistent threat to wildlife in the ecosystem, with marked spatial and temporal variation in intensity and species-specific mortality. To effectively mitigate snaring, conservation efforts should prioritize high-risk zones through targeted patrols, community engagement near human settlements, and species-specific protection during peak risk periods.

Keywords: Bushmeat, hunting, Snaring, wildlife mortality, Serengeti Ecosystem

Rubondo Island National Park: Overlooked World's Largest Tropical Lake Island Protected Area in Tanzania.

Robert Mushi

Tanzania National Parks
Corresponding Author: robert.mushi@tanzaniaparks.go.tz

Abstract

Rubondo Island National Park in Tanzania is a biodiverse conservation area situated within the complex Lake Victoria Regional Mosaic. While other islands have been modified by human activities, Rubondo Island remains a unique model for island conservation, characterized by diverse ecosystems and endangered species like introduced chimpanzees. This makes it an ideal location for research on wildlife behaviour, species conservation, and human-wildlife coexistence. Despite this, the island is underrepresented in conservation literature with existing studies being limited in scope. This review addresses this gap by undertaking a comparison analysis of lake island sizes and synthesizing available research. Literature on Rubondo Island was searched in academic databases such as Google Scholar, Web of Science, and Scopus using relevant and specific keywords related to Rubondo Island and its biodiversity. Among the world's lake islands, Rubondo is distinguished as the largest fully protected tropical lake island, free from human habitation or consumptive activities. The island hosts key native species such as sitatunga, bushbuck, vervet monkey, hippopotamus, otters, and marsh mongoose, avian, amphibians and reptiles. Some of the introduced species, including elephant, giraffe, chimpanzee, colobus monkey, suni antelope, have been successfully integrated into the ecosystem. The island is an Important Bird Area (IBA), hosting over 194 bird species, and is home to 19 reptiles and 11 amphibian species, contributing to ecosystem balance. Its primary lowland Congolese forest is the only intact remnant of this forest type in the Lake Victoria and western Tanzania region. Rubondo also protects vital fish breeding grounds critical for sustaining native and endangered fish populations. Historically inhabited by the Banyarubondo subgroup of the Zinza people, the island retains cultural and spiritual landmarks that warrant preservation. Future research should focus on chimpanzee behaviour, elephant ecosystem roles, avian and fish species updates, vegetation surveys, herpetofauna diversity, and crocodile adaptations to environmental changes.

Keywords: Biodiversity, Hotspot, Lake Victoria, Rubondo island, Species

Thomson's Gazelles' movement and habitat selection shape infection risk in the Serengeti ecosystem

Sabuni, P.L.[1], Morrison, T. A.[2], Sarakikya, J.[1], & Donaldson, J. E.[3]

[1]Tanzanian Centre for Research Cooperation, Merlino Road, Arusha, TZ
[2]School of Biodiversity, Animal Health & Comparative Medicine, University of Glasgow, UK
[3]Nicholas School of the Environment, Duke University, Durham, US
Corresponding author: sabunipeace27@gmail.com

Abstract

In seasonal systems, animals often move large distances to acquire resources. These seasonal movements have important implications for disease dynamics, potentially increasing or decreasing exposure to infectious disease. For example, movement into new areas may expose animal hosts to new pathogens. Conversely, dispersal could enable animals to escape areas of high contamination, particularly in group-living species. Thomson's gazelles (*Eudorcas thomsonii*) in Serengeti live in large herds and seek short-grass habitats rich in nutrients, often making long-distance seasonal movements to track high-quality food. These movements help satisfy their energy needs, but how space use impacts Thomson's gazelles' exposure to infective disease is largely unknown. Here, we explore how (1) movement patterns and (2) habitat selection affect parasite load in Thomson's gazelles in the Serengeti. We fitted GPS collars to 10 adult males to monitor their spatial movements and habitat preferences. Fecal samples collected twice a month from each collared animal and used to assess egg density of gastrointestinal parasites (parasite load). Each sample was GPS-tagged to relate parasite load with movement and habitat metrics (e.g., grass height, grass greenness, previous months' rainfall, time since last fire). Preliminary results suggest (1) parasite burden decreased as individuals moved more quickly and (2) gazelles found in recently burned landscapes had lower parasite loads than those that grazed in unburned areas. Our results suggest that increased movement might reduce parasite load, potentially because movement enables escape from highly contaminated areas. Moreover, gazelles that successfully located burned patches seemed to carry fewer parasites than unburned areas, fitting previously work that shows fire helps to decontaminate grasslands from parasites. Given the health impacts of parasites, these findings emphasize the importance of maintaining connectivity and heterogeneous landscapes as means of reducing disease in large migratory herbivores.

Key words: Gastrointestinal nematodes, Habitat, Movement Ecology, Thomson gazelle.

Avifauna Status of the Ngorongoro Conservation Area: Preliminary Findings

Jasson John[1], Gregory Mtega[2], Tumaini Oleleteyo[2], Peter Chacha[2]

[1]Department of Zoology and Wildlife Conservation, University of Dar es Salaam, Dar es Salaam
[2]Department of Wildlife Management and Research, Ngorongoro Conservation Area, Arusha
Corresponding author: wildornithology@udsm.ac.tz

Abstract

The Ngorongoro Conservation Area (NCA) is an important Key Biodiversity Area which falls within the Ngorongoro Lengai UNESCO Global Geopark. The area is among

the top-visited area for wildlife safaris in Tanzania. Although the avifauna components, especially the large birds, entice the attention of tourists on wildlife safaris, their abundance and distribution remain undocumented. The ongoing Bird Project in NCA hopes to establish the avifaunal status in terms of the likelihood of species encounter in all major habitats. This poster presents information on the field survey conducted in March-April 2025 covering plains, montane grasslands and forests, Acacia woodlands and lakes. To count birds, we used census points spaced between 2 to 4 km, and strategic locations especially for lakes and breeding areas. Additionally, all terrestrial large birds were also recorded between the census points. In total, we registered 280 species. Although most Palearctic migrants had already left, we counted few individuals of White Stork, Abdim's Stork, Barn Swallow, Eurasian Roller, Common Buzzard and Eurasian Swift. The globally threatened species recorded included Rüppell's Vulture, White-backed Vulture, White-headed Vulture, Hooded Vulture, Lappet-faced Vulture, Secretarybird, Grey Crowned Crane, Martial Eagle, Bateleur and Tawny Eagle. The most and least frequently encountered large terrestrial birds were Kori Bustard and the Secretarybird, respectively. Malanja depression had the largest group of Egyptian goose at around 500 individuals. Rüppell's Vulture was breeding in large numbers at Olkarien. The range restricted Moorland Chat and Jackson's Widowbird were common in montane grassland, and males of the latter were in breeding plumage displaying at a lek. Verreaux's Eagle-owl and Grey-breasted Spurfowl (Tanzanian endemic) were only sighted at Ndutu area. In addition to repeated surveys, future visits will include the Pololeti Game Reserve. We however recommend that breeding sites for the globally threatened vultures should be given special attention.

Keywords: Birds, Population, Distribution, Ngorongoro, Palearctic migrants

Status, Distribution, and Conservation Challenges of the Southern Patas Monkey in the Serengeti Ecosystem

Lameck Jacob[1], Stanslaus B. Mwampeta[1], David Sulle[2], Gabriel Mayengo[3], Janemary Ntalwila[4], Omary Gumbo[1], Peter Kiango[1], Idrissa Chuma[2], Victoria Mkessa[5] and George G. Lohay[1*]

[1]Grumeti Fund, Mugumu, Tanzania; [2]Tanzania National Parks, Arusha, Tanzania; [3]College of African Wildlife Management, Mweka, Moshi, Tanzania; [4]Tanzania Wildlife Research Institute, Arusha, Tanzania; [5]The University of Oxford, London, UK

*Corresponding author: Georgel@grumetifund.org

Abstract

The Southern Patas Monkey (*Erythrocebus baumstarki*), classified as Critically Endangered and among the world's 25 most endangered primates, is potentially Africa's most threatened monkey species. Once widespread across southern Kenya and northern Tanzania, its range has declined by over 85%, with fewer than 100 mature individuals remaining, now confined to the western Serengeti National Park. This species has been extirpated from Kenya primarily due to habitat loss caused by agriculture, charcoal production, livestock grazing, and increased poaching. In response to this crisis, the Grumeti Fund, in collaboration with TAWIRI, TANAPA, CAWM-Mweka, and the Eastern Africa Primate Diversity and Conservation Program, initiated a research project to assess the distribution, population status, and threats to the Southern Patas Monkey. This project aims to develop a comprehensive conservation strategy. Recent surveys conducted from May to October 2025 confirmed three sightings of groups containing 14, 12, and 7

individuals, respectively, in the Mbalageti area. These monkeys inhabit open *Vachellia drepanolobium* and *Balanites aegyptiaca* savanna woodlands. However, extensive signs of poaching were documented in these areas. These findings underscore the urgent need for targeted conservation interventions, including systematic monitoring, behavioral and ecological studies. It is essential to strengthen law enforcement, manage fires, and protect key woodland habitats to prevent the extinction of *E. baumstarki* and to maintain the ecological integrity of the western Serengeti landscape.

Keywords: Southern Patas Monkey, *Erythrocebus baumstarki, Vachellia drepanolobium* , critically endangered species

Understanding Dietary Interaction Between Chimps and Baboons of Gombe National Park

Zabibu Kabalika

Jane Goodall Institute Tanzania
Corresponding Author: kabalikazabibu@yahoo.com

Abstract

Animal's diet plays a crucial role in shaping nature of the ecosystem. It provides insights on the resource use and interaction patterns of animals sharing a common resource, such as periods of diet convergence and diet partitioning. Gombe is a unique ecosystem harbouring more than five primate species, all sharing a single resource of Gombe rainforest. However, little is known about dietary interaction patterns of the primates of Gombe national park. Using chimps and baboons, this study will apply a ten-year life history data on diet preference, group interaction and habitat use to draw inferences on the seasonal dietary interaction and preferences of these two prominent species across the Gombe ecosystem. Results from this study will help to understand species co-existence and to quantify degree and nature of interaction between the two species (e.g. competition or facilitation).

Keywords: Competition, Diet, Primates

ABSTRACT FOR SYMPOSIUM

SYMPOSIUM 1: Organizers - Grumeti Fund

Impact of Conservation Fencing on Large Mammals in an African Savanna Ecosystem

Victor Kakengi Michael H. Kimaro1, Kristen Denninger Snyder Noel L. Mbise, Exavery A. Kigosi Victor A. Kakengi, Eblate E. Mjingo Han Olff

Abstract

Protected Area (PA) boundaries are frequently subject to human-wildlife conflict, especially in areas with high human activity. Fencing can reduce these conflicts by restricting unwanted wildlife activities (e.g., crop damage, livestock depredation) outside PAs while also restricting unwanted human activities (e.g., illegal grazing or logging) inside. But conservation fencing also creates hard boundaries, restricting wildlife movement and disconnecting local communities from nature. The net balance between these potential benefits and drawbacks of conservation fencing is yet unclear and likely context-dependent. This study examines the effects of a 30 km-long electric conservation fence constructed in 2020 along Ikorongo Game Reserve's northern boundary, adjacent to the Serengeti National Park, the first of its kind in Tanzania, which generally has a no-fencing policy. The study area is characterized by a steep gradient from natural vegetation inside the PA to a cropland-dominated landscape outside, with a long history of intense human-elephant conflict. Using camera traps, we assessed changes in large mammal capture rates, diversity and composition, activity patterns, and niche overlaps during the pre-fencing and post-fencing stages. We found that, while some community-level shifts were detected, clear population-scale impacts attributable solely to the fence were not evident. Changes in species assemblages appeared to reflect broader environmental gradients rather than the fence itself, and most mammals maintained their typical daily activity rhythms. Subtle adjustments in how species share space were observed near the boundary, emphasizing the need for continued monitoring to separate fencing effects from other ecological drivers. While other studies in this landscape have illustrated the value of this fence in reducing human-wildlife conflict, our findings show that even well-managed conservation fences that meet their primary objectives and do not influence overall wildlife abundance and composition can still modify species activity patterns, diversity, and co-occurrence. This highlights the need for careful consideration of social and ecological trade-offs when constructing fences, and long-term monitoring is essential to quantify the impacts of conservation fencing at the community and species levels.

Keywords: Conflicts, Ecosystem, Fencing, Large Mammals , Savanna

Use of Solar Electric Fence as a Human Wildlife Conflict Mitigation Tool

Victor Kakengi

Tanzania Wildlife Research Institute
Corresponding author: victor.alexander@tawiri.or.tz

Abstract

Across Africa, rapid human population growth is intensifying pressure on the edges of protected areas, transforming once-porous ecological buffers into densely populated "hard edges" that heighten human–wildlife conflict. This issue is particularly evident in the western Greater Serengeti-Mara Ecosystem in Tanzania, where African elephants (*Loxodonta africana)* frequently damage crops, threatening household food security and weakening public support for wildlife conservation. Although electric fencing has been widely promoted in several Southern African countries as a solution to such conflicts, its adoption in Tanzania has been limited. A key concern is that fencing may disrupt essential migratory routes for wildlife that rely on village lands to move between protected areas for breeding and refuge, thereby threatening ecological connectivity. However, the release of Tanzania's National Human-Wildlife Conflict Mitigation Strategy marks a shift in policy, recognizing electric fencing as a legitimate conflict-mitigation tool. In this context, our study evaluates a newly installed solar-powered electric fence along the northern boundary of Ikorongo Game Reserve. Using a mixed-methods approach, we combine geospatial landscape-level analysis with household surveys to assess both ecological and social outcomes. We examine how biophysical and household factors differ between fenced and unfenced areas to understand how the fence influenced changes in human-elephant conflict, particularly on crop damage. Simultaneously, we assess community perceptions, satisfaction levels, and willingness to participate in fence maintenance in both contexts. Findings from this research offer valuable insights for scaling community-supported electric fencing initiatives and designing more integrated, ecologically sensitive conflict mitigation strategies across the GSME and similar trans boundary ecosystems.

Keywords: community, electric fence, human-elephant conflicts, Serengeti

Impacts of Electric Fencing on the Movements of Migratory Wildebeest in the African Savannah Ecosystem

Michael. H. Kimaro, Kristen. D. Snyder, , Noel. L. Mbise, Grant. C. Hopcraft, Victor. A. Kakengi6, Han Olff, Victor Kakengi

Abstract

The construction of electric fences near protected area boundaries is increasingly used to reduce human-wildlife conflicts and conserve biodiversity. However, such fences can disrupt the migratory patterns of species like wildebeests (Connochaetes taurinus), which depend on large-scale movements to access resources. In the Serengeti ecosystem, a 30 km electric conservation fence was constructed along the northern boundary of Ikorongo Game Reserve to deter black rhinos and elephants from entering human settlements. This study utilized GPS data to investigate the impact of the fence on wildebeest space utilization, movement patterns, and behavior. The analysis indicated subtle behavioral adjustments in animal space use and habitat preferences near the

fenced boundary. Patterns suggested localized changes in movement and habitat utilization, likely influenced by landscape features and the presence of the fence. However, overall movement direction appeared to remain consistent, highlighting the complexity of animal responses to electric fences. The findings underscore the importance of understanding wildlife behavioral responses to conservation fencing, which suggests that, when carefully installed, such measures may offer potential benefits for the management of migratory species within multi-use landscapes while addressing human-wildlife conflict issues.

Impacts of electric fencing on land-use dynamics and agricultural security in western Serengeti

Michael H. Kimaro, Milenka I. Sloots1, Kristen D. Snyder, Noel L. Mbise, Victor A. Kakengi, Walter Di Nicola6,7, Han Olff1Tanzania Wildlife Research Institute

Email: victor.alexander@tawiri.or.tz

Abstract

Protected areas in African savannas support biodiversity and ecosystem services, but are increasingly surrounded by hard land-use transitions as surrounding human populations grow. Fencing protected areas is a potential, yet contested, response to mitigate growing human-wildlife conflicts at their edges. We test the benefits of such conservation fencing for communities neighbouring protected areas in the Serengeti ecosystem, Tanzania, in a multi-year before-after study of an adjacent fenced (Ikorongo Game Reserve) and unfenced (Serengeti National Park) area, using remote sensing, ground transects, and community interviews. The study revealed a range of ecological and socio-economic changes associated with the installation of conservation fencing. Land use dynamics appeared to shift in response to the fence, with notable differences observed between fenced and unfenced areas. Community members reported both positive and negative experiences related to the presence of the fence. Some residents expressed improvements in livelihood opportunities and perceptions of increased safety and stability. Others highlighted emerging challenges related to land use competition and access to natural resources. These mixed perspectives underscore the complexity of implementing conservation interventions in multi-use landscapes and highlight the importance of considering both environmental and community-level impacts in the planning and management of fencing projects. The study suggests that conservation fencing has the potential to support coexistence between local communities and wildlife. However, it also highlights the need for careful planning and adaptive management to address unintended consequences that may arise in surrounding areas. We emphasize the importance of integrating conservation fencing interventions with community livelihoods to achieve long-term biodiversity protection and socio-economic benefits.

SYMPOSIUM 2: Integrative approaches for restoring East Africa's Rangelands for sustainable and resilient futures

Organizers: The Nature Conservancy

Understanding and monitoring Rangeland Health

Philipo Lukumay

Abstract

Rangelands cover more than half of Africa's landmass and are vital for sustaining pastoralist livelihoods, cultural heritage, and iconic wildlife populations. In East Africa, where up to 70% of the land cover is occupied by rangelands, they form the backbone of local economies supporting people and their livestock while hosting millions of tourist visitations annually. Despite their prominence on the continent and in the region, they are disproportionately understudied compared to forests and remain misunderstood. Increasingly, they are threatened by land-use change, invasive species, climate variability, and unsustainable grazing. Addressing these challenges requires integrated approaches that incorporate traditional knowledge with conventional science and carefully balance the needs of people, livestock, and wildlife. The Nature Conservancy (TNC) has been partnering with communities, government and non-government organizations in Kenya and Tanzania since YEAR to restore resilience in rangelands using integrative approaches. Applying best rangeland practices, rights-based approaches and traditional and conventional science knowledge, these experiences can serve as a platform to learn from what works and what does not, and the conditions necessary for success. In this symposium, TNC staff will present the integrative rangeland management approaches that have been implemented in northern Tanzania and northern Kenya. Specifically, we will present the experience of Holistic Planned Grazing, where wet- and dry-season grazing blocks are set aside and monitored; our invasive species control work; livestock-to-market initiatives; and the application of eco-acoustics to monitor rangeland recovery. We will demonstrate how rangeland health indicators can be monitoring by communities using smartphone applications linked to a central dashboard to provide real time data on rangeland health while empowering communities with data-driven decision-making. Parallel to this soil carbon projects involving 50 communities are pioneering sustainable financing by linking rangeland management to carbon markets, thus embedding restoration in long-term economic sustainability and global climate action. We will share our experience with invasive species control taking place in Kenya, Cochineal spp., a sap-feeding insect, is successfully suppressing *Opuntia engelmannii*, while in Tanzania, mechanical uprooting has cleared more than 20,000 acres, allowing native grasses to regenerate, biodiversity to flourish, and forage to increase for both livestock and wildlife. To reduce grazing pressure and promote coexistence, livestock-to-market initiatives are helping pastoralists fatten cattle and access better markets, creating economic incentives while improving rangeland carrying capacity. Innovative tools such as bio- and eco-acoustics are also being piloted in northern Kenya, where soil invertebrate activity is captured through sound recordings as a novel proxy for soil biodiversity and ecological recovery. Together, these diverse initiatives demonstrate how community leadership, science, and markets can converge to restore rangelands ensuring these complex ecosystems continue to sustain both people and wildlife across East Africa.

Integrative approaches for restoring East Africa's Rangelands for sustainable and resilient futures

Timothy Boucher

Abstract

The study aimed to evaluate the effectiveness of passive acoustic monitoring both above-ground (birds) and below-ground (soil invertebrates) as tools for assessing rangeland health in the tropical savannas of Kenya. Fieldwork was carried out in collaboration with the Laikipia Conservancies Association (LCA), sampling 13 clusters across six conservancies using the Land Degradation Surveillance Framework (LDSF). Soil acoustic monitoring involved recording biotic activity using piezoelectric microphones, with Acoustic Complexity Index (ACI) scores calculated for each plot. Above-ground monitoring focused on identifying bird species using AI-powered analysis (BirdNET), with 123 species detected in Mpala Conservancy. Results indicated that acoustic methods are efficient, cost-effective, and capable of distinguishing between intact and degraded soils, though further analysis is pending LDSF survey data. The study concludes that acoustic monitoring is a promising supplementary tool for biodiversity assessment in African rangelands, with recommendations for future equipment and protocols provided.

Modeling spatiotemporal dynamics in northern Tanzania rangeland ecosystem: A linear mixed-effects approach using panel ground truthing data

Philipo Lukumay

Abstract

Northern Tanzania's rangelands are ecologically significant, supporting pastoral livelihoods and biodiversity, yet increasingly face degradation from land-use change, overgrazing, invasive species, and climate variability. This study evaluates the mid-term ecological and socio-economic impacts of Holistic Rangeland Management (HRM) using a mixed-methods approach: a cross-sectional survey of 1,097 pastoral households and a five-year ecological monitoring panel. Ecological data were collected across 30 m × 30 m plots using a standardized protocol assessing 13 biophysical indicators, including bare ground, invasive species, and grass composition. Monitoring occurred twice per season within community-designed grazing blocks. Socioeconomic analysis revealed deeply rooted pastoral systems with large households, unequal land and livestock ownership, and high cattle mortality, indicating vulnerability to climate stress. Panel data analysis using linear mixed-effects models showed a statistically significant reduction in annual grass cover (Coefficient = -0.016, $p < 0.01$), suggesting early ecological recovery. Perennial grass cover declined slightly (Coefficient = -0.008, $p > 0.22$), while bare ground and invasive species cover showed marginal but non-significant reductions (Coefficients = -0.002, $p > 0.71$ and $p > 0.64$, respectively). These findings highlight the potential of sustained HRM, participatory monitoring, reseeding of native grasses, and adaptive livestock management to improve rangeland health, biodiversity, and climate resilience in semi-arid pastoral systems.

Harnessing the Cochneal (*Dactylopius spp*) for the control of Opuntia Engalmanii in Rangelands Restoration

Doreen Chirchir

Abstract

Rangelands are vital lands in the world, approximately 80% of total land mass in Kenya is considered rangelands. These lands are habitat, provide food and ecosystem services. Currently these lands are facing lots of degradation from unmatched land carrying capacity for both livestock and wildlife, soil erosion and invading alien/invasive species spread. The project is utilizing biological agent Cochneal Spp in managing the spread of Opuntia engalmanii through Lower Naibunga Conservancy in Northern Kenya, Cochneal is a suck-sapping insect which eliminate Opuntia engalmanii by attaching itselp into the cladodes and suck out the sap, the continuous feeding of the insect causes the cladodes to yellow, shrivel and die-off due to reduced photosynthesis and ability to store water. By eliminating Opuntia engalmanii land is restored translating to healthy rangelands with land for native species regrow, improved biodiversity and forage availability for both livestock and wildlife.

Enhancing Sustainable Grazing and harnessing livestock to markets strategy in Northern Tanzania Rangeland

Francis Msollo

Abstract

Northern Tanzania's rangelands covering approximately 9.3 million hectares are critical ecosystems supporting pastoral livelihoods, biodiversity, and national economic development. These lands host over 36.6 million cattle, making Tanzania the second-largest cattle population in Africa. However, unsustainable grazing, climate change, and inefficient market systems threaten their long-term viability. Recent studies show that bare ground in lowland grazing areas reaches up to 96.3%, with livestock carrying capacity as low as 3 Tropical Livestock Units (TLU) per hectare per year. Overgrazing and erratic rainfall have led to soil erosion, invasive species spread, and intensified human-wildlife conflict. Deferred grazing regimes and seasonal enclosures have proven effective in restoring vegetation biomass and soil health. To address these challenges, a Livestock Fattening Initiative is proposed, targeting communities engaged in holistic grazing management. Eligible participants, those owning over 50 cattle and at least 1 hectare of grazing land, will form registered fattening groups. These groups will operate a small-scale feedlot to finish cattle for high-end markets, promoting quality over quantity and discouraging cattle hoarding. Market inefficiencies such as middlemen exploitation, poor infrastructure, and lack of information are tackled by linking livestock associations directly with buyers. The World Bank estimates that Tanzania needs $546 million in public investments over five years to unlock the livestock sector's full potential. The Nature Conservancy (TNC) is already implementing integrated rangeland management across 546,000 hectares, aiming to reach 700,000 hectares by 2026. Expected conservation and economic outcomes include: Reduced bare land and soil erosion through adherence to grazing plans. - Balanced stocking rates that minimize competition between livestock and

wildlife. - Healthier, market-ready livestock that stabilize incomes and reduce pressure on rangelands, - Cultural shift among herders from cattle hoarding to commercial livestock management, controlled market participation to prevent overstocking and maintain ecological balance, this integrated strategy aligns ecological sustainability with economic incentives, fostering resilient pastoral systems and healthier rangelands in Northern Tanzania

Turning the Tide: Community-Based Invasive Species Control in Northern Tanzania

Warda Kanagwa

Abstract

Invasive alien species are recognized as the second greatest threat to global biodiversity after habitat loss, with profound ecological, economic, and social impacts. In Tanzania, invasive species have spread across an estimated 62% of the country, with northern rangelands experiencing 41% coverage. Their expansion reduces pasture productivity for both livestock and wildlife, suppresses native vegetation, blocks dispersal corridors, and exacerbates livestock losses through predation, driving local communities deeper into poverty. Key invasive species such as *Dichrostachys cinerea, Ipomoea hildebrandtii, Parthenium hysterophorus, Caesalpinia decapetala,* and *Gutenbergia cordifolia* pose direct threats to rangeland health and ecosystem integrity. The Nature Conservancy (TNC), in collaboration with communities and partners, initiated a pilot program to address these challenges in northern Tanzania. A reconnaissance survey identified hotspots dominated by *D. cinerea, I. hildebrandtii, and P. hysterophorus*, prompting targeted removal interventions. Drawing on both field data and literature review, we assessed a range of control approaches including mechanical, chemical, biological, and integrated pest management methods. The pilot emphasized mechanical removal, community engagement, training on uprooting techniques, and procurement of appropriate tools. Initial efforts successfully cleared approximately 300 acres of heavily invaded rangeland. Building on this success, the program has now expanded to over 20,000 acres of invasive removal, largely achieved through joint action with local communities and partners. Early monitoring indicates positive regeneration, with increases in desirable perennial grasses, recovery of annual grasses, and a measurable reduction in bare ground. This work demonstrates that collaborative, science-based invasive species management can restore rangeland productivity, safeguard biodiversity, and improve pastoral livelihoods. Scaling such approaches offers a pathway to sustaining the ecological and economic value of East Africa's rangelands, which are critical for both wildlife conservation and community resilience.

SYMPOSIUM 3: Organizers - UNDP & MNRT

Combating Poaching and Illegal Wildlife Trade in Tanzania: A call to Action

Damas Masologo

United Nations Developpment Programme
Email:

Abstract

The project on "Combating Poaching and Illegal Wildlife Trade in Tanzania through an integrated Approach" commonly known as **IWT Project**, is GEF funded, supported by UNDP Tanzania and implemented by the Ministry of Natural Resources and Tourism. The project was a result of increasing trend of wildlife poaching, particularly of elephants, and the illegal trafficking of ivory to consumer countries, which caused rapid decline elephant population, risking the opportunity for significant rural development through wildlife tourism. In 2014, the Government of Tanzania developed and approved the National Strategy to Combat poaching and illegal Wildlife Trade (NSCPIWT), which was subsequently reviewed in 2023. In particular, the project is supporting efforts of the Government of Tanzania in implementing the Anti-poaching Strategy, i.e. by strengthening legislation and institutional capacity to tackle poaching and wildlife trafficking at national level and increase intensity of international collaboration to fight illegal wildlife trade (IWT) between Tanzania and neighbouring countries (Outcome 1). At the landscape level the project is contributing to anti-poaching capacity of newly established multi-agency wildlife law enforcement institutions, the Tasking and Coordination Groups (TCGs), improving multi-institutional collaboration and increase the level of their cooperation with local communities, the private sector and NGOs in ten ecosystems into which the country is partitioned (Outcome 2). At the same time, the project is addressing the needs of local communities in sustainable livelihoods and equitable sharing of benefits from wildlife and tourism via increasing community involvement in wildlife law enforcement and monitoring activities; promoting sustainable livelihoods that reduce dependency on vulnerable natural resources within the Ruaha-Rungwa ecosystem (Outcome 3). A national campaign is being undertaken, raising awareness on conservation and need to combat wildlife related crimes, among citizens and authorities in Tanzania. Lessons learned from the project via active participation of all stakeholder groups in the project implementation and M&E are documented, packaged and made available nationally and internationally to contribute to the fight against poaching and IWT, including lessons on gender mainstreaming (Outcome 4).

Main Topic in this symposium will include:

i. Sharing experiences, best practices on combating poaching and illegal wildlife trade an experience from IWT project
ii. Multi-Agency wildlife law enforcement institutions as an operational tool for combating poaching and illegal wildlife trade
iii. The role of community engagement in monitoring poaching and other illicit wildlife activities
iv. Gender Mainstreaming in the Wildlife Sector, best practices, opportunities and challenges

SYMPOSIUM 4: Organizer - Aga Khan & University and TAWIRI

Ecological Innovation for Urban Futures: Nature Preservation through Living Labs in Tanzania

[1]Emmanuel Sulle, [2]Ally Nkwabi, [2]Neema Kilimba, [2]Richard Lyamuya and [2]Janemary Ntalwila
[1]Aga Khan University; [2]Tanzania Wildlife Research Institute
Email: emmanuel.sulle@aku.edu

Abstract

As the world confronts the interconnected challenges of the triple planetary crisis—climate change, biodiversity loss, and environmental pollution—research institutions and universities play a pivotal role in catalyzing transformative, evidence-based solutions for building resilient and sustainable communities. This symposium will present an in-depth examination of innovative approaches to nature preservation in peri-urban environments, with a focus on emerging models from Northern Tanzania. Anchored at the Aga Khan University's Arusha Climate and Environmental Research Centre (AKU-ACER), a living lab situated on nearly 4,000 acres of previously degraded land, this initiative exemplifies how ecological restoration can provide broad-based benefits for biodiversity, human well-being, and environmental resilience. Located within a predominantly Maasai community, AKU-ACER serves as a dynamic field site for transdisciplinary research aimed at regenerating ecosystems that have been negatively impacted by climate change, population pressure, and land-use changes. The symposium will highlight findings from a comprehensive biodiversity assessment led by experts from the Tanzania Wildlife Research Institute (TAWIRI), which documents the richness and significance of local flora and fauna, including mammals, birds, and plant species. Through four presentations by researchers working at AKU-ACER and TAWIRI, the event will illuminate the tangible connections between healthy ecosystems and public health, the role of ecological diversity in climate adaptation, and the transformative potential of peri-urban conservation efforts. Importantly, this model of a living lab provides a scalable and context-sensitive blueprint for urban and peri-urban nature preservation, offering critical lessons for similar efforts across cities in Tanzania and beyond. The symposium aims to foster dialogue on replicating such initiatives to create greener, healthier, and more inclusive urban futures. The symposium will focus on the following key talks:

i. Janemary Ntalwila and Ally Nkwabi: Large and small mammals' diversity of the Aga Khan University's Arusha Climate and Environmental Research Centre

ii. Ally Nkwabi and John Sannare: Avifauna species of the Aga Khan sites: Indicators of forest restoration.

iii. Neema Kilimba and Janemary Ntalwila: Insects diversity: An Indicator of the ecosystem health

iv. Richard Lyamuya and Pius Kavana: Landscape restoration and plant diversity at Aga Khan University's Arusha Climate and Environmental Research Centre

v. Emmanuel Sulle: Management challenges for conservation of the biodiversity at the Aga Khan University's Arusha Climate and Environmental Research Centre.

Keywords: Climate change, Biodiversity, Pollution, Community, Policy

SYMPOSIUM 5: Organizer ABRU

Research and Long-term Continuity at ABRU in MINAPA.

Guy Norton

abruguy@gmail.com; +44 [0]778 6601066

The symposium will focus on the following key papers: -

i. Continuity, maintenance and value of long-term research: Finding a way forward after fifty years of research at ABRU in Mikumi National Park (Guy W. Norton)

ii. Fortified Garbage Pits: Potential Measure for Reducing Human-Baboon Conflicts in Domestic Areas (Amani S. Kitegile, Shaban F. Shaban, Abdulhatibu M. Mohamed)

iii. Crop preferences of African elephants: A comparative study of crop damages to farmers adjacent to Mikumi National Park, Tanzania (Deusdedith B. Fidelis).

iv. Assessing the influence of wildlife grazing pressure and climate on grass growth in Mikumi National Park, Tanzania (Shaban F. Shaban, Guy W. Norton, Deusdedith B. Fidelis, Samuel N. Mtoka, Amani S. Kitegile, Abdulhatibu M. Mohamed).

v. Demographic dynamics of Yellow Baboons (*Papio cynocephalus*) in Mikumi National Park, Tanzania (Reckichius M. Kadogo, Guy W. Norton, Deusdedith B. Fidelis, Samuel N. Mtoka, Amani S. Kitegile, Abdulhatibu M. Mohamed).

ABSTRACT FOR WORKSHOPS

Workshop 1 Organizer: The Jane Goodall Institute – Tanzania

Stable isotope technique as a tool in ecological and forensic research

Jason Newton[1], Rona McGill[1] and Zabibu Kabalika [2]

[1]National Environmental Isotope Facility, Scottish Universities Environmental Research Centre, University of Glasgow, United Kingdom; [2]The Jane Goodall Institute – Tanzania; P. O. Box 70728 Mikocheni, Dar es Salaam, Tanzania

Corresponding author: Jason Newton - Jason.Newton@glasgow.ac.uk

Abstract

Stable isotope ecology is a powerful and versatile tool in wildlife research when used carefully, providing unique insights into the diets, movements, and ecological interactions of animals in both terrestrial and aquatic systems. This workshop will introduce participants to the principles underlying stable isotope analysis, focusing on bulk isotope ratios of carbon ($\delta^{13}C$), nitrogen ($\delta^{15}N$), hydrogen ($\delta^{2}H$), and sulfur ($\delta^{34}S$). We will explain how isotopic variation arises in natural systems, how these variations are reflected in animal tissues, and how it can be used to reconstruct ecological processes. Applications of stable isotope ecology will be explored through two main themes: diet and food webs, and movement and migration. In the first theme, we will examine how isotopes can reveal dietary composition and trophic niche. In the second, we will discuss how isotope ratios tied to geographic and climatic variation can be used to track animal movements across landscapes, providing invaluable information on migration ecology. The workshop will be illustrated with case studies from a range of taxa, highlighting examples such as seasonal dietary shifts, introduced species, tracking migration and wildlife crime and the utility of museum collections. We will also consider methodological aspects, including preferred sample types. Particular attention will be given to the limitations and potential pitfalls of isotope analysis, alongside strategies for robust inference. By the end of the workshop, participants will have an appreciation of both the theoretical underpinnings and practical applications of stable isotope ecology, and an understanding of how these methods can be applied to their own research questions in wildlife biology.

Keyword: Diet, Food web, Migration, Movement, Trophic level, Stable Isotope

Workshop 2 Organizer: The Jane Goodall Institute – Tanzania

GIS-Enabled Community-Led Patrolling: A Model for Enhancing Forest Conservation and Livelihoods in Western Tanzania

[1]Noris Justine B.Sc., [1]Deus Mjungu Ph.D, [1]Paul Mjema MSc, [2]Lilian Pintea Ph.D.

[1]The Jane Goodall Institute Tanzania, [2] The Jane Goodall Institute USA
Corresponding Author: nmushi@janegoodall.or.tz

Abstract

Effective forest conservation is a cornerstone of biodiversity protection and climate change mitigation. Building on previous successes where professional forest monitors used GIS tools to achieve improved forest conditions, this study details an initiative to empower Village Natural Resource Councils (VNRCs) in Western Tanzania. The project's objective is to build the capacity of VNRCs to conduct systematic patrols and use GIS applications for real-time data collection, thereby preparing the communities to participate in future carbon trading markets. VNRC members were trained in advanced ecological monitoring techniques and the use of Geographic Information System (GIS) applications for real-time data collection on deforestation, illegal activities, and forest regeneration. This training enabled the communities to document changes within their patrolled areas and contribute to a centralized dataset. While the collected data still shows the persistent challenges of new encroachments and farming as major threats, the presence of VNRC patrols has demonstrably led to a significant increase in community awareness regarding conservation. This increased awareness has translated into stronger support from the village government for conservation efforts, specifically through law enforcement and knowledge sharing. Additionally, the data collected via the GIS apps has been instrumental in providing a clear picture of the ongoing challenges of forest destruction, enabling more targeted interventions and resource allocation. This work demonstrates a replicable, scalable model where local communities are not merely subjects of conservation but active agents in its implementation and beneficiaries of its success. The findings underscore the importance of integrating technology and financial incentives into community-based natural resource management to achieve both ecological and socio-economic resilience.

Keywords: Carbon Trade, Community Conservation, Forest Monitoring, GIS, Tanzania

Workshop 3: Organizer - FZS

Strategic Village Land Use Planning and Rapid Response Team in Human-Wildlife Conflict Mitigation: Experience from Greater Mahale and Serengeti Ecosystem, Tanzania

Masegeri Rurai

Frankfurt Zoological Society
Corresponding author: masegeri.rurai@fzs.org

Abstract

Human-Wildlife Conflict (HWC) remains a significant challenge to both biodiversity conservation and the socio-economic resilience of communities living in and

around Tanzania's critical ecological zones, particularly the Greater Mahale and Serengeti ecosystems. Unrestricted agricultural expansion, rapid settlement growth, undefined development control and limited spatial projection modelling of Tanzania land in line with shifting wildlife migration patterns have led to escalated incidences of crop raiding, livestock predation, and human fatalities. Frankfurt Zoological Society (FZS) has facilitated various mitigation measures, which included village land use plans, deployment of Human-Wildlife Conflict Monitors (HWCMs), sophisticated HWC monitoring dashboards using ArcGIS Survey123, Rapid Response Team mechanisms, reinforced livestock enclosures, deterrents based on chili, toolkits tailored to elephants, and community awareness campaigns, these efforts have only partially succeeded in lowering the intensity of the conflict. This assessment highlights field-based insights and experience from the FZS (HWC) mitigation efforts in the Greater Mahale and Serengeti ecosystems, emphasising the role of Rapid Response Team and Village Land Use Planning (VLUP) as a strategic, long-term approach to mitigating HWC. The VLUP, under the integrated and participatory approach, aligns community development priorities as the basis of promoting Wildlife Management Areas (WMAs), identifying wildlife corridors, and repairing degraded rangelands. Through the Serengeti Ecosystem Development and Conservation Project (SEDCP) and Emergency Recovery Fund for Biodiversity (ERB) projects, FZS has implemented participatory VLUP in 53 villages in the Serengeti ecosystem. Compatible land uses have been designated to reduce both land use conflict and HWC, supported by village by-laws approved at the village and district levels. To ensure the VLUP is not in silos, FZS has been placing some landmarks, including beacons and signboards, in every land use as the primary basis to reduce pressure on land. Despite HWC challenges and weak VLUP enforcement, the security of tenure after VLUP has acted as a coolant mechanism in enhancing conservation sustainability for the local communities. The adoption of Mobile Application to Secure Tenure (MAST) technology has systematically adjudicated Certificates of Customary Right of Occupancy (CCROs) to the local communities and particularly the marginalised groups (elders, widows, disabled, poor). Through VLUP, the technical know-how from the local communities has mapped the elephant routes from protected areas to villages, which now guide the setting of HWC observation towers, also for the early warning (preparedness and readiness) of elephant occurrences. Key lessons include the value of community-led planning, currently weak VLUP enforcement remains a key challenge for the present cross-sectoral brainstorming solution for the sustainable land use planning governance across the country, the importance of advanced technology to secure tenure, and the effectiveness of spatial data in guiding conflict response. Opportunities: To scale these integrated approaches and align VLUP with national land and HWC governance policies and National development control. Way forward: calls for strengthened institutional coordination, sustained technical support, and policy mainstreaming to promote sustainable human-wildlife coexistence. The study concludes with policy-oriented recommendations for mainstreaming VLUP into national conservation and land governance frameworks, with the overarching goal of promoting sustainable, long-term Human-Wildlife Co-existence

ABSTRACT FOR SEMINARS

Seminar 1: How AI Can Empower Wise Decision

Beyond Dashboards: How AI Can Empower Wise Decision-Making in Wildlife Conservation

Angelika Barczak

Management Faculty University of Warsaw
Corresponding author: A.barczak2@uw.edu.pl +48790211500

Abstract:

The paradox of management in today's conservation landscape is that it is even more complicated despite the many tools at the disposal of the leaders because they are inundated with many dashboards, charts, and reports. Often, those in leadership lack the deeper insights needed to make ethical, wise, and resilient decisions. Even though numbers can reveal what is happening, they rarely explain why or whether the path being taken is truly the right one. This seminar introduces the Strategic Mirror Method, a practical framework for engaging Artificial Intelligence (AI) as a dialogue partner in conservation leadership. Rather than providing ready-made answers, AI can be used to provoke thought, challenge assumptions, and open new perspectives. The method highlights three key roles for AI:

i. Devil's Advocate – Exposing blind spots and testing strategies against overlooked risks.
ii. Empathy Translator – Anticipating the perspectives of local communities, rangers, or tourism stakeholders to reduce conflict and strengthen relationships.
iii. Future Stress-Tester – Highlighting vulnerabilities in strategies under shifting conditions such as funding cuts or climate policy changes, enabling leaders to prepare flexible responses.

By applying these roles to pressing challenges, which include human–wildlife conflict and resource allocation, participants will see how AI can help align decisions with organisational values, encourage innovation, and cultivate intellectual humility and systems thinking. The seminar will also provide actionable tools such as sample prompts, dialogue structures, and small-scale exercises that executive leaders can immediately use within their teams.

Key Takeaway: AI's greatest value in conservation leadership is not in automating decisions, but in deepening the thought process that precedes them. By moving beyond descriptive analytics and fostering wisdom driven dialogue, leaders can strengthen resilience, engage stakeholders more effectively, and guide conservation strategies that balance ecological, social, and economic goals.

Seminar 2: Organizers BEEGREEN

The Apitourist's Guide to Tanzania – Apitourism, a new approach to the conservation of bees

Dr. Kathrin Krausa and Warren Steyn

e-mail: info@beegreen.co.tz

Tanzania boasts a rich and diverse beekeeping heritage, woven deeply into both rural livelihoods and the nation's natural landscapes. As one of the cornerstones of the country's economy, tourism is intersecting with beekeeping: apitourism. This emerging niche invites travellers to immerse themselves in the world of bees, offering unique experiences that range from witnessing hive-making to participating in honey harvesting and learning about sustainable beekeeping practices. Apitourism can be more than just an additional tourism product or a novel revenue stream for local communities—it is a powerful tool for education and conservation. By opening beekeeping sites to visitors, apitourism raises awareness about the crucial ecological role of bees, the challenges they face, and the importance of their preservation for both biodiversity and agriculture. Currently, Tanzania features at least 21 apitourism destinations welcoming both local and international tourists. Our presentation introduces Tanzania's first apitourism guidebook a comprehensive resource designed to help travellers discover and plan bee-focused adventures across the country. The guidebook highlights diverse destinations, the variety of bee species found in Tanzania, and the different ways in which travellers can engage with beekeeping culture. Moreover, our talk will underscore the significance of establishing a robust network of apitourism facilitators. Through collaboration and knowledge-sharing, such a network has the potential to strengthen the sector, support community development, and ensure that apitourism remains a sustainable and beneficial approach for both people and pollinators.

Keywords: Apitourism, Beekeeping, Conservation, Tourism Product, Travellers,

Seminar 3: Serengeti–Mara Wildebeest Migration

Serengeti–Mara Wildebeest Migration at a Crossroads: Transboundary Collaboration as the Ultimate Solution

Noah Sitati[1], Janemary Ntalwila[2,] and Jafari Kideghesho[3]

[1]WWF Tanzania, P.O. Box 63117, Dar es Salaam, [2]Tanzania Wildlife Research Institute (TAWIR), P.O Box 661, Arusha, Tanzania. 3Retired Rector-African College of Wildlife Managament-Mweka-Tanzania
Corresponding Author: nsitati@wwf.or.tz

Abstract

The Serengeti–Mara ecosystem hosts one of the most iconic biological phenomena on Earth: the annual migration of more than 1.5 million blue wildebeest (*Connochaetes taurinus*), accompanied by plains zebra (*Equus quagga*) and associated ungulates. This large-scale movement, spanning Tanzania's Serengeti National Park and Kenya's Maasai Mara National Reserve, is primarily governed by spatio-temporal variability in rainfall, forage

availability, and predator–prey dynamics. Seasonal migratory patterns include mass calving in the southern Serengeti (February–March), followed by progressive movements to the western corridor and northern Serengeti, culminating in the high-risk crossings of the Grumeti and Mara Rivers (June–October). These events represent not only keystone ecological processes that sustain ecosystem structure and function but also critical natural capital underpinning regional tourism economies. However, recent decades have seen escalating anthropogenic pressures including fencing, agricultural expansion, and unregulated tourism infrastructure development—particularly in the Mara dispersal areas. These land-use changes have fragmented habitats, obstructed migratory corridors, and compromised critical breeding grounds. Literature reviewed over the past three decades indicates that if unchecked, these pressures may precipitate a collapse of functional connectivity, with severe consequences for population viability and ecosystem services. This paper underscores the urgent need for transboundary governance mechanisms to safeguard the ecological integrity of the Serengeti–Mara migration. A joint Tanzania–Kenya framework is recommended, integrating land-use planning, corridor protection, and adaptive management approaches to secure long-term ecological connectivity. Strengthened bilateral collaboration represents the ultimate solution to conserving this unparalleled terrestrial mammal migration and the socio-ecological benefits it provides.

Keywords: Conservation, Habitat connectivity, Migration, Serengeti–Mara, Wildebeest

Seminar 4: Organizer: Tanzania Geothermal Development Company

Harnessing Geothermal Energy for Sustainable Tourism Development in Tanzania: A pathway to Innovation, conservation and Community Empowerment

Seminar 5: Organizers TAWIRI

Mitigatinng Human-Crocodiles in Tanzania

Janemary Ntalwila[1]*, Revocatus Meney[1], Emmanuel Masenga[1], Iddi Lipende[1], Anselmi Munga[1], Selemani Moshi[1], Julius Keyyu[1], and Eblate Mjingo[1]

[1]Tanzania Wildlife Research Institute (TAWIRI), P.O. Box 661, Arusha, Tanzania
*Corresponding Author: janemary.ntalwila@tawiri.or.tz | jntalwila@yahoo.com

Abstract

Human-crocodile conflict (HCC) is an increasing threat in Tanzania, primarily driven by population growth and agricultural encroachment into crocodile habitats. These conflicts frequently result in human fatalities, livestock loss, and disruption of livelihoods, particularly in water-dependent communities. This study evaluates efforts by the Tanzania Wildlife Research Institute through the Ministry of Natural Resources and Tourism in mitigating HCC by constructing crocodile exclusion fences in four high-risk districts: Korogwe, Mkinga, Ludewa, and Uvinza. Between 2010-2020, 65 fatal crocodile attacks were reported in Tanzania, of these 37% occurred during swimming or bathing, 23% while fishing, 10% collecting water, 8% crossing rivers, and 22% in other circumstances. Incidents peaked during the rainy season (November–May), which

overlaps with the crocodile breeding season. In alignment with the National Human-Wildlife Conflict Mitigation Strategy (2020–2024), ten crocodile exclusion fences were constructed between February and June 2025. Concurrently, 916 community members received training on HCC mitigation strategies. Feedback collected from 320 individuals through focus group discussions and key informant interviews indicated that 85% believed the exclusion fences would significantly reduce conflict. Another 10% recommended combining the fences with supplementary initiatives such as safe water supply and public education, while 5% remained uncertain. The study concludes that sustainable mitigation of HCC in Tanzania requires integrated interventions, including the provision of safe water access points, land-use planning along waterways, and the construction of secure river crossing structures. Success hinges on strong collaboration between conservation authorities, local governments, and community stakeholders.

Keywords: Conflict, Crocodile, Human, Exclusion-Enclosures

Seminar 6: Organizers-TAWIRI

Kihansi Spray Toad Conservation: Progress, Challenges, and Future Directions

Bukombe John, Felix Shayo, Raymond Okick and Janemary Ntalwila

Tanzania Wildlife Research Institute, Box 661-Arusha, Tanzania
Correcponding author: bukombe.john@tawiri.or.tz

Abstract

This discussion group seeks to assess the viability of continuing national support for the KST program, based on ecological outcomes, management experiences, and financial realities. Participants will explore innovative policy, research, and partnership strategies to ensure sustainable recovery of this iconic species. The Kihansi Spray Toad (*Nectophrynoides asperginis*), an endemic amphibian species once declared extinct in the wild in 2009, has become a flagship for conservation innovation in Tanzania. Through international collaboration, ex situ breeding programs was initiated at the Bronx Zoo and Toledo Zoo in the USA, and later at the University of Dar es Salaam and Kihansi field site, successfully revived the species. Since the launch of reintroduction efforts in 2012, over 6,000 individuals have been released into a carefully engineered habitat within the Kihansi Gorge. This seminar aims at reviewing the current status of the Kihansi Spray Toad Conservation Program, highlighting key milestones such as the development of sustainable breeding colonies, habitat restoration through artificial spray systems, and post-release monitoring. However, significant challenges remain including chytridiomycosis (a fungal disease responsible for global amphibian declines), fluctuating microclimate conditions due to hydropower operations, and long-term financial sustainability of program operations. With national and global biodiversity goals in focus, this session will engage policymakers, researchers, and donors in a strategic dialogue on the future of the KST program. It will assess ecological and economic impacts, review lessons learned from over a decade of management, and propose evidence-based, multi-sectoral strategies to strengthen resilience and ensure the toad's survival. Discussions will emphasize the value of integrating conservation with infrastructure planning, securing stable financing mechanisms, and expanding local and international partnerships to uphold Tanzania's leadership in amphibian conservation.

Keywords: Captive Breeding, Endemic, Iconic Species, Kihansi Spray Toad, Reintroduction

Seminar 7: Synopsis: TEMBONASI documentary film project

Organizer Richard Mgumba

Human-wildlife conflict (HWC) poses a significant threat to both conservation efforts and community livelihoods in Tanzania, a country harboring 20% of Africa's large mammal species. While historically vital for local survival, wildlife increasingly inflicts substantial losses on communities living near protected areas, making coexistence difficult. This conflict manifests primarily as crop and property damage, human injury, and fatalities. Recent data highlight the severity of the issue: in 2024 alone, wildlife damaged 78,371.10 acres of crops, with elephants responsible for 99% of this destruction. In response, government mitigation efforts between 2023 and 2024 led to the killing of 26 elephants that had attacked humans. Current policy involves classifying such elephants as "problematic animals," with subsequent elimination or relocation. To address this challenge, the TEMBONASI documentary film project aims to initiate community conservation dialogues and educate citizens, particularly those in high-risk areas, on traditional, effective, and practical methods to prevent human-elephant conflict, thereby fostering a more sustainable coexistence.

THANK YOU OUR SPONSORS

Tanzania Wildlife Research Institute (TAWIRI)
Headquarter, Njiro Road, Plot No. 213, Block "A"
P. O. Box 661, **Arusha – Tanzania**

Tel. No: +255 734 094 646
Fax: +255 27 254 8240,
E-Mail: barua@tawiri.or.tz,
Website: www.tawiri.or.tz