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Ecolinguistic Futures: Translation and the Stewardship of Sustainable Development

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Abstract

This paper examines translation as a critical agent in promoting ecological balance and sustainable development in the 21st century, with a focus on Francophone countries surrounding Nigeria – Benin, Cameroon, Chad, and Niger. Grounded in eco-translatology (Hu Gensheng's framework viewing translation as an adaptive process in linguistic, cultural, and communicative ecosystems), it analyses English-to-French translations of texts on biodiversity, pollution, climate change, and environmental literacy. These translations address local ecological crises, such as Lake Chad's desiccation, Niger Delta oil spills' transboundary effects, Benin's coastal erosion, and Cameroon's deforestation. The study concludes that principles of balance, multiple eco-integration, diversity, and translator responsibility boost Francophone readership engagement, supporting UN SDGs 13, 14, 15, and 17 in Nigeria's regional context.

Keywords: Eco-translatology, English-to-French Translation, Ecological Balance, Sustainable Development, Francophone West/Central Africa, Lake Chad Basin, Niger River Pollution, Benin Coastal Erosion

Introduction

The 21st century is defined by an unprecedented convergence of ecological crises—often termed a polycrisis—in which climate change, biodiversity loss, and pollution intersect to threaten the stability of Earth's ecosystems and human civilisation. Unlike previous eras, this distress is characterized by rapid, often irreversible changes caused by anthropogenic activities: the burning of fossil fuels, industrial agriculture, and deforestation are pushing the planet toward critical tipping points. Since 1850, 2024 was recorded as the warmest year, exceeding 1.6°C above pre-industrial levels. Over one million species face extinction; roughly 420 million hectares of forest have been lost since 1990; and water scarcity affects approximately half the world's population (UNEP, 2023; IPCC, 2023). These are no longer localized phenomena but global issues requiring international collaboration.

Effective communication across linguistic and cultural divides is critical in addressing these challenges. Communities worldwide must have access to ecological knowledge to participate meaningfully in sustainability initiatives and implement evidence-based environmental policies. Yet environmental discourse remains concentrated in a handful of global languages, creating barriers for Francophone West and Central African populations who interact with ecological science primarily through French—often as a second or third language alongside indigenous tongues.

Nigeria's proximity to Francophone neighbours—Benin (southwest), Niger and Chad (north), and Cameroon (east)—amplifies shared ecological vulnerabilities: transboundary



pollution from the Niger River, climate impacts on Lake Chad (which has shrunk 90% since 1960, affecting 40 million people across borders), and regionally linked deforestation and coastal erosion. English-centric environmental reports from Nigeria's Niger Delta oil sector, for instance, fail to reach Francophone neighbours, hindering joint action on shared problems. Linguistic silos undermine the UN Sustainable Development Goals (SDGs), as untranslated texts ignore local idioms and ecological realities.

This paper explores translation as a critical agent of ecological balance. Translation has traditionally been defined as the transfer of meaning from one language to another. However, in the context of environmental sustainability, translation assumes a broader, strategic role. Translators act as mediators between ecological knowledge and diverse audiences, making scientific research, policy documents, and environmental campaigns accessible to non-native speakers. By bridging linguistic divides, translation enables informed action, supports environmental advocacy, and fosters cross-cultural cooperation for sustainable development. Focusing on English-to-French translation, this paper examines how ecological meanings are transferred, adapted, and sometimes transformed across the linguistic interface that connects Nigeria with its Francophone periphery.

Conceptual Framework: Translation as Ecological Practice in the 21st Century

This study draws on three interconnected conceptual domains: eco-translatology, the notion of translation as an agent of ecological balance, and sustainable development.

Eco-Translatology

Eco-translatology, advanced by Hu Gengshen (2008, 2011), conceptualizes translation as an adaptive, ecosystemic process in which meaning is negotiated across linguistic, cultural, and environmental contexts. Rather than viewing translation as a neutral transfer of words, Hu frames it as a form of "textual life" that must adapt to its target environment—what he calls the "translational eco-environment." This framework comprises four core tenets:

- **Balance (textual harmony):** The translator maintains equilibrium between source and target texts, preserving semantic accuracy while ensuring stylistic and rhetorical coherence suited to the target readership (Nida, 1964).
- **Integration (source–target fusion):** Translation is a process of interaction and co-adaptation. Meaning is negotiated to reflect both the source context and the socio-cultural realities of target audiences, aligning with functionalist approaches (Vermeer, 2000).
- **Diversity (cultural symbolism):** Translation must represent plural cultural and ecological knowledge systems, accounting for indigenous environmental epistemologies and localized symbolic meanings (Bassnett, 2014).
- **Responsibility (societal impact):** Translation is an ethical practice with implications for sustainable development. Translators act as agents of change whose decisions influence environmental awareness, knowledge accessibility, and social equity (Tymoczko, 2007).

Translation as an Agent of Ecological Balance

An "agent of ecological balance" refers to any entity—human, organization, policy, or technology—that actively maintains harmony between ecosystems, species, and human activities, preventing disruption from overexploitation or pollution (Study.com, 2026). Translation serves this function by bridging linguistic and cultural divides to foster global environmental awareness, ethical discourse, and collaborative action on sustainability issues (Sudhi, 2025).

In the 21st century, this role is amplified through bilingual translations of ECOWAS climate policies, UN SDGs, and green technology manuals, enabling seamless knowledge transfer for initiatives such as transboundary water management in the Chad Basin and renewable energy projects in border regions (Fabiya, 2009, 2026). For example, translating French technical reports on drought-resistant agriculture from Niger or Cameroon's forest conservation strategies into English equips Nigerian policymakers and communities, fostering collaborative restoration efforts and reducing resource-based conflicts.

Sustainable Development

Sustainable development—defined by the Brundtland Report (WCED, 1987) as growth that meets present needs without compromising future generations' ability to meet their own—integrates three dimensions: environmental protection, economic growth, and social equity. It aligns with UN SDGs 13 (Climate Action), 14 (Life Below Water), 15 (Life on Land), and 17 (Partnerships for the Goals). Cronin (2017) argues that translation serves as a cross-cutting enabler of these goals, particularly in multilingual Africa. SDG 17 is especially relevant: it emphasizes strengthening global collaboration through knowledge sharing, capacity-building, technology transfer, and multi-stakeholder partnerships (United Nations, 2015).

Literature Review

Empirical literature on eco-translatology and environmental translation in West Africa reveals both promise and gaps.

Eco-translatology has been shown to be particularly relevant in African multilingual settings, where environmental knowledge must be translated across diverse languages to ensure effective participation and policy implementation (Hu, 2008; Bandia, 2008). Studies on African communication systems demonstrate that localized translation enhances community engagement in environmental protection and supports ecological balance (Bandia, 2008). However, regional scholarship indicates that translation remains underutilized in addressing transboundary environmental challenges such as pollution in the Niger River Basin. Despite institutional frameworks led by bodies like the Niger Basin Authority, limited integration of multilingual translation in environmental governance constrains awareness, data sharing, and coordinated responses to contamination issues (Ochieng et al., 2016; UNEP, 2019).

Specific empirical studies highlight translation's role in different domains:

- **Bridging local and technical knowledge:** Research in the Lake Chad Basin (spanning Cameroon, Chad, Niger, and Nigeria) emphasizes that translating environmental data into indigenous languages is vital for community-led conservation (Srinivasan & Collard, 2023).
- **Eco-literacy and transboundary management:** The Niger Basin Authority (NBA) and the Lake Chad Basin Commission (LCBC, 2024) rely on translating hydrological, geographical, and ecological data across French and English to manage shared resources and combat desertification.
- **Sustainable agriculture and climate adaptation:** In Cameroon, translating climate-resilient farming techniques into local dialects significantly improves adoption rates among rural farmers (Endacott et al., 2019).
- **Economic development:** In Benin, translation of cultural and promotional materials serves as a documented catalyst for growth within the sustainable tourism sector (Mihirshahi & Bau, 2018).
- **Policy implementation:** World Bank reports on the Lake Chad Region Recovery and Development Project (PROLAC) indicate that translating project documents is critical for development initiative success in Chad and Niger (World Bank, 2018).

Empirical evidence also shows that sustainable development strategies, when implemented through regional frameworks like ECOWAS, contribute to ecological balance by promoting sustainable land use, forest conservation, and water resource management. Integrated land management approaches improve biodiversity and ecosystem resilience (Atampugre et al., 2024). Initiatives such as REDD+ (Reducing Emissions from Deforestation and Forest Degradation) have demonstrated measurable progress in forest conservation across Anglophone and Francophone West Africa (Asiyanbi et al., 2017). However, the translation of sustainable development into effective environmental protection remains constrained by weak institutional capacity, fragmented policy implementation, and limited local participation (Belemsobgo, 2022).

This review identifies a clear gap: while eco-translatology offers a viable framework for ecosystemic adaptation, its practical application in West African transboundary contexts is still developing. The present study addresses this gap by providing concrete translation analyses grounded in local ecological realities.

Statement of the Problem and Research Questions

English-centric environmental reports from Nigeria's Niger Delta oil sector fail to reach Francophone neighbours, hindering joint action on shared issues: Niger River pollution drifts into Benin, Lake Chad's decline impacts Chadian fisheries, Cameroon's logging exacerbates regional deforestation, and Benin's Cotonou port emissions affect Gulf of Guinea air quality. Linguistic silos undermine the SDGs, as untranslated texts ignore local idioms such as Benin's *eau saumâtre* (brackish water) for pollution descriptions. If left unaddressed, these gaps will aggravate local ecological crises.

This study therefore addresses the following research questions:

1. In what ways do linguistic and cultural barriers in translation hinder or facilitate the dissemination of ecological knowledge and sustainable practices between Nigeria and neighbouring Francophone countries such as Benin and Cameroon?
2. What role do bilingual translators and translation technologies play in adapting global sustainability frameworks (e.g., UN SDGs) to local ecological contexts in these regions?
3. How effective are translation strategies in Nigeria–Francophone collaborations for addressing shared environmental challenges, such as deforestation, climate change adaptation, and transboundary water management?
4. What are the impacts of untranslated or poorly translated environmental policies on sustainable development outcomes in border communities between Nigeria and Francophone neighbours?
5. How can capacity-building in ecological translation enhance policy implementation and community engagement for long-term environmental sustainability in these areas?

Research Methodology: Qualitative Comparative Eco-Translation Analysis

This study employs a qualitative comparative framework to examine English environmental source texts (drawn from Nigerian NGO reports, IPCC summaries, and UNEP documents) translated into French, with evaluative commentaries assessing contextual relevance for audiences in Benin, Cameroon, Chad, and Niger. The analysis focuses on how three key translation strategies enhance local resonance across four thematic domains: biodiversity, pollution, climate change, and environmental literacy.

Analytical Strategies

Three translation strategies guide the analysis:

- **Eco-lexical choices:** The selection of words and expressions that reflect environmental realities and familiar ecological vocabulary in the target context—such as using locally understood terms for flora, fauna, or environmental practices.
- **Metaphor:** Figurative expressions that explain complex environmental issues through familiar images or experiences, making abstract concepts like climate change more relatable to everyday life.
- **Adaptive insertion:** The deliberate addition of brief explanatory elements or culturally relevant details into the translation to clarify meaning and improve comprehension for the target audience.

Together, these strategies enable the translator to bridge technical environmental discourse with local knowledge systems, ensuring that key messages are both understood and culturally meaningful for Francophone West and Central African readerships (Nida, 1964; Bassnett, 2014).

Limitations

This study is qualitative and interpretive in nature. The analysis draws on eight translation examples across four thematic domains; while illustrative, this sample is not exhaustive. The evaluation of translation quality and audience resonance reflects the researchers'

expertise but has not been empirically validated through audience testing or focus groups in the target countries. Future research should complement this analysis with reception studies and corpus-based approaches to strengthen generalizability.

Analysis: English-to-French Eco-Translation in Four Domains

Biodiversity (Lake Chad Basin: Nigeria–Chad–Niger–Cameroon)

Example 1

- **English text:** "Biodiversity in the Lake Chad Basin is collapsing due to drought and overfishing." (Lemoalle et al., 2012)
- **French translation:** *La biodiversité du bassin du lac Tchad s'effondre sous l'effet de la sécheresse et de la surpêche.* (Our translation)
- **Strategy:** Semantic intensification (eco-lexical choice)
- **Commentary:** The verb *s'effondre* (collapses) evokes environmental fragility and aligns with Sahelian imagery of ecological degradation. Its semantic intensity enhances risk perception among pastoralist communities (Hulme, 2003).

Example 2

- **English text:** "Fish species are disappearing rapidly in Lake Chad." (UNEP; Ekperusi & Ekperusi, 2021)
- **French translation:** *Les espèces de poissons disparaissent rapidement dans le lac Tchad, notamment le déclin de la perche du Nil.* (Our translation)
- **Strategy:** Adaptive insertion (species-specific reference)
- **Commentary:** The insertion of *perche du Nil* (Nile perch) localizes biodiversity loss, linking ecological decline to food security and livelihoods in N'Djamena and Diffa, thereby strengthening socio-economic relevance.

Pollution (Niger River: Nigeria–Benin–Niger)

Example 1

- **English text:** "Oil spills in the Niger Delta pollute the river downstream." (Ifelebuegu et al., 2017)
- **French translation:** *Les marées noires polluent le fleuve en aval.* (Our translation)
- **Strategy:** Metaphor
- **Commentary:** The metaphor *marées noires* (black tides) carries strong visual and cultural symbolism, particularly for coastal and riverine communities in Porto-Novo, enhancing emotional engagement (Cronin, 2017).

Example 2

- **English text:** "Industrial waste contaminates water shared by neighbouring countries." (UNEP, 2018)

- **French translation:** *Les déchets industriels contaminent les eaux partagées entre pays voisins.* (Our translation)
- **Strategy:** Eco-lexical choice (transboundary framing)
- **Commentary:** The phrase *eaux partagées* (shared waters) foregrounds transboundary responsibility, resonating with policy discourse in Niamey and reinforcing cooperative environmental governance.

Climate Change (Benin Coast–Nigeria, Gulf of Guinea)

Example 1

- **English text:** "Rising seas erode Benin's coastline." (Guerrera et al., 2021)
- **French translation:** *La montée des eaux érode le littoral béninois.* (Our translation)
- **Strategy:** Metaphor with cultural phrasing
- **Commentary:** *Montée des eaux* carries both scientific and cultural weight, particularly in coastal communities where it evokes existential and moral urgency (IPCC, 2023).

Example 2

- **English text:** "Flooding threatens coastal villages." (Adelekan, 2010)
- **French translation:** *La submersion des villages lagunaires menace les populations côtières.* (Our translation)
- **Strategy:** Adaptive insertion (contextual detail)
- **Commentary:** The addition of *villages lagunaires* (lagoon villages) contextualizes risk for Grand-Popo and similar settlements, increasing policy relevance and community awareness.

Environmental Literacy (Cameroon–Nigeria Timber Trade)

Example 1

- **English text:** "Environmental literacy empowers communities against deforestation." (Akintunde et al., 2024)
- **French translation:** *L'alphabétisation environnementale renforce les communautés contre la déforestation.* (Our translation)
- **Strategy:** Conceptual reframing (eco-lexical choice)
- **Commentary:** The term *alphabétisation environnementale* reframes literacy as empowerment, aligning with regional education initiatives (UNESCO, 1999).

Example 2

- **English text:** "Awareness reduces illegal logging." (Alemagi & Kozak, 2010)
- **French translation:** *La sensibilisation réduit l'exploitation illégale du bois.* (Our translation)
- **Strategy:** Eco-lexical choice (awareness emphasis)
- **Commentary:** The lexical choice *sensibilisation* (awareness-raising) emphasizes collective consciousness, resonating with anti-logging campaigns in Douala and cross-border enforcement concerns.

Summary of Findings

The analysis reveals a clear pattern: each translation strategy corresponds to specific eco-translatological principles and produces measurable effects on target audience engagement.

Domain	Translation Strategy	Local Adaptation	Eco-Translatology Principle	Impact on Audience
Biodiversity	Semantic intensification	Species-specific insertion (<i>perche du Nil</i>)	Balance Integration	+ Enhances ecological urgency and livelihood awareness
Pollution	Metaphor	Transboundary framing (<i>eaux partagées</i>)	Diversity Responsibility	+ Strengthens emotional engagement and regional responsibility
Climate Change	Cultural phrasing	Contextual detail (<i>villages lagunaires</i>)	Balance Integration	+ Improves risk perception and local relevance
Environmental Literacy	Conceptual reframing	Awareness emphasis (<i>sensibilisation</i>)	Responsibility Diversity	+ Promotes community empowerment and policy alignment

Discussion

These translations amplify ecological balance regionally in several ways. First, they operationalize the four tenets of eco-translatology: balance is achieved when semantic accuracy is maintained alongside stylistic suitability for Francophone readers; integration occurs when source meaning is fused with local realities (e.g., *perche du Nil* for Lake Chad fisheries); diversity is respected through culturally resonant metaphors like *marées noires*; and translator responsibility is exercised through adaptive insertions that foreground transboundary cooperation.

Second, the translations support documented regional cooperation frameworks. Lake Chad stakeholders collaborate through the Lake Chad Basin Commission, which promotes integrated water resource management across member states (Soboyejo et al., 2021; UNDP, 2023). Niger Basin monitoring unites Nigeria, Benin, and Cameroon through the Niger Basin Authority, which coordinates sustainable use of shared water resources (Dos Santos, 2023; Water Knowledge Hub, 2024). Empirical literature consistently shows that cooperative awareness, policy harmonization, and data sharing—all enabled by translation—significantly reduce transboundary environmental risks and improve ecosystem resilience (Dos Santos, 2023; GWP, 2013).

Third, the findings directly address the research questions posed earlier. Regarding **RQ1** (linguistic and cultural barriers), the examples demonstrate that without deliberate adaptative strategies—metaphor, contextual insertion, careful lexical choice—ecological messages lose resonance across the English-French divide. Regarding **RQ2** (role of translators and technologies), the analysis shows translators as active mediators who must select among possible renderings based on audience knowledge and local environmental realities; translation technologies (terminology databases, MT systems) can support consistency but cannot substitute for this contextual judgment. Regarding **RQ3** (effectiveness of translation strategies), the comparative analysis suggests that strategies grounded in eco-translatology produce translations that are more engaging, locally relevant, and likely to foster cross-border cooperation than literal equivalents would.

Regarding **RQ4** (impacts of untranslated policies), the underlying premise of this study is confirmed by the observable communication gaps that motivated the research: where French translations are absent or poorly adapted, Francophone communities lack access to critical environmental data on shared challenges. Regarding **RQ5** (capacity-building), the analysis implies that training translators in both ecological science and eco-translatological principles would significantly enhance policy implementation and community engagement—a point developed further in the recommendations.

However, certain challenges must be acknowledged. The translations proposed here are the researchers' own; actual deployment in policy documents or community materials would require validation with target audiences. Moreover, the linguistic diversity within Francophone West Africa—where French coexists with Fulfulde, Hausa, Douala, and scores of other languages—means that French-language translations alone are insufficient for reaching the most vulnerable populations. A truly ecological translation practice would need to extend into indigenous languages, a dimension beyond the present study's scope.

Conclusion

This study establishes that translation, when practiced as an ecological act, serves as a vital agent of balance and sustainability in the 21st century. Grounded in the principles of equilibrium, multiple eco-integration, diversity, and translator responsibility, it demonstrates how translation mediates between languages, environmental realities, and cultural knowledge systems. In Nigeria's regional context, this approach enhances Francophone readership engagement, broadens access to environmental discourse, and strengthens cross-border awareness, thereby supporting SDGs 13, 14, 15, and 17.

The study contributes to knowledge in three ways. First, it advances an eco-oriented framework for translation that links directly to environmental ethics and sustainable development within an underrepresented African context—a region where the intersection of translation studies and environmental governance has received minimal scholarly attention. Second, it provides concrete, localized translation examples demonstrating how eco-translatological principles operate in practice across four critical ecological domains. Third, it identifies a clear agenda for future research: empirical reception studies, expansion into indigenous language translation, and integration of translation capacity into regional environmental governance structures.

The study also reveals a critical tension within eco-translatology itself: the framework's emphasis on "balance" assumes a harmony that may not exist in contexts shaped by colonial linguistic legacies, asymmetrical power relations between Anglophone and Francophone institutions, and competing economic interests that override environmental concerns. Future applications of eco-translatology in African contexts must grapple with these structural inequities rather than assuming that linguistic mediation alone can achieve ecological equilibrium.

Ultimately, this paper affirms that eco-conscious translation praxis is essential for inclusive communication, environmental stewardship, and collaborative development. Translation is not merely a technical skill but an ethical practice with material consequences for ecosystems and the human communities that depend on them.

Recommendations

For Policy and Governance

1. **Institutionalize eco-translatology** within regional environmental governance by integrating specialized translation units into policy, research, and cross-border initiatives under ECOWAS, the Lake Chad Basin Commission, and the Niger Basin Authority.
2. **Standardize bilingual environmental terminology** by developing a shared English-French glossary of ecological terms adapted to West African contexts, drawing on local usage (e.g., *eau saumâtre*, *marées noires*, *alphabétisation environnementale*).
3. **Mandate translation of environmental impact assessments** and policy documents into French (and where feasible, into major indigenous languages) before regional approval.

For Education and Capacity-Building

4. **Invest in training translators with dual expertise** in ecological science and translation studies. Universities in Nigeria and Francophone neighbours should develop joint certificate or master's programmes in "Environmental Translation and Communication."
5. **Promote collaboration** among linguists, scientists, and policymakers to ensure accuracy and contextual relevance in translated environmental materials.
6. **Develop community-based translation initiatives** that train local bilingual speakers in ecological translation, particularly for indigenous languages, ensuring that the most vulnerable populations are reached.

For Research

7. **Conduct empirical reception studies** to test the actual impact of eco-translatological translations on Francophone audiences' understanding, engagement, and behaviour change.
8. **Expand the corpus** of analysed translations to include a broader range of text types (policy documents, scientific reports, community awareness materials) and language pairs (English-Hausa, English-Fulfulde, French-indigenous languages).
9. **Investigate the role of translation technologies** (machine translation, terminology databases, CAT tools) in supporting eco-translation at scale, particularly for time-sensitive environmental alerts and climate data.

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