The role of linguistics in promoting biocultural diversity for sustainable development: A case of Chindali spoken in Ileje, Songwe Region, Tanzania

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ABSTRACT

This paper aimed to analyse the role of linguistics in promoting biocultural diversity for sustainable development by studying Chindali, an indigenous language as spoken in the Ileje District of the Songwe Region in the southern highlands of Tanzania. Using Chindali as an example of another indigenous language, the paper discusses the vital function of language in promoting bicultural diversity for meeting the United Nations Sustainable Development Goals (SDGs). This study is based on Luisa Maffi's 1996 Biocultural Diversity Theory. This study employed a qualitative approach with a descriptive research design. Data were gathered through text collection. The population of this study consisted of Chindali native speakers found in Ileje District who are estimated to be 193,000 people. The population also included texts written in Chindali. To inform the study, 8 informants were sampled using purposive and snowball sampling techniques, which resulted in data saturation. The researchers also collected a book written in Chindali, which demonstrates biocultural diversity in different stories. Data were analysed descriptively through thematic analysis. The findings indicate that indigenous languages serve as a means of communication and, at the same time, act as a store of significant biocultural variation, including culture, ecology, and biodiversity. It demonstrates that indigenous languages play an important role in conserving and transferring biocultural information required for long-term development, influencing community behaviours in biodiversity, land use, and sustainability that adhere to the UN's 2030 Sustainable Development Goals 11, 12, and 15. The study adds to the scant literature on the role of linguistics in promoting biocultural diversity for sustainable development. The study suggests more research on Bantu orthography so that Bantu languages should be in written form.

Keywords: Biocultural Diversity, Chindali, Linguistics, Sustainable Development, Sustainable Development Goals (SDGs)

I. INTRODUCTION

Various intellectuals have expressed an interest in sustainable development. Because of its significance, the United Nations (UN) has taken steps to recognise it as a key 2030 Agenda item. This sustainability Agenda addresses all sectors of society, politics, economics, and culture. In response to this Agenda, current researchers have studied various aspects, including the function of linguistics as a component of culture, in promoting biocultural diversity for sustainable development. However, conclusions remain inconsistent, particularly regarding the function of indigenous languages in fostering biocultural diversity for sustainable development; because indigenous languages are not emphasised, Kiswahili and English have taken on this role in East Africa (Ondondo, 2020). In the rest of Africa, the major language is English.

Although some researchers have attempted to address the role of linguistics in promoting biocultural diversity for sustainable development (Maffi, 1998; Hanspach et al., 2020; Gavin et al., 2015), the issue remains under-represented in the Chindali language, which is spoken in Ileje, Songwe, in Tanzania's southern highlands. This gap inhibits our understanding of how biocultural development, particularly through indigenous languages, might attain sustainability. As a result, this study investigates the function of linguistics in enhancing biocultural diversity for sustainable development, using Chindali spoken in Ileje, Songwe region, the southern highlands of Tanzania, as an example. The findings are expected to help inform both sustainable development policy and language planning for sustainable development.

1.1 Statement of the Problem

The world is moving towards sustainable development, as outlined in the United Nations' 2030 Agenda. The strategy emphasises ecological preservation, climatic resilience, and biodiversity, as outlined in SDG 11, 13, and 15. However, linguistics is little adressed as a component of sustainable development. On the other hand, much work on the function of linguistics in encouraging biocultural variety for sustainable development is cross-linguistic; little has been

done to address the issue in Chindali. The study is significant because it adds to our understanding of the role of linguistics in promoting biocultural diversity for sustainable development using Chindali language.

1.2 Research Objective

Investigates the critical role of the language plays in promoting biocultural diversity sustainability and the implications of their loss for achieving the United Nations Sustainable Goals (SDGs).

II. LITERATURE REVIEW

2.1 Theoretical Review

The study is underpin by Biocultural Diversity Theory (Maffi, 1998). According to the theory, Cultural Diversity, Linguistic Diversity, and Biological Diversity are all interrelated and mutually beneficial. Cocks (2010) states that biodiversity is increasingly recognized as an essential resource on which families, communities, and nations depend. The idea will be useful in investigating the role of linguistics in supporting biocultural development for the Chindali language. The continuity losses of biodiversity around the world remain problematic for nature conservation (Bridgewater &Rotherham, 2019); in this line, it is very important to investigate the critical role of the language plays in promoting biocultural diversity sustainability and the implications of their loss for achieving the United Nations Sustainable Goals (SDGs) to develop the theory. The theory will assist the researcher in collecting and analysing words demonstrating biocultural and sustainable development.

The supporting theories are Linguistic Relativity, advocated by Benjamin Lee Whorf in 1897-1941 and Edward Sapir in 1884-1939, which states that language influences how people perceive and categorise the world, Traditional Ecological Knowledge, pioneered by Harold Conklin in 1950, which states that indigenous languages and local communities hold sophisticated ecological knowledge passed down from one generation to another through language and oral traditions, and Sustainable Development Theory which require environmental protection, cultural preservation and social equity. The researcher will examine data using these ideas by linking collected terms that depict biocultural variety and sustainable development.

2.2 Empirical Review

The globe drive towards sustainable development as UN' 2030 agenda. The agenda emphasizes on ecological preservation, climate resilience and biodiversity, which is well stipulated in SDG 11, 13, and 15. However, it overlooked linguistics as the dimension of sustainable development. Maffi (2005) explain the linkage between language, culture and biodiversity forming the biocultural diversity. Maffi (Ibid) argues that linguistics plays a crucial role in sustaining biocultural diversity, as a language encodes traditional ecological knowledge vital to sustainable development. The assertion implied that for development sustainability it is important to put emphasis of these aspects in interconnection and not as separate entity. Maffi (1998) concludes that language is fundamental for conserving traditional ecological knowledge essential to biodiversity. Hanspach et al. (2020) states that biocultural approaches, anchored in linguistic diversity and increasingly recognized as a vital for addressing complex sustainability challenges through pluralistic worldviews.

Across linguistics, many languages around the world encode rich ecological knowledge and sustainable practices development. As these languages face extinction there is an urgent need to understand their role in sustaining both local environments and global at large. Gavin et al. (2015) a strategy for incorporating traditional knowledge and cultural values into conservation efforts is explained by Gavin et al. (2015). In a similar vein, Pretty et al. (2009) discuss the significance of cultural practices, traditional knowledge, and local government in maintaining biodiversity. Grenoble and Whaley (2006) are of the view that indigenous languages carry taxonomies, oral traditions, and cosmologies that guide sustainable interactions with the Environment. Gorenflo et al. (2012) supports that there is significant correlation between areas of high biodiversity and high linguistics diversity. The non-expert of the biocultural diversity understands the communicated knowledge to build ecological literacy. A salient concern of biodiversity conservation arena is to understand how language can be employed by experts to communicate knowledge to non-expert audiences and build economical literacy.

According to Agbeleoba et al. (2025), in their study of ecolinguistic and critical discourse analysis of environmental narratives in sustainable development goal communications, languages play an important role in improving global development sustainability. Gul et al. (2025) argue that language can either perpetuate unequal notions or develop a sense of interconnectedness with nature, demonstrating how indigenous languages approach environmental issues. The difficulties discussed are those that individuals face on a daily basis in their communities. United Nations Educational, Scientific and Cultural Organization, [UNESCO] (2025) encouraged members of the G20 Culture Working Group, which met in Durban, South Africa, to strengthen their engagement in linguistic diversity through policies, partnerships, and concrete initiatives that support the revitalisation, preservation, and promotion of indigenous languages

as critical to long-term development. On the other hand, Ondondo (2020) advocates for the use of indigenous languages in sustainable development, stating that for a nation to develop educationally, socially, politically, and culturally, its people must interact with the language they understand best; thus, indigenous languages play an important role in the propagation of development issues. Thus, to have good command in linguistics empower an individual to involve actively in sustainability. The strong command in language has a significant relationship with development sustainability.

Apart from the efforts made by various authors to address the role of linguistics in promoting biocultural diversity for sustainable development in accordance with the Global Agenda of SDG 11, 13, and 15, little has been done to emphasise linguistics, particularly indigenous languages, in promoting biocultural diversity for sustainable development. This study aims to bridge the gap by investigating how the Chindali language spoken in Ileje district, Tanzania, plays an important role in promoting biocultural variety for sustainable development. This knowledge gap is evidenced by Otamendi-Urroz, et al., (2025) who state that there is a research gap on bicultural diversity in Africa and Asia which need to be presented, specifically in traditional knowlegde, values and worldviews.

III. METHODOLOGY

The study was undertaken in the Bundali division of the Ileje District in the Songwe Region, with a focus on Ngulugulu village, where Chindali is the native language. The area was selected because it is a remote area, which appears to be less influenced by other languages. A qualitative approach with a descriptive study design was employed to examine the role of linguistics in promoting biocultural diversity for sustainable development. The researcher opted the descriptive research design because the focus of the study is describe the characteristics of collected words that carries ecological knowledge and portray the biocultural diversity for sustainable development. The population of this study consisted of Chindali native speakers found in Ileje District who are estimated to be 193,000 people (LOT, 2009). The population also included texts written in Chindali.

A sample of 8 elderly native speakers from the village was selected because they are insightful in language and culture. The informants were obtained through purposive and snowball sampling technique. The researcher sampled the native insightful key informants in the study area who were able to tell life stories and narrate Chindali folklores through both linear and exponential non- discriminative snowball sampling technique. The researcher consulted village and hamlet leaders to obtain their permission to collect data. The researcher obtained the first native insightful key informants purposively who could provide stories and narrations by asking the first villager to tell him about the native insightful key informants who could provide stories and narrations. After the session, the researcher asked the informants the person who was conversant in Chindali language and culture till 8 informants who saturated the information. Snowball technique was opted for because it is natural and convenient in collecting natural and authentic information from a native speaker. It enabled the researcher to get potential informants that could narrate Chindali folklores and give life stories about social and cultural issues where different terms for biocultural diversity were selected. These informants produced sentences from the natural setting, the context in which language is used. The technique was suitable because giving narrations and life stories is a special skill not everyone can have. Some people are not talented in speaking skills.

Primary data were collected through semi-structured interviews, allowing face-to-face conversations with informants at their residences. Data collection sites included funeral ceremonies, markets, and households. A researcher asked informants to narrate stories about oral traditions, terminologies of different soils, agricultural cycles and practices, ritual for land conservation, and environmental practices. To check the consistency of the responses, unstructured and probing questions were used to gather further information related to prior inquiries. This process continued until saturation was reached. Written records of the information were taken, extracting sentences and Chindali terms with biocultural diversity. Secondary data were gathered through a documentary review of one Chindali text known as *Tutunoshange Utwajha Twitu* by Konga (2019) his review supplemented the data collected through semi structured interviews and aimed to reflect the contemporary state of Chindali. Using various methodologies for data collecting allowed for triangulation of findings, which improved the validity and dependability of the results. Throughout the study, ethical considerations were prioritized, such as getting informed consent, maintaining participant anonymity, and preserving participant rights. Overall, the technique established a solid foundation for undertaking ethical, accurate, and reliable research on the function of languages in promoting biocultural variety for long-term development.

The study used deductive thematic analysis because qualitative data analysis is flexible (Braun & Clarke, 2006; Sauro, 2015). Deductively, themes were derived from existing Chindali terms selected from various sentences extracted from narrations, stories, and Chindali written texts. These sources prompted the researcher to study the crucial role of language in promoting biocultural diversity sustainability, as well as the implications of language loss for fulfilling the United Nations Sustainable Development Goals.

IV. FINDINGS & DISCUSSION

4.1 Findings

This section covers the findings of the importance of linguistics in supporting biocultural diversity for sustainable development. This study demonstrates that indigenous languages play an important role in conserving and transferring biocultural information required for long-term development. Indigenous languages serve as stores of environmental, cultural, and ecological knowledge, influencing community behaviours in biodiversity, land use, and sustainability.

Konga (2019) *Tunoshange Utwaya Twitu* 'We Are to Keep Our Environment' provides an example in the Chindali language. The book emphasises how indigenous linguistic expression embodies ecological ideals and sustainable actions. In the first chapter, *Ichiisu Isa Muumwo uChala Akachipela* 'The World as Created by God,' Konga quotes Genesis 1:31, "God saw all that He had made, and behold, it was very good," to emphasise the natural world's completeness and sanctity. He uses this theological insight to advocate for environmental conservation, writing in Chindali: "*Bhwo uChala aamala ukupela utundu twoshi, akatesha nu kwagha kooshi akandu kiisa pandaashi papaake*". This is a direct confirmation of the divine nature and value of all creation, which justifies its preservation.

In seven chapters, Konga (Ibid.) elaborates on Ndali cultural traditions relating to environmental management.

1. *Ichiisu Isa Muumwo uChala Akachipela* 'The World as Created by God' provides a theological and cultural basis for conservation. (Chapter 1)
2. *Ubhukabhi Ubhwa Fula* 'The richness of Rain' explores rain as a symbol and source of ecological richness. (Chapter 2)
3. *Ukupemba Ulupya's* 'Burning the Grazing Mountain Area' critically investigates the customary practice of burning pastureland during the dry season to promote grass regeneration. While beneficial in the short term, it is found to be environmentally harmful. (Chapter 3.)
4. *Tukulondighwa Ukubhyala Amakokwe Amingi* advocates for community-wide afforestation and replanting efforts. (Chapter 4)
5. *Imbwibhwi Isha Miishi* 'Water Springs' highlights the ecological and cultural significance of preserving freshwater sources. (Chapter 5.)
6. *Ubhulindilili Ubhwa Fipeligwa* 'Preservation of Biodiversity' focusses on indigenous techniques for sustaining biodiversity. (Chapter 6)
7. *The Indope Jhikufundhisha Ilongwi* 'Manure Fertilises the Soil' initiative promotes sustainable agriculture practices through organic fertilisation. (Chapter 7)

Konga's study demonstrates how indigenous languages capture systems of knowledge that are critical to local and global environmental objectives. By articulating environmental, agricultural, and religious traditions in Chindali, the author not only protects cultural legacy, but also provides insights into sustainable living based on traditional ecological knowledge. His critique of damaging behaviours such *as ukupemba ulupya* ('Burning the Grazing Mountain Area') demonstrates the dynamic character of indigenous knowledge systems capable of conserving traditions while also responding to ecological constraints. These findings demonstrate the critical role of linguistics, particularly indigenous language preservation and documentation, in furthering sustainable development goals through the protection and revitalisation of biocultural variety.

The data collected and analysed for this study show that the Chindali language comprises a diverse set of phrases that convey biocultural knowledge essential for sustainable development. The extinction of the Chindali language is a serious threat to this knowledge and, by extension, biocultural diversity. These expressions highlight the intricate relationships between language, land, agricultural activities, oral traditions, and spiritual life.

4.1.1 Soil Terminology

Chindali language identifies several types of soil using particular names, each containing ecological information about its qualities and applications.

Table 1
Soil Terminology

Term	Ecological Information
i/mu-chitifya	swamps
i/mu-ngolongo	warm, fertile lands
i/mu-ngumba	frigid locations with barren soil
i/mu-chitukula	Black, dusty upper-layer soil
i/mu-chiponda	clay soil
i/mu -panya	Lime soil
i/mu –sangalabhwe	Stony soil
i/mu -chikulishi	red stony soil,
i/mu -chishi	muddy soil
i/mu -chibhumba	sticky soil

3.2 Agricultural Practices

The Chindali speaking community employs traditional agricultural methods, each encoded in distinct linguistic terms:

Table 2
Terms Showing Agricultural Practices

Term	Ecological Information
Fisabhi	terraces
Undipa	terrace less
Ukwalikila	mulching

These words describe not just the physical properties of the soil, but also their roles in promoting or limiting biodiversity. For example, marsh and lime soils are deemed unsuited for agriculture, yet they fulfil diverse ecological services depending on their type. This soil taxonomy reflects an indigenous ecological classification system that is incorporated in the language. The Chindali-speaking group uses traditional agricultural methods, each stored in separate linguistic terms:

Fisabhi 'terraces' refers to the method of growing soil terraces on sloped terrain to reduce erosion and maximise arable acreage. *Undipa* 'without terrace', on the other hand, is used to cultivate flat terrain that has not been terracified. *Ukwalikila* 'mulching' is covering the soil with organic materials like grass or tree branches to conserve moisture and avoid erosion. These examples demonstrate how indigenous languages embody sustainable land management approaches.

4.1.2 Seasons

Chindali uses unique words to highlight seasonal variations and guide agricultural planning:

Table 3
Season Terms

Term	Ecological Information
Kumpingo	signals the start of the rainy season
Pachishiku	rainy season
Palumu	dry season

These phrases assist communities in coordinating agricultural activities with meteorological trends, assuring timely planting and harvesting. The seasonal calendar inherent in the language demonstrates a deep awareness of the local environmental cycle.

3.4 Oral Traditions and Cultural Expression

The study discovered that Chindali oral traditions, such as folktales, riddles, and songs, are crucial for conserving and disseminating biocultural information. An elderly respondent recalled:

> *"Abho Tata na bho Majhi bhakatupangilagha utupango na majholo linga twalya tukulindilila ukupitila" 'Our fathers and mothers told us folktales in the evening after dinner before bedtime.'*(Tumpe, 25/09/2025)

When asked about the significance of these stories, she explained:

"Shikatumanyishanga, ukushimanya inyingi isha pa chisu" 'They helped us to understand many things about the world' (Asekisye, 15/19/2025)

These narratives serve as repositories of cultural values, environmental awareness, and moral education. Similarly, *ifyili* (riddles) are used to stimulate critical thinking among children, while *amalengwe* and ***ichibhota*** (traditional songs) are performed during weddings, funerals, initiation rites, and agricultural festivals. These oral forms link ecological knowledge with social cohesion and identity.

"*Abho Tata na bho Majhi bhakatupangilagha utupango na majholo linga twalya tukulindilila ukupitila*"
"Our fathers and mothers told us folktales after supper before bedtime". (Tumpe, 25/09/2025)

When asked about the significance of these stories, she stated,

"Shikatumanyishanga, ukushimanya inyingi isha pa chisu" "*They helped us to understand many things about the world*." (Tumpe, 25/09/2025)

These narratives preserve cultural values, raise environmental awareness, and provide moral education. Similarly, *ifyili* (riddles) are used to encourage critical thinking in youngsters, but *amalengwe* and *ichibhota* (traditional songs) are performed at weddings, funerals, initiation ceremonies, and agricultural festivals. These oral forms connect ecological knowledge, social solidarity, and identity.

4.1.3 Spiritual Practices

Chindali is also utilised in spiritual contexts, particularly in hallowed places called *lisheto/masheto* 'shrine(s)', where religious and ancestral ceremonies are held. During these rites, the community asks the *mishuka* 'spirits of the deceased' for blessings on crops or other communal needs. The use of Chindali in these ceremonies emphasises the spiritual aspect of biocultural variety, as language serves as a conduit for linking people to environment and ancestors.

The analyzed data demonstrated that indigenous languages are more than communication tools: they are biocultural knowledge system. They rich of language knowledge, culture and biodiversity that woks in interlinkage (Maffi, 2005). Analysis of data shows language is a carrier on both cultural values and biodiversity; thus, language loss threatens not only cultural heritage but also the practical wisdom needed for sustainability and identity (Dastgoshadeh & Jalilzadeh, 2011). For development sustainability, linguistics acts as a bridge to ecology as evidenced by Fill and Mühlhäusler (2006) that ecolinguistics studies show that the loss of linguistics diversity parallels biodiversity loss, demonstrating how languages function as repositories for local ecosystem knowledge.

Incorporating indigenous knowledge into development planning could significantly enhance the effectiveness of SDGs, particularly SDG 11 on sustainable community, 13 on climate action, and 15 for life on land (United Nation, 2015). This assertion supports emphasis made by UNESCO (2023) that emphasizes the importance of language diversity for sustainable development as well as the rapid pace of language loss. Buizer et al. (2016) explain that biocultural diversity encompassing linguistics practices provides a framework for integrating cultural knowledge and ecosystem stewardship in sustainable development. Hanspach et al (2020) agree with Buizer et al (Op.Cit), suggesting that comprehensive biocultural frameworks that incorporate linguistic and cosmological elements strengthen conservation tactics by drawing on integrational knowledge systems.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study demonstrates how indigenous languages, such as Chindali, play an important role in maintaining and disseminating biocultural knowledge, which is required for sustainable development. These languages serve more than only communication purposes; they also preserve traditional ecological knowledge, cultural practices, spiritual beliefs, and environmental ethics. The extinction of indigenous languages endangers not only cultural heritage, but also the practical ecological wisdom encoded in these languages, which is critical for biodiversity protection and climate resilience.

5.2 Recommendation

The report recommends that policymakers include indigenous knowledge and linguistic diversity into national and global development policies to improve ecological stewardship, cultural resilience, and community-driven sustainability efforts.

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