



## Archiving Outamba Kilimi National Park Wildlife Biodiversity in Different Local Languages of Sierra Leone

Moses Fayiah<sup>1\*</sup>, Mohamed Ramadan Bah<sup>2</sup>, Amara Conteh<sup>3</sup>, Emmanuel Johnny Walker<sup>2</sup>,  
Ishmael Abdul. Jalloh<sup>4</sup>

<sup>1</sup>Department of Forestry and Wood Science, School of Natural Resources Management, Njala University, Sierra Leone, West Africa.

<sup>2</sup>Wild Chimpanzee Foundation, Freetown Sierra Leone.

<sup>3</sup>Forum for Environment, Biodiversity and Climate Change Sierra Leone.

<sup>4</sup>Sierra Leone Agricultural Research Institute, Kenema Branch Eastern Sierra Leone.

### ABSTRACT

The Outamba Kilimi National Park (OKNP) is characterized as a biodiversity hotspot in Sierra Leone. The identification and translations of names of wildlife species found within the Outamba Kilimi National Park into local tribal dialects/languages reflect a unique traditional, cultural, and social biodiversity conservation approach. This study aims to archive some of Outamba Kilimi National Park wildlife species in eight different local languages spoken in Sierra Leone. The identification of wildlife species across the OKNP was done using "the Kingdom Field Guide to African Mammals Book" for scientific names and tribal/elders for wildlife identification in different local languages using pictorial images of the wildlife in question. Some of the wildlife species encountered include primates, carnivores, and ungulates, and some keystone tree species that are of great conservation value. The study recorded 63 wildlife species found at the Outamba Kilimi National Park from 2014 to 2024. The local languages in which the names of wildlife species are translated include; Krio, Susu, Limba, Temne, Mende, Fulani, Yalunka, and Koranko but Susu is widely spoken across the park landscape. Nonetheless, the OKNP is under conservation threats such as illegal logging of Rose Wood (*Pterocarpus erinaceus*), illegal hunting of wildlife species, illegal settlement within the park, cattle rearing, farming and illegal dredge mining. This study will serve as a baseline for future studies in wildlife species identification and translation into local languages across Sierra Leone. It is recommended that research be conducted for trees, birds, fishes, and other wildlife species found at the parks.

**Keywords:** Biodiversity, Wildlife, Outamba-kilimi, National park, Language, Sierra leone

**Corresponding author:** Moses Fayiah

**e-mail** ✉ [mfayiah@najal.edu.sl](mailto:mfayiah@najal.edu.sl)

**Received:** 02 June 2024

**Accepted:** 24 October 2024

### INTRODUCTION

The 21<sup>st</sup> century is experiencing biodiversity extinction shock with plant and animal losses estimated to be around 1,000 times as compared to centuries ago (Mace, 2005; Gorenflo *et al.*, 2012; Kotera & Phillott, 2023). Therefore, the identification, and translation of wildlife animal species in local language dialects is critical for the conservation of biological resources especially at Outamba Kilimi National Park. The translations of wildlife species names into local tribal languages reflect a unique traditional, cultural, and tribal biodiversity knowledge preservation for the current and future generations (Chen, 2016; Garnett *et al.*, 2018; Chowdhury *et al.*, 2022; Amano *et al.*, 2023; Kotera & Phillott, 2023). Knowing the names of wildlife species in local languages enhances efficient biodiversity-nature interaction between society and wildlife (Wilder *et al.*, 2016; Frainer *et al.*, 2020). The change in local tribal names based on time affected the naming of some wildlife especially in the Yalunka tribe that is quietly going extinct in Sierra Leone. Some

names of certain flora and fauna have changed from one generation to another due to tribal language modification and continued civilization. The preservation of local biodiversity names in local or indigenous languages is crucial to the long-term success of conservation in a developing country like Sierra Leone (Janovsky & Larson, 2019; United Nations, 2019; Gafner-Rojas, 2020; Fish *et al.*, 2024). The archiving of wildlife species names in eight local languages in Sierra Leone is important because this knowledge is time-sensitive (Kotera & Phillott, 2023). Because of the continued modification of civilization, ecological knowledge is drastically fading away and eroding (Loh & Harmon, 2014). Across Africa and Sierra Leone in particular, there is a massive decline in speaking and understanding local dialects as a result of the influence of educational exposure, technology, internal migration, and difficulty in understanding local dialects among other reasons. As such, archiving this ecological knowledge will revitalize the sense of understanding biodiversity conservation using our native tongue or dialect (Unasho, 2013; Toomey, 2016; Hua *et al.*, 2019). Incorporating Indigenous tribal knowledge in modern biodiversity conservation efforts provides a diverse approach to the protection and conservation of biodiversity

found in remote communities with high conservation value (Di Bitetti & Ferreras, 2017; Amano *et al.*, 2021). Local language diversity and the cultural way of life of indigenous people are intrinsically connected to biodiversity conservation in the 21<sup>st</sup> century (Frainer *et al.*, 2020). Indigenous people and their cultural activities are critical in conservation as they aid biodiversity interpretation in different languages and actions (Gorenflo *et al.*, 2012; Frainer *et al.*, 2020). For successful biodiversity conservation, traditional ecological knowledge plays a key and vital role as they are mostly passed on from generation to generation (Berkes, 2012; Wilder *et al.*, 2016; Wallace *et al.*, 2020). Indigenous or traditional knowledge supports local taxonomic planning, research, and wildlife identification hence supporting biodiversity conservation (Tantipisanuh & Gale, 2018; Konno *et al.*, 2020; Ramírez-Castañeda, 2020). The perspective of naming wildlife in local languages provides a platform for the local community's indigenous knowledge about biodiversity to be utilized for successful biodiversity conservation.

#### Background

The Outamba Kilimi National Park was first designated as a "Game reserve" in 1974 and was later gazetted as an Outamba Kilimi National Park in October 1995. Outamba-Kilimi National Park is critical for the protection of Sierra Leone's flora and fauna diversity. Outamba-Kilimi is considered a biodiversity hotspot of Sierra Leone and contains different ecologies that harbor different wildlife species. The park is notable for its rich wildlife species and its diversity of habitats and ecologies. The Outamba Kilimi landscape has a rich history of biodiversity conservation activities and is home to rare wildlife species only found in Sierra Leone. Recent discoveries of rare wildlife species have brought the park into the spotlight on its potential to

harbor critically endangered species that can only be found in that part of the country. The park is well known for its wild flora and fauna diversity amidst anthropogenic and climate change pressure. The park hosts a variety of habitats such as gallery forests, open savannah, secondary forests, farm bush, and woodland savannah. These ecologies are however under great threat as a result of wildfires, illegal logging, and illegal gold mining along river banks, illegal hunting, and shifting cultivation (Munro, 2020). The park is home to diverse plant species that are of great conservation importance within West Africa's ecosystem. The Outamba Kilimi National Park landscape is home to the largest Savannah Ecosystem in the northern part of Sierra Leone.

#### Primates of OKNP

The park plays host to important mammal species that are only found within the OKNP landscape. Some of these mammals are of regional conservation concern and are designated as critically endangered species. Some of these mammals are the West African Elephants, Chimpanzees among others. Besides primates, the park also hosts carnivores such as Leopards and ungulates such as Bongo antelopes. The park is home to some common IUCN list of endangered wildlife species such as the Sooty Mangabey, Buffalo, Chimpanzees (CR), Bongo Antelopes, Red Colobus Monkeys, Pigmy Hippopotamus, African Elephants, Maxwell Duiker, Savanna Buffalo, Leopard, Black and white Columbus Monkey, hooded vulture, among others (Government of Sierra Leone 5th National Report to CBD, 2014). The park is home to three distinct vulture species designated by the IUCN as critically endangered (CR). These vulture species include; the white-head vulture (*Trigonoceps occipitalis*, CR), the hooded vulture (*Necrosyrtes monachus*, CR), and the white-backed vulture (*Gyps africanus*, CR)

**Table 1.** Primates of Outamba-Kilimi National Park and their IUCN Conservation Status

	Scientific Name	Common Name	Conservation Status
1	<i>Pan troglodytes verus</i>	Western chimpanzee	Critically Endangered
2	<i>Colobus polykomos</i>	Sooty mangabey	Vulnerable
3	<i>Erythrocebus patas</i>	Patas Monkey	Least Concern
4	<i>Procolobus verus</i>	Olive colobus	Vulnerable
5	<i>Cercopithecus petaurista</i>	Lesser spot-nosed monkey	Least Concern
6	<i>Chlorocebus sabaues</i>	Green Monkey	Least Concern

The OKNP landscape is regarded as an important protected area that enhances primate conservation within the West African sub-region. The park hosts a variety of primates that are critically endangered for instance the "Western Chimpanzee". The Western Chimpanzee is, however, considered the OKNP key focal species that requires conservation attention. The OKNP is home to the largest remaining populations of Chimpanzees in Sierra Leone. The above primates play a very important conservation role through seed dispersal and other activities that promote ecosystem regeneration (**Table 1**).

Carnivores like the African Leopard (*Panthera pardus*), Spotted Hyena (*Crocuta crocuta*), African Civet (*Civettictis civetta*), African Palm Civet (*Nandinia binotata*), Marsh Mongoose (*Atilax paludinosus*) among others. These carnivore species play a

critical role in the conservation of the park through their scavenger, predatory, and seed dispersal activities within the park. Ungulates like the Red River Hog, (*Potamochoerus porcus*), Roan Antelope (*Hippotragus equinus*), Western Bushbuck (*Tragelaphus scriptus*), Common Warthog (*Phacochoerus africanus*) among others play a crucial role in conservation and ecosystem function of the park as they serve as herbivores and prey for carnivore's species of the OKNP.

#### Key stone trees species found in OKNP

The OKNP is not only home to a variety of wild animals but also to a great diversity of plant species (**Table 2**). The OKNP is dominated by woody plant species and flowering plants. The diversity of plant species within the OKNP landscape is greatly

attributed to the different ecological habitats found in the park (Fayiah & Fayiah, 2022). The OKNP accounts for over 300 plant species that are of great conservation significance. The *Pterocarpus erinaceus* (Rosewood) tree species are among the most threatened tree species in the park. The quality of the

rosewood and the international demand for the wood is the source of its illegal exploitation. Although there are over 300 tree species found in the park, however, the below species are commonly found within different ecologies of the park.

**Table 2.** Key Stone Trees Species found at OKNP

Scientific Names of Key Stone Tree Species	Ecological Habitats
<i>Pterocarpus erinaceus</i>	Savanna & Woodland
<i>Triplochiton scleroxylon</i>	Forests habitat
<i>Milicia excelsa</i>	Forests habitat
<i>Terminalia superba</i>	Forests habitats
<i>Daniellia Oliveri</i>	Savanna & Woodland
<i>Talbotiella gentii</i>	Wetlands
<i>Milicia regia</i>	Forests habitat
<i>Raphia farinifera</i>	Wetlands
<i>Parkia biglobosa</i>	Savanna & Woodland
<i>Lophira lanceolata</i>	Savanna & Woodland
<i>Pericopsis elata</i>	Different habitat
<i>Khaya senegalensis</i>	Forests Habitat
<i>Guibourtia ehie</i>	Different habitat
<i>Nymphoides guineensis</i>	Different habits
<i>Dilophotriche occidentalis</i>	Different habitats

#### Threats facing biodiversity conservation at OKNP

Although the OKNP is designated a national park, however, the park is rapidly losing its biodiversity richness status due to intensive anthropogenic activities across the park (Fayiah & Fayiah, 2022). These anthropogenic activities include illegal timber logging and trafficking, wild animal poaching and trade, gold mining along river banks, conventional slash-and-burn agricultural practices, and wildfire outbreaks. Furthermore, the illegal logging or harvesting of rosewood species (*Pterocarpus erinaceus*) within the park has exposed the park to great disturbance from loggers as well as the sound of heavy vehicles hurling the logs inside the park. This activity has resulted in deforestation, biodiversity loss, forced wildlife migration into neighboring Guinea, and the creation of small road networks within the park (Government of Sierra Leone, 2023). These rosewood trees are considered the “ivory of the forest” as they are among the most internationally trafficked flora in the world due to their quality, wood properties, and strength.

Although Outamba Kilimi National Park is characterized as a biodiversity hotspot in Sierra Leone, however, there is little or no comprehensive research documenting this claim and recording of wildlife species in different local languages. This is the first study that will document the wildlife species of Outamba Kilimi National Park in eight local languages in Sierra Leone. The rapid development of technology and the advancement of Western education (reading and speaking English) is inevitably resulting in the loss of local language knowledge and by extension the identification of wildlife species found in the park. Literature has shown that local names of fauna in more than five languages are scarce if not unavailable

in Sierra Leone. The only known literature that documents flora species in Sierra Leone in four to five local languages has been the work done by Savill and Fox (1967) titled “Trees of Sierra Leone”

This article intends to become the first document that will archive wildlife species in eight local languages in Sierra Leone. This research work will give greater insight in identifying wildlife species in eight local languages thereby closing the gap that has existed since the founding and colonization of Sierra Leone. This knowledge gap has stimulated a decline in the identification of wildlife, especially by the younger generation. This study is poised to close this knowledge gap by making available the names of wildlife species in eight local languages. Furthermore, the findings from this research will provide useful insight into the biodiversity status of OKNP and archive the local names of eight wildlife keystone species of the park. Thus, the article seeks to answer the following research questions 1) what is the biodiversity status of OKNP? 2) what are the local names of key wildlife species found in OKNP? 3) what conservation measures should be instituted to protect the fauna wildlife of OKNP? Our study is the first to document wildlife species of OKNP in the local dialect spoken by indigenes around the park.

#### MATERIALS AND METHODS

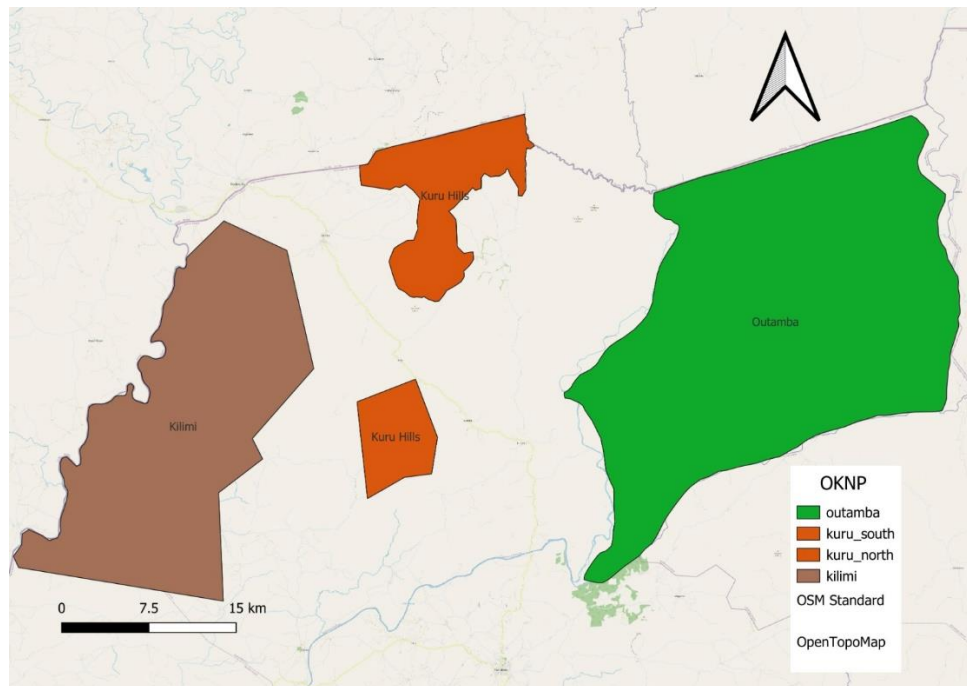
##### Description of the study area

Sierra Leone is a small nation located in West Africa and has a land area of 71 740km<sup>2</sup> equivalent to 27, 699sq miles. The country has 120km<sup>2</sup> of water bodies with the Atlantic Ocean

bordering along the west and southwest of the country. The country is bordered by Guinea to the north-east and Liberia to the south-east. The country has five geographic characteristics namely Mountains, Coastal lowlands, Interior plains, Interior plateau, and Hills (Government of Sierra Leone Report, 2023). The country's richness in biodiversity, vegetation, productive ecosystem, and lands is greatly attributed to its quintessential nature (Fayiah *et al.*, 2020a). The Northern region where Outamba Kilimi National Park is situated is characterized by Guinean-Forest and woodland that stretches into Guinea. Typically, the country's vegetation is made up of two key biogeographic ecosystems namely; the Guinean Congo Forest and the Sudan Guinean Savannah biome (Government of Sierra Leone Report, 2023). The north-western vegetation of Sierra Leone is characterized by Savannah Woodlands, Grassland Ecosystems, and patches of woodland and riparian forests landscapes.

The Outamba-Kilimi National Park (OKNP) is situated in the far north of Sierra Leone. It has a distance of approximately 296km and is situated within the Tambakha Chiefdom Karina District, Northern Province Sierra Leone. The Outamba Section of the park is approximately (74, 100ha) of land while the Kilimi

section is (38,800ha) respectively. The Outamba Kilimi National Park has the largest savanna ecosystem covering an area of 110, 900ha in Sierra Leone (Government of Sierra Leone, 2023). The Outamba-Kilimi National Park is logically divided into two; The Outamba section consists of hills, forests, grassland, flood plains, and a network of rivers of the little scarcies and Mongo. The Kilimi section is characterized by small streams that drain into the great scarcies. The Kilimi section of the landscape is flat with scattered vegetation. The Outamba Kilimi Landscape is part of the Guinean Forest Savanna Mosaic ecoregion in West Africa Africa (Nature and Wildlife, 2024). The forests serve as a migratory corridor for critically endangered wildlife species facing threats on either side of the landscape. The landscape has a blend of different forest-type vegetation such as gallery forests, woodlands, grassland savannah, moist broadleaf forests that present a dynamic and diverse wildlife ecosystem. The population of both Lower and Upper Tambakha was estimated to be 34, 422 people (Statistics Sierra Leone, 2021). According to the 2021 housing and population census, Sierra Leone's population was estimated at 7, 092, 113 people (Statistics Sierra Leone, 2021).



**Figure 1.** Map showing Outamba Kilimi National Park

#### Study design

The study used both secondary and primary data for this research. The secondary sources from published government reports, articles publication, FAO reports, online repositories, and technical reports among other sources. The primary source adopted various methods such as direct and indirect wildlife observation approaches and tribal stakeholder consultations across the OKNP landscape. The observation approach was done randomly across various ecological habitats of the park. The direct observation was done using camera pictures and vocalization/sounds of animals. The indirect observation approach was done through feeding trace, footprint, dung, and

nest surveillance across the park for the past ten years. The tribal stakeholder's consultation was done by engaging traditional village heads, former hunters, farmers, and herbalists. These indirect and direct observation data were collected over a long period for the entire park.

#### Wildlife species identification

Biodiversity identification in local languages is critical for the preservation of wildlife names for the current and future generations (Kueffer & Larson, 2014; Hooykaas *et al.*, 2019; Lam, 2020). The identification of wildlife species across the OKNP was done using "the Kingdom Field Guide to African

Mammals” The identification of wildlife species in local languages was done by tribal heads/elders using pictorial diagrams of the animals in question. Pictures of the various animals were displayed or shown to tribal elders using Android or computers. In cases where a particular elder is unable to identify the animal, the picture is taken to another tribal elder in the village. After the compilation of wildlife species names, two tribal heads per community within the park vetted these names using pictures from an Android phone. The scientific names of wildlife encountered were determined using the “Kingdom Field Guide to African Mammals” The identification of some keystone tree species of the park was done using “Trees of Sierra Leone Book” authored by (Savill & Fox, 1967). Other methods of wildlife species identification globally practiced today have been through wildlife camera trapping mechanisms set in forests as per (Yu et al., 2013; Villa et al., 2017; Yousif et al., 2017; Willi et al., 2019) are widely used today. Nonetheless, this method of wildlife identification is expensive and requires technical expertise and taxonomist knowledge.

#### Data collection

The data for this study was from secondary and primary sources. The primary source of data was collected through direct and indirect observation. The secondary sources of data were collected through a desktop survey of published literatures such as biodiversity reports, conference proceedings, and article publications. Keywords such as Outamba, Kilimi, Biodiversity, National Park, and Wildlife were used to search for relevant information on the status of biodiversity of the park.

#### Data analysis

The collected data of the study was exported into Microsoft Excel for cleaning and presented in tabular form for ease of understanding. Columns without a name are labeled as N/A.

### RESULTS AND DISCUSSION

The study presents results for 63 wildlife species at the Outamba Kilimi National Park via direct or indirect observation from 2014 to 2024. These wildlife observations include primates, carnivore’s ungulates, and some keystone tree species that are of great conservation value. These wild species names are recorded in eight local languages in Sierra Leone excluding the Latin or scientific names. However, some tree species’ local names are absent due to the inability of tribal heads contacted to accurately identify and name these species. The keystone tree species of the Outamba Kilimi National Park is the (*Pterocarpus erinaceus*) commonly called Rose Wood. The illegal harvesting of this species is the root of deforestation and other landscape fragmentation activities in the park. Among the wildlife species recorded on the OKNP, Chimpanzees, Monkeys, and Western elephants are considered the keystone species that have a disproportionate impact on the entire park landscape. The local languages in which the names of wildlife species are translated include; Krio, Susu, Limba, Temne, Mende, Fulani, Yalunka, and Koranko. In Sierra Leone, Krio, Temne, and Mende are the largest ethnic languages that every Sierra Leonean speaks and understands one of these languages clearly. Every Sierra Leonean living in Sierra Leone understands or speaks one of these languages with ease. The ethnic local language spoken widely across the park by locals is Susu. However, the majority understand and speak Krio the Lingua franca of Sierra Leone especially among the youths. In addition to local names, the common names of these species are also given in **Table 3**.

**Table 3.** Local Names of Wildlife Species found in Outamba Kilimi National Park

Scientific Name	Common Names	Susu	Krio	Fulani	Limba	Temne	Koranko	Mende	Yalunka
<i>Panthera leo</i>	Lion	Yeteh	Lion	Peo-rie	Yaadee	Tenedi-kant	Yaa-reh	Jah-lee	N/A
<i>Panthera pardus</i>	Leopard	Barteh	Lepet	Boutoh-Be-eh	Ohu-yeah	Ka-Tonkla	Kulee	Kohlee	Buruna-nyarina
<i>Crocuta crocuta</i>	Spotted Hyena	Kalma	Hyena	Bonoruu	N/A	N/A	N/A	N/A	N/A
<i>Profelis aurata</i>	Golden Cat	Barteh Gbele	wild Puss	Nyarie-borureh	N/A	Au-tukk	N/A	Dbo-gbo-pussy	N/A
<i>Leptailurus serval</i>	Serval Cat	Barteh Foreh	Wild Puss	Nyarie-borureh	Bayo-bho-ye	N/A	N/A	N/A	N/A
<i>Canis (lycaon) pictus</i>	African Wild Dog	Laka-Bareh (Lagie-bare)	Wild Dog	Donduu	Taa-ee	An-tann	Or-raa-roo	N/A	N/A
<i>Canis adustus</i>	Side stripped Jackal	Woula/ Laka Bareh	Wild Dog	Donduu	N/A	N/A	N/A	Dhogbo-nyeeleh	N/A
<i>Felis nigripes</i>	Black footed cat	Woula-Nyarie	Wild Puss	Nyarie-borureh	Balee-nyee	An-yaarie	N/A	Pee-wuee	N/A
<i>Genetta pardine</i>	Pardine Genet	Barteh Khulumansay	Genet	Pipe-nyarie	Cardoo	An-tonkla	N/A	N/A	N/A
<i>Civettictis civetta</i>	African Civet	khulumansay Kolokati	Mus Kyat	Bufu-nyah	Foo	An-Shen-Gbep	Fra-yhon-kumah	Ghikwuee	N/A

<i>Nandinia binotata</i>	Palm Civet	Fantee	Mus Kyat	pepi-nyarie	Foo	An-tonkla	N/A	N/A	N/A
<i>Ichneumia albicauda</i>	White Tail Mongoose	khulumansay /Binkii	Mongose	Bufu-nyah	Khurey-Khurey	An-sey-en	N/A	N/A	N/A
<i>Atilax paludinosus</i>	Marsh Mongoose	khulumansay Foreh	Mongose	Bufu-nyah	Khurey-Khurey	An-toto	N/A	Paikwuee	N/A
<i>Herpestes flavescens</i>	Slender Mongoose	Totwe-a	Mongose	Bufu-nyah	Khurey-Khurey	An-toto		Paikwuee	
<i>Pan troglodytes verus</i>	Western Chimpanzee	Demue	Babu	Demuu	Peeh-tee	Kawotoh	Wohroh	Gooleh	Demuna
<i>Papio papio</i>	Guinea Baboon	Ghokie	Monkey	Gokee	Kohgiee	Konkoh-kula	Banfan		Gbokuna/Kalaa
<i>Cercocebus atys</i>	Sooty Mangabey	Kakamassi	Monkey	Keroh	Huntaralanko	Katalokuu	Kuu-leh	Kwu-waa	Kodena
<i>Colobus polykomos</i>	King Colobus	Yem Bey	blaken white monkey	Bandoruu	Kubandoh	Karushii	Sun-gbeh	Jee-weah	Foonina
<i>Cercopithecus petaurista</i>	Lesser Spot-Nosed Monkey	Yere-fekeh	white nose onkey	Kulaa-Chalaa	Kendor	Sotahferah	Gban-fah	Hopha-Kulee	Foonina
<i>Cercopithecus (Diana) roloway</i>	Diana Monkey	Baghoyie	monkey	Keroh	Kubandoo	Futabee	N/A	Kwa-gboii	Tugase-forela
<i>Cholocebus athiops</i>	Green Monkey	Kuley Feqeh	black face monkey	Keroh	Baghoo Puteh	Tayek-Keferah	N/A	Kwu-waa	Kudee
<i>Erythrocebus patas</i>	Patas Monkey	Wondokuley	Red monkey	Kuulah	Kupol-polee	Kayek	N/A	Kwu-waa	Kudee
<i>Cercopithecus campbelli</i>	Campbells Monkey	Yonruma	Red mot monkey	Keroh	Kendor	Kafotabee	N/A	Kwu-waa	Kude-Gbelaa
<i>Pro-colobus badius</i>	Red Colobus	Yambey Gbele	Red Body Monkey	Bandoruu	Kubandoh	Karushii	Sun-gbeh	Jee-weah	Foonina
<i>Perodicticus potto</i>	Common Potto	Khundeh	poto	Jamaldu		An-Konko	N/A	N/A	N/A
<i>Galagoides thomasi</i>	Thomas Galago	Binkii	bush pikin	Pepe-nyarie	Chen-Cheh	An-yuufuu	N/A		N/A
<i>Galagoides demidoff</i>	Demidoffs Galago (Bushbaby)	Binkii	bush pikin	Pepe-nyarie	Chen-Cheh	Kenani	N/A	N/A	N/A
<i>Orycteropus afer</i>	Aardvack	Kinfeh	Advark	Yea-duu	Shenkii	Kenani	N/A	N/A	N/A
<i>Hipopotamus amphibious</i>	Common Hippo	Mallie	Hippopotamus	Gabee	Noroo		Yere-wulee	Mallay	N/A
<i>Loxodonta africana cyclotis</i>	Forest Elephant	Syllie	Elephant	Maubaa	Kampaa	Raank	Kum-gbeleh	Heeleeh	N/A
<i>Syncerous caffer nanus</i>	Buffalo	Woulai Ningea	Bush cow	Ehdaa	Cha-chee	Baa-an	Furaa-Nighee	Taawee	
<i>Kobus dafassa</i>	Waterbuck	Yallay	Deer	Jaureh	Shen-kee	Ae-Tik	Minah	N/A	N/A
<i>Cephalophus silvicultor</i>	Yellow Back Duiker	Munti	Freetambo	Jaureh	Kulmaa	Au-Worr	N/A	N/A	N/A

<i>Tragelaphus scriptus</i>	Bushbuck	Khelie	Freetambo	Boulereh	Bata-haa	Or-tikk	N/A	Ndo-peeaa	N/A
<i>Cephalophus rufilatus</i>	Red Flanked Duiker	Bouleh	Freetambo	Jaureh-BoLereh	Balomaa	En-lem	Wouyan	Fufue-twawee	N/A
<i>Cephalophus niger</i>	Black Duiker	Lofueh	Freetambo	Joureh-boloreh	Bapheloo	En-lem	Wouyan	N/A	N/A
<i>Cephalophus dorsalis</i>	Bay Duiker	Bouleh	Freetambo	Joureh-lareh	Balomaa	En-lem	Wouyan	N/A	N/A
<i>Hyemoschus aquaticus</i>	Water Chevrotain	Yei Khelie	Freetambo	Joureh-Papiteh	Bhatahaa	An-shane	Wouyan	N/A	N/A
<i>Philantomba maxwelli</i>	Maxwell Duiker	Torkeh	Freetambo	Joureh-wil-lerah	Balomaa	en-worr	Wouyan	Twa-wee	N/A
<i>Potamochoerus larvatus</i>	Bushpig	Birfie-yei	Bush Hog	Korsej-borureh	Korr-saa	Kasup- En-Bhoku-um	Koh-sea-eh	Dodeaa-Tehlee	N/A
<i>Phacochoerus africanus</i>	Common Wharthog	Ballie	Bush Hog	Korsej-borureh	Korr-saa-hoputeh	Kasup- En-Bhoku-um	Koh-sea-eh	Dodeaa-Tehlee	N/A
<i>Hylochoerus meinertzhageni</i>	Giant Forest Hog	Gbese	Bush Hog	Korsej-borureh	Korr-saa-hobuleh	Kasup- En-Bhoku-um	Koh-sea-eh	Dodeaa	N/A
<i>Potamochoerus Porcus</i>	Red River Hog	Khoseh Gbelee	Red hog	Korsej-borureh	Kpeesee	Kasup	Koh-sea-eh	Dhongboh-Londeeh	N/A
<i>Smutsia gigantea</i>	Gaint Pangoline	Konsofa	Shame beef	Kinsin-konson	Kotoo	N/A	Bonsoreeh	Kaai-nyiee	N/A
<i>Phataginus tricuspis</i>	Tree Pangoline	Kososroh	Shame beef	Kinsin-konson	Kotoo	N/A	Bonsoreeh	Kaai-nyiee	N/A
<i>Hystrix cristata</i>	Crested Porcupine	Sagaleh	Porcupine	Bengah-sagaldeh	Sagalee	An-lipp	Bale-yoleh	Vhoo-gwueh	N/A
<i>Mellivora capensis</i>	Honey Bager	Dindilin-ye		Bareh-bourureh	Teteh	N/A	N/A	N/A	N/A
<i>Atherurus africanus</i>	Brush Tail Porcupine	Khese-khese-in	Porcupine	Benjah	Khurey-Khurey	An-sheteh	Baleeh	See-jeah	N/A
	Rabbit	Yeareh	Rabit	Saaree	Sankahboyie	An-leem	Faseh-nikuroh	Haa-gbe-wee	N/A
<i>Rattus rattus</i>	Black Gaint rat	Baleeh	Gron-pig	Bae-ruu-sulmeh	Kuyobhie	AnKil	Tuleh-gbeh	Kiwii	N/A
<i>Thryonomys swinderianus</i>	Marsh Cane rat	Yen-yeh	Cutin grass	Maa-nyaa	Sumbuu	Da-Baem	Ko-in-nanu	See-wee	Kalafena
<i>Thryonomys gregorianus</i>	Savannah Cane Rat	Yen-yeh	Cutin grass	Maa-nyaa	Sumbuu	Ta-gbut	Ko-in-nanu	See-wee	Kalafena
<i>Xerus rutilus</i>	Stripped ground Squirrel	Khoryeh	Squirrel	Qheruu	Khere-yeah	Mo-kereh	Keeran	Kai-kwuee	N/A
<i>Funisciurus pyrropus</i>	Fire footed rope Squirrel	Yendekhe	Squirrel	Qheruu	Khere-yeah	Okonko	Keeran	Kai-kwuee	N/A
<i>Glaucomys volans</i>	Flying Squirrel	Sehleh	Squirrel	Jolduu	Tompee	On-benaa	Tompah	Gwuan-ee	N/A
<i>Veranus komodoensis</i>	Monitor Lizard	Segeleh	Guana	Bambajowal	Sinsee	An-futor	N/A	N/A	N/A

	Agama Lizard	Kohleh	Kondo	Sagaree	Kuteroo	Tonkeleh	N/A	Paamee	N/A
<i>Dendroaspis polylepis</i>	Black Mamba	Bidaae	Black Snake	Fintorie	Ghuho-ghoro	An-weet	Tun-fee	Qhuleeh	N/A
<i>Python regius</i>	Ball Python	Tineh-foreh	Boma	Modorie-Donghol	Leen	An-Nyeren	Min-yhaa	Dilee	N/A
<i>Python sebae</i>	Rock Python	Tineh-Gbeleh	Boma	Modorie-diyen	Thoyoh	Kobasin	Min-yhaa	Jaa-hun-Gutee	N/A
<i>Cerastes vipera</i>	Sand Viper	Tambalumbeh	Viper	Kourarie	Wortoh	An-ruff	N/A	Tupwuee	N/A
<i>Naja melanoleuca</i>	Cobra	Fintwue	Cobra	Fintorie	Ghuho-ghoro	An-gboroo	N/A	Ghulee	N/A
<i>Pelusius niger</i>	Tortoise	Nanteh-Khurey	Tortoise	Keaku	Hootea	Sarad-laal	Chi-chee	Haakwuee	N/A
<i>Trionyx triunguis</i>	African-shelled Tortoise	Ndel-Khurey	Wata-Tortoise	Keaku	Kumelor	An-kusesay	Chi-chee	Haakwuee	N/A

Note\*\* Some wildlife species names in local languages were not identified. Some languages have two names for a particular species. A blank column means no local name was found for that species. N/A mean names in a particular local language were not found.

The Outamba Kilimi National Park is home to wildlife species of critical conservation value. The park's geographic location and proximity to the neighboring Guinea forest landscape make it an ideal corridor for wildlife movement. The park is known for harboring critically endangered species such as hooded vultures, African Forest elephants, and Western Chimpanzees among others. Nonetheless, the park landscape is characterized by illegal logging of rosewood (*Pterocarpus erinaceus* Logs) and other trees species illegal hunting of wildlife species, illegal settlement within the park, cattle rearing within the park, slash and burn agricultural practices, and illegal dredge mining. However, the vast nature of the park makes it easier for the landscape to still harbor critically endangered wildlife species in great numbers.

The main tribal language or native dialect spoken across the park landscape is Susu although the younger generation speak Krio (Sierra Leone's Lingua franca). Other dialects spoken across the park are Limba, Koranko, Fulani, Temne, Mende and Yalunka. However, the majority of these younger generations are unable to name or identify the wildlife species found within their territory in their local tribe or dialect. Such development is worrisome for biodiversity conservation and future generations' role in natural resources management. This scenario is among the reasons that inform this study to close such gap for the current and future generations. Understanding the names of wildlife species in local dialect makes it easier for researchers and other biodiversity conservation projects or initiatives to strive well. The knowledge of wildlife species in the local dialect makes the indigenous people a critical force to reckon with in the conservation of biological resources. Furthermore, a knowledge of wildlife species in the local dialect enhances employment potential from the government and conservation projects of the landscape. This study's aims and findings are in line with the literature provided by (Kotera & Phillott, 2023). According to the authors, the identification of biodiversity in local languages is going extinct around the world. The authors argue that understanding the local names of wildlife species helps increase conservation interaction among

locals. Studies conducted by Wilder *et al.* (2016) and Gorenflo *et al.* (2012) also lend credence to this work by reiterating the importance of local languages in biodiversity conservation. A recent study by Yangandalwar and Indurkar (2022) and Ocholla *et al.* (2016) concludes that local people provide greater protection for biodiversity than modern conservation knowledge and activities. Hence their knowledge in wildlife species identification is a great treasure for the conservation of biodiversity.

Across Sierra Leone, Krio, Mende, and Temne languages are the three main local dialects spoken. As such, every Sierra Leonean speaks at least one of these dialects with ease. Therefore, recording wildlife species' local names in these languages will have great conservation benefits, especially for future generations. Local people and their dialect have a strong bond on flora and fauna conservation and habitat preservation across Africa. This study corroborates with the research done by Benner *et al.* (2021) on using "traditional ecological knowledge alongside scientific knowledge to meet critical biodiversity conservation objectives. Furthermore, Salomon *et al.* (2018) argue that combining ecological conservation knowledge with scientific knowledge enhances the understanding of biodiversity across various natural resources management systems. In tropical countries like Sierra Leone, local ecological knowledge of biodiversity has unique and different perspectives as compared to scientific knowledge on conservation, environmental protection, wildlife identification, and movement patterns of wild animals as per (Turner *et al.*, 2009). Knowledge of wildlife species in local dialects/languages enhances biodiversity conservation, culture, and traditional ways of habitat preservation.

The Yalunka and Koranko dialects are among the few spoken dialects in Sierra Leone today. Although some people may claim to be Yalunka or Koranko by tribe, they, however, barely speak or understand the dialect. Therefore, the unfilled gap in the **Table 4** is attributed to the limited number of people who speak or understand Yalunka dialect. Knowledge of biodiversity in traditional language helps in the integration of conservation



strategies and approaches in natural resources management (Benner et al., 2021; Petso et al., 2022).

For example, the local dialect name for spotted Hyena (*Crocuta crocuta*); Golden cat (*Profelis aurata*) among others in some of the above-mentioned local languages was not known. This could be attributed to the limited number of species within the forest ecologies of Sierra Leone, especially after the civil war in 2000. Another possible explanation for this could be the decline in the identification of wildlife species due to the decline in traditional ecological knowledge of biodiversity in general. In addition, most species found within the OKNP landscape are rare in other parts of the country hence the reason for the difficulty in identifying most of the species in some local dialects.

The identification and translation of wildlife species names in major tribes/dialects like Mende, Temne, Limba, and Fulani have great conservation value within the landscape of Sierra Leone. These languages are spoken in the four corners of Sierra Leone and as such would make a great impact in the conservation and preservation of wildlife knowledge for the current and future generations. The diversity of wildlife species cut across various regions in Sierra Leone is similar. This is in accordance with the findings of Fayiah et al. (2020b) who stated that wildlife's species diversity differ across different regions of the country. Therefore, achieving the names of wildlife species will serve as a strong foundation for the identification and understanding of wildlife species found across Sierra Leone. This study will serve as a baseline study for future research and knowledge sharing on wildlife identification in Sierra Leone.

## CONCLUSION

The identification and naming of wild animals across the Outamba Kilimi National Park is important to achieve conservation objectives in the park. The study found that the main tribal language or native dialect spoken across the park landscape is Susu although the younger generation speak Krio (Sierra Leone's Lingua franca). Achieving wildlife species of the Outamba Kilimi National Park is critical in conserving biodiversity in Sierra Leone. The eight local languages or dialects in which the names of wildlife species will serve as vocabulary for the current and future generations. The wildlife species category studied includes primates, carnivores, and ungulates which are of great conservation value. However, the park is under threats such as illegal logging of Rose Wood (*Pterocarpus erinaceus*), timber logging, illegal hunting of wildlife species, illegal settlement within the park, cattle rearing within the park, slash and burn agricultural practices and illegal dredge mining. This study will serve as a baseline for future studies in wildlife species identification in local languages across Sierra Leone. More research is recommended to be done for tree species, fish, and birds for a better understanding of our local biodiversity.

**ACKNOWLEDGMENTS:** None

**CONFLICT OF INTEREST:** None

**FINANCIAL SUPPORT:** None

**ETHICS STATEMENT:** None

## REFERENCES

- Amano, T., Berdejo-Espinola, V., Akasaka, M., de Andrade Junior, M. A., Blaise, N., Checco, J., Çilingir, F. G., Citegetse, G., Corella Tor, M., Drobniak, S. M., et al. (2023). The role of non-English-language science in informing national biodiversity assessments. *Nature Sustainability*, 6(7), 845-854. doi:10.1038/s41893-023-01087-8
- Amano, T., Berdejo-Espinola, V., Christie, A. P., Willott, K., Akasaka, M., Báldi, A., Berthinussen, A., Bertolino, S., Bladon, A. J., Chen, M., et al. (2021). Tapping into non-English-language science for the conservation of global biodiversity. *PLoS Biology*, 19(10), e3001296.
- Benner, J., Nielsen, J., & Lertzman, K. (2021). Using traditional ecological knowledge to understand the diversity and abundance of culturally important trees. *Journal of Ethnobiology*, 41(2), 209-228. doi:10.2993/0278-0771-41.2.209
- Berkes, F. (2012). *Sacred ecology*. 3rd ed. Routledge New York. doi:10.4324/9780203123843
- Chen, S. (2016). Language and ecology: A content analysis of ecolinguistics as an emerging research field. *Ampersand*, 3, 108-116.
- Chowdhury, S., Gonzalez, K., Aytekin, M. Ç. K., Baek, S. Y., Belcik, M., Bertolino, S., Duijns, S., Han, Y., Jantke, K., Katayose, R., et al. (2022). Growth of non-English-language literature on biodiversity conservation. *Conservation Biology*, 36(4), e13883. doi:10.1111/cobi.13883
- Di Bitetti, M. S., & Ferreras, J. A. (2017). Publish (in English) or perish: The effect on citation rate of using languages other than English in scientific publications. *Ambio*, 46, 121-127.
- Fayiah, M., & Fayiah, M. S. (2022). Challenges of biodiversity conservation in Africa: A case study of Sierra Leone. In *Biodiversity In Africa: Potentials, Threats and Conservation* (pp. 601-622). Singapore: Springer Nature Singapore. doi:10.1007/978-981-19-3326-4\_23
- Fayiah, M., Kallon, B. F., Dong, S., James, M. S., & Singh, S. (2020b). Species diversity, growth, status, and biovolume of Taia River Riparian forest in Southern Sierra Leone: Implications for community-based conservation. *International Journal of Forestry Research*, 2020(1), 2198573.
- Fayiah, M., Shikui, D., Singh, S., Supe, R. X., Sheriff, K., Robinson, I., & Barrie, A. (2020a). Plant diversity and regeneration potentials in Protected Area Forests of Sierra Leone. *Current Research in Agricultural Sciences*, 7(2), 64-83.
- Fish, R. D., Austen, G. E., Bentley, J. W., Dallimer, M., Fisher, J. C., Irvine, K. N., Bentley, P. R., Nawrath, M., & Davies, Z. G. (2024). Language matters for biodiversity. *BioScience*, 74(5), 333-339. doi:10.1093/biosci/biae014
- Frainer, A., Mustonen, T., Hugu, S., Andreeva, T., Arttijeiff, E. M., Arttijeiff, I. S., Brizoela, F., Coelho-de-Souza, G., Printes, R. B., Prokhorova, E., et al. (2020). Cultural and linguistic diversities are underappreciated pillars of biodiversity. *Proceedings of the National Academy of Sciences*, 117(43), 26539-26543. doi:10.1073/pnas.2019469117
- Gafner-Rojas, C. (2020). Indigenous languages as contributors to the preservation of biodiversity and their presence in international environmental law. *Journal of International*

- Wildlife Law & Policy*, 23(1), 44-61. doi:10.1080/13880292.2020.1768693
- Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C. J., Watson, J. E., Zander, K. K., Austin, B., Brondizio, E. S., et al. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability*, 1(7), 369-374. doi:10.1038/s41893-018-0100-6
- Gorenflo, L. J., Romaine, S., Mittermeier, R. A., & Walker-Painemilla, K. (2012). Co-occurrence of linguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. *Proceedings of the National Academy of Sciences*, 109(21), 8032-8037.
- Gorenflo, L. J., Romaine, S., Mittermeier, R. A., & Walker-Painemilla, K. (2012). Co-occurrence of linguistic and biological diversity in biodiversity hotspots and high biodiversity wilderness areas. *Proceedings of the National Academy of Sciences*, 109(21), 8032-8037. doi:10.1073/pnas.1117511109
- Government of Sierra Leone (2023). Non-detriment finding for West African rosewood pterocarpus erinaceus in sierra leone. Cites Scientific Authority Sierra Leone. Available from: <https://cites.org/sites/default/files/documents/F-PC26-16-04.p>
- Government of Sierra Leone 5th National Report to CBD (2014). Sierra Leone's 5th National Report to the CBD Blic of Sierra Leone. Available from: <http://207.253.234.101/doc/world/sl/sl-nr-05-en.pdf>
- Hooykaas, M. J., Schilthuizen, M., Aten, C., Hemelaar, E. M., Albers, C. J., & Smeets, I. (2019). Identification skills in biodiversity professionals and laypeople: A gap in species literacy. *Biological Conservation*, 238, 108202. doi:10.1016/j.biocon.2019.108202
- Hua, X., Greenhill, S. J., Cardillo, M., Schneemann, H., & Bromham, L. (2019). The ecological drivers of variation in global language diversity. *Nature Communications*, 10(1), 2047. doi:10.1038/s41467-019-09842-2
- Janovsky, R. M., & Larson, E. R. (2019). Does invasive species research use more militaristic language than other ecology and conservation biology literature? *NeoBiota*, 44, 27-38.
- Konno, K. O., Akasaka, M., Koshida, C., Katayama, N., Osada, N., Spake, R., & Amano, T. (2020). Ignoring non-English-language studies may bias ecological meta-analyses. *Ecology and Evolution*, 10(13), 6373-6384.
- Kotera, M., & Phillott, A. D. (2023). What's in a name? Changes in local names can reflect shifts in biodiversity and culture. *Current Conservation*; Vol 17: [Accessed June, 2024] Available from: <https://www.currentconservation.org/wp-content/uploads/2023/12/Issue-17.3.pdf>
- Kueffer, C., & Larson, B. M. (2014). Responsible use of language in scientific writing and science communication. *BioScience*, 64(8), 719-724.
- Lam, D. P., Hinz, E., Lang, D. J., Tengö, M., von Wehrden, H., & Martín-López, B. (2020). Indigenous and local knowledge in sustainability transformations research: A literature review. *Ecology & Society*, 25(1).
- Loh, J., & Harmon, D. (2014). Biocultural diversity: Threatened species, endangered languages. World Wide Fund for Nature Netherlands.
- Mace, G. M. (2005). Millennium ecosystem assessment. Current state and trends: Findings of the Condition and Trends Working Group. In: R. Hassan, R. Scholes, N. Ash, (Eds.), *Ecosystems and Human Well-Being* (Vol. 1, pp 77-122). Washington, DC: Island Press.
- Munro, P. (2020). CHAPTER 5 Wildlife Conservation. In *Colonial Seeds in African Soil: A Critical History of Forest Conservation in Sierra Leone* (pp. 125-161). New York, Oxford: Berghahn Books. doi:10.1515/9781789206265-008
- Nature and Wildlife (2024). Outamba-Kilimi National Park. Available from: <https://www.visitsierraleone.org/outamba-kilimi-national-park/>
- Ocholla, G. O., Mireri, C., & Muoria, P. K. (2016). Application of indigenous knowledge systems in wildlife management: A case study of the Samburu pastoral community in Kenya. *International Journal of Applied*, 6(1).
- Petso, T., Jamisola Jr, R. S., & Mpoeleng, D. (2022). Review on methods used for wildlife species and individual identification. *European Journal of Wildlife Research*, 68(1), 3. doi:10.1007/s10344-021-01549-4
- Phillott, A. D., & Chandrachud, P. (2021). Fishers' ecological knowledge (FEK) about sea turtle in coastal waters: A case study from Vengurla, India. *Chelonian Conservation and Biology* 20(2), 211-221.
- Ramírez-Castañeda, V. (2020). Disadvantages in preparing and publishing scientific papers caused by the dominance of the English language in science: The case of Colombian researchers in biological sciences. *PloS one*, 15(9), e0238372.
- Salomon, A. K., Lertzman, K., Brown, K., Wilson, K. I. B., Secord, D., & McKechnie, I. (2018). Democratizing conservation science and practice. *Ecology and Society*, 23(1), 597-608.
- Savill P. S., & Fox, J. E. D. (1967). Trees of sierra leon. Government Printing Press, Freetown. *Sierra Leone*.
- Tantipisanuh, N., & Gale, G. A. (2018). Identification of biodiversity hotspot in national level-Importance of unpublished data. *Global Ecology and Conservation*, 13, e00377. doi:10.1016/j.gecco.2018.e00377
- Toomey, A. H. (2016). What happens at the gap between knowledge and practice? Spaces of encounter and misencounter between environmental scientists and local people. *Ecology and Society*, 21(2), 28.
- Turner, N. J., Ari, Y., Berkes, F., Davidson-Hunt, I., Ertug, Z. F., & Miller, A. (2009). Cultural management of living trees: An international perspective. *Journal of Ethnobiology*, 29(2), 237-270.
- Unasho, A. (2013). Language as genes of culture and biodiversity conservation: The case of "Zaysite" language in southern region of Ethiopia. *International Journal of Modern Anthropology*, 1(6), 13-36. doi:10.4314/ijma.v1i6.1
- United Nations (2019). International Year of Indigenous Languages. Available from: <https://www.un.org/development/desa/dspd/2019/01/2019-international-year-of-indigenous-languages/>.
- Villa, A. G., Salazar, A., & Vargas, F. (2017). Towards automatic wild animal monitoring: Identification of animal species in camera-trap images using very deep convolutional neural networks. *Ecological Informatics*, 41, 24-32.

- Wallace, R., Ayala, G., Negroes, N., O'Brien, T., Viscarra, M., Reinaga, A., Márquez, R., & Strindberg, S. (2020). Identifying wildlife corridors using local knowledge and occupancy methods along the San Buenaventura-Ixiamas road, La Paz, Bolivia. *Tropical Conservation Science*, 13, 1940082920966470. doi:10.1177/1940082920966470
- Wilder, B. T., O'meara, C., Monti, L., & Nabhan, G. P. (2016). The importance of indigenous knowledge in curbing the loss of language and biodiversity. *BioScience*, 66(6), 499-509.
- Willi, M., Pitman, R. T., Cardoso, A. W., Locke, C., Swanson, A., Boyer, A., Veldthuis, M., & Fortson, L. (2019). Identifying animal species in camera trap images using deep learning and citizen science. *Methods in Ecology and Evolution*, 10(1), 80-91.
- Yangandalwar, S. G., & Indurkar, U. S. (2022). Role of tribal people in the conservation of biodiversity in gadchiroli district (M.S.). *International Journal of Researches in Biosciences, Agriculture and Technology*, 3(10), 73-79.
- Yousif, H., Yuan, J., Kays, R., & He, Z. (2017). Fast human-animal detection from highly cluttered camera-trap images using joint background modeling and deep learning classification. In *2017 IEEE international symposium on circuits and systems (ISCAS)* (pp. 1-4). IEEE.
- Yu, X., Wang, J., Kays, R., Jansen, P. A., Wang, T., & Huang, T. (2013). Automated identification of animal species in camera trap images. *EURASIP Journal on Image and Video Processing*, 2013(1), 52.