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Integrating traditional ecological knowledge in environmental assessment of socio-economic infrastructure projects in South Eastern Cameroon

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Abstract
Economic development in Africa resulting in infrastructural advancement leads to habitat loss and fragmentation. Environmental assessments are conducted to minimize negative ecological impacts of infrastructural projects, but traditional ecological knowledge is often ignored. This study documents the Traditional Ecological and Ethnobiological Knowledge (TEEK) of Baka Indigenous communities in the Dja Biosphere Reserve in south-eastern Cameroon, to justify their inclusion in environmental assessment of infrastructure projects in the region. We conducted group discussions among 17 Baka communities to characterize their indigenous knowledge, and semi-structured interviews with private construction companies' employees, NGOs, and government officials to assess their awareness and integration of TEEK in environmental assessments. Our findings show that Baka communities hold unique traditional knowledge including plant flowering and fruiting phenology, animal population, behaviour and trophic roles, and local uses of 23 plant and 29 animal species. We highlighted barriers to integrating TEEK in environmental assessments and discussed potential solutions.

Keywords: Cameroon, traditional ecological knowledge, ethnobiological knowledge, environmental assessment, Baka people, indigenous communities

Introduction
Investment in infrastructure and capital projects is associated with economic development, increase in gross domestic product (GDP), and poverty alleviation especially in the developing economies (Chakamera and Alagidede, 2018; Gurara *et al.*, 2017; Mallek *et al.*, 2024) [13, 32, 44]. For example, access to essential services such as transportation and healthcare were reported to have positive effects especially on poor families (Khandker, Bakht, and Koolwal, 2009; Mu and van de Walle, 2007) [41, 54]. However, African countries continue to lag behind in infrastructural development, which experts associate with slow economic growth on the continent (Chinzara, Dessus, and Dreyhaupt, 2023) [16]. Therefore, many African countries have recently intensified capital investment on infrastructures to boost their local economies (Mo Ibrahim Foundation, 2023) [50]. However, most infrastructure development requires land use change resulting in habitat loss and fragmentation, which is the greatest threat to biodiversity (Brooks *et al.*, 2002; Groom *et al.*, 2006; Nic Ludhagha *et al.*, 2020) [11, 30, 57].
Environmental assessment (EA), also known as environmental impact assessment (EIA), is defined as a comprehensive and integrative evaluation of the potential adverse effects a project will have on the environment, social and human wellbeing (Gulis *et al.*, 2022; Morgan, 2012) [31, 53]. EA was first codified into law in the United States in January 1970, following years of persistent pressures by environmental groups; today, it has been written into law in all countries across the world (Bond *et al.*, 2020; Gulis *et al.*, 2022) [9, 31]. The main goal of the EA is to ensure sustainable development with minimal impacts on biodiversity and the environment (Keken *et al.*, 2022; Morgan, 2012) [40, 53]. However, the EA is based on scientific and ecological data such as species diversity, endemic and threatened species, and their habitats, without considering traditional ecological knowledge and biocultural practices (Sallenave, 1994; Usher, 2000) [68, 76].

Traditional ecological knowledge (TEK) is a subset of Indigenous science referring to knowledge, skills, and philosophies developed by societies with a long history of interaction with their natural environment (Finn, Herne and Castille, 2017; Vermeulen, 2022) [26, 77]. It is also considered a mechanism by which Indigenous communities have acquired and passed down their knowledge of natural phenomena over generations (Gordon *et al.,* 2023; Montag *et al.,* 2014) [29, 52]. TEK can provide important historical reference in ecological studies and conservation management (Moller *et al.,* 2004; Wentzel *et al.,* 2023) [51, 79]. Appreciation and acknowledgment of the importance of TEK has resulted in an increase in scientific publications that integrated TEK in their studies (Finn, Herne and Castille, 2017; Jessen *et al.,* 2022) [26, 38]. Examples of western science that integrated TEK include ecological modelling of wildlife movement, habitat selection, and animal behaviour (Bonta, Gosford and Eussen, 2017; Housty *et al.,* 2014; Polfus *et al.,* 2014) [10, 36, 65], biotic interactions (Savo *et al.,* 2016) [69], archaeological basis for modelling population trends (Lee *et al.,* 2018) [42], species identification (Dos Santos and Antonini, 2008) [21], and phenological shifts over time (Wehi, 2009) [78]. However, there is a slow uptake in the integration of TEK in environmental impact assessments, especially in the Global South (Eckert *et al.,* 2020) [23]. Over 17.5% of terrestrial surfaces are managed by Indigenous peoples (United Nations Environment Programme, 2017) [75], therefore, integrating their TEK in environmental impact assessments will promote diversity of voices and enhance community participation in governance and natural resource management (Amutabi, 2013) [6]. Biodiversity conservation is intricately linked with Indigenous knowledge because poor management of natural resources and habitats of native biodiversity can result in consequential loss of biocultural heritage, local languages and dialects, aesthetic and spiritual values (Ens *et al.,* 2016; Souther, Colombo and Lyndon, 2023) [24,71].

Cameroon is a Central African country, noted for its rich fauna, flora, and cultural diversity, but this biological diversity is increasingly threatened by habitat loss, species overexploitation, and global environmental changes (Abugiche, 2008; WWF, 2022) [3, 82]. Being the 5th most biologically diverse country in Africa (Butler, 2023) [12], threats to Cameroonian biodiversity may have a significant impact on many range-restricted species, while new taxa are still being discovered and described to date (Cheek, Edwards and Onana, 2023; Cornel *et al.,* 2020; Matheny *et al.,* 2017; Ngoute and Rowell, 2024) [15, 17, 47, 55]. The country is home to over 25 million people, belonging to over 250 ethnic groups, of whom about 10% identify as Indigenous people (International Labor Standards, 2015) [37]. Therefore, the rights of the Indigenous communities are enshrined in Cameroonian national laws, in accordance with the United Nations Declaration on the Rights of Indigenous peoples (Manning *et al*. 2018) [45]. In Cameroon, there are two main groups of Indigenous peoples: the forest dwellers, who are mainly hunter-gatherers, including the Baka, Bagyeli, Bakola, and Bedzang peoples, and are mostly distributed in the South and East regions of Cameroon; and the Indigenous pastoralists, such as the Mbororo people, occupying the savannah areas in the Northern region of the country (Gbabandi, 2021) [28].

The Baka Indigenous communities occupying areas near the Dja Faunal Reserve are the first forest occupants in Cameroon (Nguiffo, 2003) [56]. For these Indigenous communities, the forest is their ancestral home, cultural heritage, source of livelihood, symbol of spiritual connections, and security (Pemunta, 2013) [63]. They live in small encampments and solely rely on non-timber forest products for livelihood; however, their way of life has been gradually eroded starting since the 1950s when the French colonial government-initiated road projects and other infrastructure development (Billong *et al.,* 2020; Pemunta, 2013) [8, 63]. Post-independence from France, the Cameroonian government continues to initiate several capital projects in the area including the Mékin Hydroelectric Dam, the Sangmélima-Ouesso road construction, and logging concessions (Rim, 2023) [67]. Prior to the implementation of these projects, EAs were carried out in accordance with the national laws, but the Baka people and their Indigenous knowledge were not included in the assessments and the project implementations (Pemunta, 2013) [63].

The objective of this study is to investigate the barriers to the integration of TEKs in environmental assessments. To do this, we used focus group discussions to document the diverse TEKs held by the Baka peoples of the Dja Faunal Reserve, Cameroon. We also interviewed resident staff of government and non-governmental organisations working in the region to assess their awareness and utilisation of TEKs in their projects. We discussed solutions and recommendations that will overcome the barriers to the integration of TEK in the EA of development projects in the region, with potential for the uptake of such recommendations across Cameroon and Africa, more broadly.

Materials and Methods

Study area

We administered questionnaires in three districts where Baka communities are found: Djoum, Mintom, and Lomié, in Southern and Eastern regions of Cameroon, respectively (Figure 1). These districts are characterised by Guinean-type Equatorial Domain climate. The average annual temperature in these regions is 25 °C, annual average relative humidity is 81%, and rainfall varies between 1500 and 3000 mm/year (Mbarga, 2014) [49]. The relief is a diversified plateau with a topography characterised by plains, valleys, and hills. The area extends over two hydrographic basins including that of Dja River in the North and of Ayina River in the South. The vegetation is characterised by dense forest and peri-forest savannas, which harbour a diversity of animals, birds, and invertebrates (Zamedjo, 2011) [84].

Collectively, over 23,000 people live in Djoum and Mintom districts, comprising the Fang, Bulu, Zamane, and the Baka ethnic groups, while Lomié district has over 19,000 inhabitants representing Baka, Zime, Kako, and Ndjeme groups (Abdel *et al.,* 2024; Mbarga, 2014) [1, 49]. However, the Baka Indigenous people are the dominant ethnic group in these focal districts (Abdel *et al.,* 2024; Mbarga, 2014) [1, 49], hence our study focused on this group. These Indigenous communities depend on small-scale and subsistence agriculture, hunting, and fishing (Abdel *et al.,* 2024) [1].

Data collection

We conducted focus group discussions to collect and classify TEK in 17 selected Indigenous communities in three distinct districts Djoum (N=7), Mintom (N=4), and Lomié (N=6; Figure 1). The selection of these 17 Baka communities was based on their geographical proximity to the Dja Biosphere Reserve, giving priority to larger camps, and communities adjacent to or affected by government infrastructure projects, including settlements that were recently relocated due to a

road construction project. The focus group discussions included all available members of the respective communities, ranging from five to 13 individuals, including adults and youths, depending on the size of the respective communities. Focus group discussions, each lasting about 90 minutes, were conducted in the Baka's local language with the help of a translator. These discussions included specific questions to highlight the types of TEKs, the ability to identify native plants and animals in the area, and the communities' experience with the government and NGOs and their development and/or social projects. During the focus group discussions, TEK were identified and classified using the free list method (Quinlan 2005) [66] which involved collecting specific information such as the names and local uses of plants and animals, plant phenology, seasonal behaviour of the animals, and other attributes, for identifying and classifying traditional ecological knowledge. With the permission of the surveyed local communities, the focus discussion group meetings were recorded from which vital information was transcribed and extracted for data analysis.

To assess the awareness, appreciation, and integration of TEKs in the EA process and project implementation, we conducted semi-structured interviews for four employees working for private construction companies, seven staff of various NGOs, and 18 government officials overseeing the construction projects within the study area. With the consent of the respondents, the semi-structured interviews, each lasting about 60 minutes, were recorded and later transcribed for coding and data analysis.

We extracted data such as species local names, the parts used, and the corresponding local uses from the transcription of the recorded focal group discussions. Following this, we determined the scientific names and assessed the biogeographical status (native vs introduced) of each species using the Plant of the World (POWO; https://powo.science.kew.org/), the Animal Diversity Web (ADW; https://animaldiversity.org/), and Birds of the World (BOW; https://birdsoftheworld.org) databases. We also determined the threat status of all referenced species using the IUCN Red List of Threatened Species (IUCN (https://www.iucnredlist.org/).

Data analysis

We calculated the quotation index, representing the frequency of mentions of each species across the 17 focal group discussions (Pieroni *et al.*, 2004) [64]. We also used analysis of variance (ANOVA) to determine significant differences in TEK among the 17 surveyed communities, as well as to determine significant difference ($\alpha = 0.05$) in the frequency of references to the TEK among sampled communities. Data collected during the interviews of the government officials and private company construction workers on their awareness and application of TEK in EA and infrastructure projects was summarised.

Results

a) TEK held by Baka Indigenous communities

The 17 surveyed Baka communities demonstrated various Indigenous and Local Knowledge (ILK), which can be broadly categorised into ecological and ethnomedicinal domains. Overall, 29 native faunal and 23 plant species were mentioned by the communities (Tables 1-2). The Baka communities have local names for all mentioned animal species and described their local uses (Table 1). Most of these animals were hunted for meat or sold as bushmeat in local markets as a source of income (Table 1). The local respondents also noted the ecological significance of some of the birds as seed dispersers and another avifauna with high abundance (Table 1). One dangerous animal was mentioned, and traditional laws regulating the consumption of another animal were described (Table 1). For example, nine of the 29 animal species identified by these communities are protected by taboos and local traditional laws in the communities (Table 1). Traditional ecological knowledge associated with 23 of the 29 native animals has a relatively high (quoted by at least 80% of the respondents) quotation index among the 17 surveyed communities (Table 1). Moreover, only five of the 29 animals have been assessed as having higher extinction risks on the IUCN Red List ranking (Table 1).

The Baka communities mentioned 23 native plants by their local names and described their uses, ranging from food, medicinal uses, construction, fodder, spices and condiments, fish poison, and apiculture, among others (Table 2). The local communities also described the flowering and fruiting phenology and other notable ecological significance of the plant species (Table 2). However, only four of the 23 four plants have been assessed as having higher extinction risks (vulnerable, endangered) while the rest were either least concern, data deficient, or near threatened (Table 2). Additionally, 18 of the 23 native species mentioned by the respondents, have relatively high quotation index (quoted by at least 80% of the respondents; Table 2). Other local ecological knowledge demonstrated by the communities include their ability to navigate through the Dja Biosphere Reserve just by using natural signs and their ability to know the seasons.

b) Distribution and similarity of the TEKs among the 17 surveyed communities

The traditional ecological and ethnobiological knowledge collected in Djoum, Mintom, and Lomié are relatively common and well distributed in the region. Therefore, the quotation index showed the high degree of congruence and similarity in the TEKs shared among the surveyed communities. Twenty-four of the 29 native animals and 18 of the 23 plants were referenced in more than 80% (+++) of the 17 surveyed communities, which highlights the ubiquity of TEKs on the native biodiversity in the region (Tables 1, 2). These results were further corroborated with an ANOVA test ($F=1.48$, $DF=2$, $P=0.26$) showing that there was no significant difference in the TEKs held among the three distinct districts where these 17 communities were surveyed.

(c) Awareness of TEKs by non-Indigenous residents and the driving factors

All seven NGO staff, only one of four private company employees, and four of the 18 government officials have heard of TEKs or know what it means. Some of the government workers explained that they were recently transferred to work in the region, so they have limited experience and knowledge of the local communities. Overall, the employees of government institutions, NGOs, and private companies do not use TEKs in their environmental assessment and project implementations. Furthermore, despite being aware of the TEKs and having been working directly with the local communities in the region for many years (ranging from five to 30 years), the NGO staff rarely use TEKs in their work. Some of the reasons for lack of inclusion of the Indigenous communities and their traditional knowledge include the following: (a) lack of awareness of

local communities and their cultures within government institutions, (b) local communities were not invited or involved in decisions regarding projects within their lands, (c) high illiteracy levels of the Indigenous communities hinder engagement with the government, (d) the occasional recommendations by leaders of local communities conflict with government efforts to minimise project costs, (e) weak social structure among the local communities resulting in weak or no representations in government stakeholder forums, and (f) lack of policy framework to promote the inclusion of TEKs in environmental assessment and infrastructure project implementations.

Discussion

This study highlighted a wide variety and well-diffused traditional ecological and ethnobiological knowledge systems possessed by the Baka Indigenous communities. A total of 12 local uses were described by the 17 surveyed Baka communities for the 23 plant and 29 faunal species. These local uses, ranging from source of food, medicine, spices and condiments, protein, fodder, timber, domestic energy source, fish poison, apiculture, soap and cosmetics, to income from selling bushmeat, underscores high reliance of local communities in Sub-Saharan Africa on natural resources for livelihoods (Hailemicheal *et al.*, 2024; Joos-Vandewalle, Wynberg, and Alexander, 2018; Liu *et al.*, 2021; Timko, Waeber, and Kozak, 2010) [33, 39, 43, 73], especially near or within protected areas such as Biosphere reserves (Yang, 2024) [83]. Beyond local uses, relevant ecological knowledge mentioned by the local communities include birds, e.g., *Lophoceros fasciatus* and *Ceratogymna atrata*, that are effective in seed dispersal, animals noted for high toxicity levels, plants used by insects in their development stages, seasonal animal behavioural changes, and knowledge of the phenology of plant flowering and fruiting, which may reflect their wild fruit gathering habit. Local TEKs and their integration with western science for biodiversity conservation and human health have been documented in other parts of the world including the Eastern Himalaya, the Aboriginal peoples of Western Canada, East African local fishing communities, and Nhema communities, Zimbabwe, among others (Abea *et al.*, 2024; Finn, Herne, and Castille, 2017; Maroyi, 2011; Mathooko, 2005; O'Neill *et al.*, 2017; Turner, Ignace and Ignace, 2000) [2, 26, 46, 48, 62,74]. Such vital ecological knowledge could be developed and integrated into testable hypotheses on forest ecology, species responses to environmental changes, and biotic interaction dynamics (Jessen *et al.*, 2022) [38] and conservation practices and policies (Haq *et al.*, 2023; Werdel, Matarrita-Cascante and Lucero, 2024) [34, 80].

Relatively high quotation index for many of the species mentioned by the Baka communities indicate that the ethnobiological and ecological knowledge is well circulated and preserved among the several settlements and encampments surrounding the Dja Biosphere Reserve, as have been passed along from generation to generation (Bethel *et al.*, 2022; Hatfield, 2017) [7, 35]. However, proactive programs on alternative income sources away from bushmeat sales coupled with monitoring of wildlife populations should be implemented to reduce harvesting pressure on the local fauna of the region. This is particularly important since five of the 29 local animals are already listed in the threatened categories of the IUCN Red List. Nonetheless, these communities also have and respect traditional laws (taboos) that forbids hunting of at least nine species mentioned during the surveys. Such traditional laws are effective means of protecting rare and threatened species and reduce overexploitation for thousands of years (Osei-Tutu, 2017; Sinthumule, 2023) [62, 70]. This study showed that the Baka communities know the forest very well and this knowledge is diffused among the local communities, which justifies the importance of effectively engaging with these Indigenous groups for the conservation of Dja Biosphere Reserve and the design and implementation of government projects.

Despite the fact that Cameroon has ratified relevant UN Charters and promulgated national laws that protect Indigenous People's rights, the results obtained from this study showed that local communities and the traditional ecological knowledge they possess are neglected in environmental assessments and project implementation in southeastern Cameroon. This has had a profound effect on the way of life of these local communities, for example, some of the local communities were relocated due to a government infrastructure project in the region. This is a symptom of a broader political problem of lack of government engagement with local communities, which further hinders the implementation of effective community-based conservation (Ahmed, Kathambi and Kibugi, 2023; Dawson *et al.*, 2021) [5, 18]. The lack of integration of TEKs in environmental assessments and project implementations in this region may be attributed to lack of training for government employees on TEKs, transient residency of government employees, thus having little time to engage with the local communities, and lack of awareness on cultural sensitivity and Indigenous people's rights. While the employees of government institutions and construction companies working in the region are not aware of TEKs possessed by the Indigenous communities, the NGO employees who acknowledge local TEKs rarely use it in their grassroots activities and social development projects. Lack of consideration of TEKs in the local operations of the international NGOs operating in the study area suggest colonial science and practices, orchestrated by power and funding structures. Rather than facilitating bi-directional knowledge exchanges between local communities and international NGOs, western practices and philosophies are being unidirectionally taught to these local communities. The findings here strengthen the multiple evidences in literature that demonstrate the continuation of western neo-colonial philosophies by international NGOs in Africa (Domínguez and Luoma, 2020; Dowie, 2011; Freudenthal *et al.*, 2012) [20, 22, 27].

Policy interventions are needed at national level in Cameroon to facilitate training programmes for government employees and to develop best practices and guidelines for engaging with local communities where infrastructure projects are being implemented. Such policies would strengthen measures to combat discrimination and marginalisation of local people, reconcile the development and preservation of their cultures, advocate for community-based conservation, and ensure effective engagement and representation of Indigenous communities in environmental assessments (Esnail *et al.*, 2023; Oduor, 2020) [25, 61]. When government employees are trained, this will have a positive impact on how they and the staff of private companies, whose projects they supervise, interact with local communities. Likewise, NGO employees need to be trained on cultural awareness, community engagement, and appreciation for TEKs. Government policies are also needed to ensure that local communities are protected from colonial and parachute science by international NGOs (De Vos and Schwartz, 2022) [19]. Low literacy levels and weak traditional institutions among the Baka Indigenous

people and the local communities present in the three districts visited during this study severely hinder representation during stakeholder meetings. However, these reasons are not enough to prevent local community representation in stakeholder forums; rather it underscores lack of government commitment to reach the local communities by providing translators or engaging with the educated progenies of the local communities. While ethnic diversity among these local communities can result in diversity of natural resource use and increase TEKs considered in project environmental assessment and implementation, it can also be an ingredient for incongruence and disunity (Agrawal and Gibson, 1999; Hailemicheal *et al.*, 2024; Noss, 1997) [4, 33, 58]. Therefore, unity among ethnic diversity in these communities is crucial for effective stakeholder representations. Additionally, transparency and accountability are important to build trust among the local communities and their leaders or representatives (Syafaruddin, 2024) [72].

Indigenous peoples and local communities have depended on local biodiversity for livelihoods for millennia. These people groups have spiritual, emotional, and mental connections to their ancestral homes, since it is part of their identity, ethnicity, and language. The traditional ecological and ethnobiological knowledge and wisdom they have developed and transmitted intergenerationally are important sources of information that can guide government policies and infrastructure programs, protected area design and management, and research. Therefore, this study advocates for minimising the negative effects of capital projects on biological and biocultural heritages, through policy interventions and diversity and inclusion of all stakeholders and voices in government decision making process.

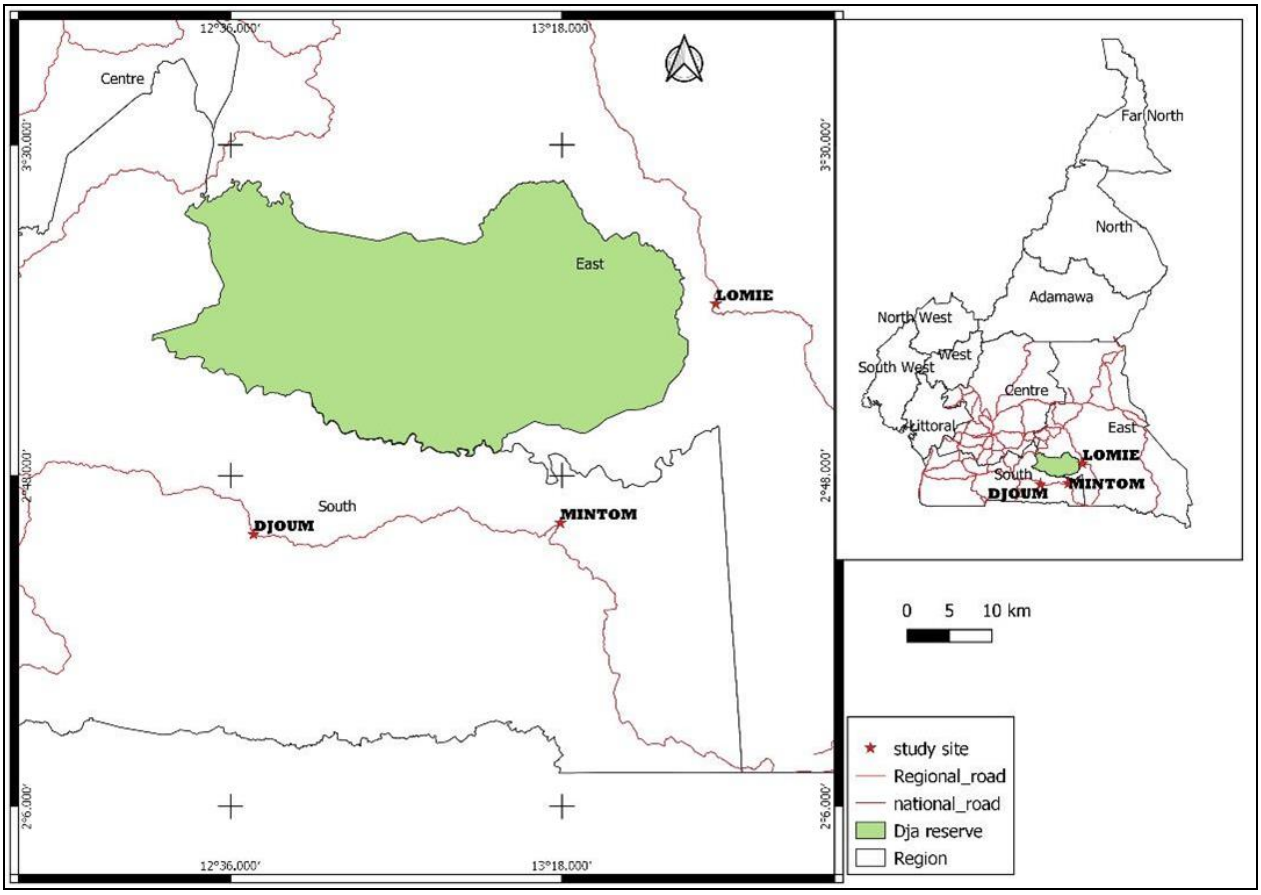

Fig 1: Map of Cameroon showing the location of the three surveyed districts communities dominated by the Baka Indigenous People. *Green shaded area represents the Dja Biosphere Reserve, the reference protected area that these communities depend on for livelihood.*

Table 1: A list of the faunal species and their local uses mentioned by the 17 Baka communities in Southeastern Cameroon during the survey

Scientific names	Local name	Common name	Origin	IUCN status	Local uses or knowledge	Quotation index*
Atherurus africanus J.E. Gray, 1842	Mboke	African brush-tailed porcupine	Native	Least concern	Food, meat, source of income	+++
Civettictis civetta Schreber, 1776	Liabo	African civet	Native	Least concern	Food, source of income	+++
Syncerus caffer nanus Boddaert, 1785	mbɔ̀kɔ̀	African forest buffalo	Native	Least concern	Meat, source of income	+++
Colobus guereza Rüppell, 1835	Kalu	Black-and-white colobus	Native	Least concern	Dangerous animal, it can bring illness and other kinds of harm	+
Myosciurus pumilio Le Conte, *1857*	Sende	African pygmy squirrel	Native	Least concern		+
Cephalophus nigrifrons St. Leger, 1934	Monjombe	Black fronted duiker	Native	Least concern		+++
Philantomba monticola Thunberg, 1789	Dèngbè	Blue duiker	Native	Least concern	Food, source of income	+++
Pan troglodytes Blumenbach, 1775	Seko	Chimpanzee	Native	Endangered	Food, source of income	+++
Cercopithecus pogonias Bennett, 1833	Mambe	Crowned guenon	Native	Near threatened	Source of income	+
Cercopithecus neglectus Schlegel, 1876	Po'o, Kema na ngo	Monkey	Native	Least concern	Source of income	+++
Loxodonta cyclotis Matschie, 1900	Ya	Elephant	Native	Critically endangered	Food, source of income	+++
Cricetomys emini Wroughton, 1910	Gbe	Emin's pouched rat	Native	Least concern	Food, source of income	++
Hylochoerus meinertzhageni Thomas, 1904	Bea	Giant forest hog	Native	Least concern	Food, source of income	+++
Gorilla gorilla gorilla Savage, 1847	Ebobo	Gorilla	Native	Critically endangered	Food, source of income	+++
Cercopithecus mitis Wolf, 1822	Kema	Monkey	Native	Least concern	Food, source of income	+++

Panthera pardus Linnaeus, 1758	Sua	Panther	Native	Vulnerable	Food, source of income	+++
Cephalophus callipygus Peters, 1876	Ngèndì	Peters' duiker	Native	Least concern	Prohibited for consumption by young girls	+++
Potamochoerus porcus Linnaeus, 1758	Pàmè	Red river hog	Native	Least concern	Potential source of food	+++
Tragelaphus spekii Speke, 1863	Mbùli	Sitatunga/marshbuck	Native	Least concern	Intensive hunting for meat	+++
Cephalophus silvicultor Afzelius, 1815	Bèmbà	Yellow-backed duiker	Native	Near threatened	Protected from hunting by traditional taboos against eating its meat	+++
Cercopithecus nictitans Linnaeus, 1766	Avembe	Putty-nosed monkey	Native	Near threatened		++
Psittacus erithacus Linnaeus, 1758	Kukulu	Grey parrot	Native	Endangered	Intelligent bird. It is commonly kept as a pet	+++
Lophoceros fasciatus Shaw, 1812	Mokuyek uye	Congo pied hornbill	Native	Least concern	Effective seed disperser	+++
Ceratogymna atrata Temminck, 1835	Mango	Black-casqued hornbill	Native	Least concern	Effective seed disperser	+++
Lophoceros camurus Cassin, 1857	Ndo, koloko	Red-billed dwarf hornbill	Native	Least concern	Good meat	++
Horizocerus albocristatus Cassin, 1848	Mbedi	Western long-tailed	Native	Least concern		+
Bycanistes albotibialis Cabanis & Reichenow, 1877	Kata	White-thighed hornbill	Native	Least concern	A bird with powerful alarm calls	+++
Corythaeola cristata Vieillot, 1816	Kulungu	Great blue turaco	Native	Least concern	Protected by certain taboos which prohibit the natives from killing or seizing it	+++
Tauraco persa Linnaeus, 1758	Kululu	Guinea turaco	Native	Least concern	Very popular bird used as a pet	+++

*Quotation Index (based on the number spontaneously mentioned by communities): + quoted by less than 25% of the communities; ++ quoted by more than 25% and less than 80% of the targeted communities, +++ quoted by more than 80% of the communities.

Table 2: A list of the native flora and their local uses mentioned by the 17 Baka communities in Southeastern Cameroon during the survey

Scientific names	Local names	Origin	IUCN status	Local uses or knowledge	Other ecological knowledge	Quotation index*
Albizia zygia J.F.Macbr	Saka	Native	Least concern	Food, fodder, timber, fuelwood, apiculture, medicine, cosmetic	Flowers in February to May, and ripe fruits from November to April	+++
Alstonia boonei De Wild	Guga	Native	Least concern	Medicine	Flowers from June to August, fruits from December to March	+++
Annickia chlorantha Oliv. Setten & Maas	Evue	Native	Least concern	Medicine		+++
Baillonella toxisperma var. obovata Aubrév. & Pellegr	Mabe	Native	Vulnerable	Medicine, food		+++
Blighia welwitschii var. bancoensis Aubrév. & Pellegr.	Tokoa bemba	Native	Least concern	Fish poison, medicine, timber	Immature fruit from January, open fruits from November	+++
Canarium occidentale A.Chev	Sene	Native	Least concern	Food, fuelwood, crafts	Flowers from July to August or from December to March	++
Gambeya lacourtiana De Wild. Aubrév. & Pellegr	Bambu, mubambu	Native	Least concern	Food, fuelwood		+++
Cleistopholis patens var. klaineana Pellegr	Poo	Native	Least concern	Medicine	Fruits between June and January, but fruiting peaks between April and May,	+++
Piptadenia gabunensis Harms Roberty	Boluma	Native	Least concern	Medicine, soap, timber	Flowering from November to April, mature fruits from September to October	+++
Distemonanthus benthamianus Baill	Movingui	Native	Least concern	Medicine	Dry fruits from November	+++
Entandrophragma thomasii Ledoux	Sipo	Native	Vulnerable	Medicine, timber	Flowers between November and March, mature fruits at the end of the dry season	+++
Scorodophloeus zenkeri Harms	Lom, Lem	Native	Least concern	Medicine, spices		++
Garcinia sp	Nsang	Native	Data deficient	Medicine		+++
Leplaea cedrata A.Chevy Pellegr	Boce	Native	Near threatened	Medicine	Flowering from February to October, fruits from March to April, or from June to July or November to December	+
Irvingia gabonensis Aubry-Lecomteex O'Rorke Baill	Pékié	Native	Near threatened	Food, medicine	Flowers in February to June	+++
Keayodendron bridelioides Leandri	Yok	Native	Vulnerable		Flowering occurs in May to June Fruiting in November to April	+++
Sorindeia rubiflora Engl	Nkana	Native	Least concern	Food, soap	Flowering and fruiting peaks towards the end of the dry season	++
Greenwayodendron suaveolens Engl & Diels Verdc	Botunga	Native	Least concern	Medicine	Flowering in October until November and the peak of fruiting is in December	+++
Pterocarpus zenkeri Harms	Ngele	Native	Endangered	Medicine, construction	Flowering from December to March, fruits from December to March	+++
Pycnanthus angolensis Welw. Warb	Etenge	Native	Least concern	Medicine, cosmetic		++
Ricinodendron heudelotii Baill. Pierre ex Pax	Gobo	Native	Least concern	Medicine, food, spices	Flowers from March to May, fruits from May to October. It is a host for caterpillar of native insects	+++
Entada tetraptera Schumach. & Thonn Roberty	Daga, djaba, djaga	Native	Least concern	Spices, medicine	Flowering from end February to early April	++
Trichoscypha redingi De Wild	Ngoyo	Native	Least concern	Food, medecine	Flowering, between February and June Fruiting between June and January	+++

Quotation Index (based on the number spontaneously mentioned by communities): + quoted by less than 25% of the communities; ++ quoted by more than 25% and less than 80% of the targeted communities, +++ quoted by more than 80% of the communities.

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