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Community Perceptions of Indigenous Language Communication in Climate Change Action: Evidence from Machakos County, Kenya

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Abstract

Climate change poses severe threats to Kenya's arid and semi-arid lands, yet national climate communication strategies remain predominantly articulated in English and Kiswahili, potentially marginalizing indigenous linguistic communities from meaningful adaptation action. This study examined community perceptions of indigenous language communication in climate change action in Machakos County, Kenya. The study was grounded on Participatory Communication Theory and Cultural Theory of Risk Perception. It adopted a qualitative case study design grounded in an interpretivist paradigm and social constructivist assumptions, focusing on how residents construct meaning around climate communication within Kikamba-speaking contexts. Data were collected over ten weeks through 24 in-depth interviews, six focus group discussions, 10 key informant interviews, participant observation, and field notes. Participants included smallholder farmers, pastoralists, elders, youth, community leaders, extension officers, and non-governmental organization staff. Data were analyzed using inductive thematic analysis supported by NVivo 14. Findings revealed four interrelated themes. First, Kikamba functions as a primary epistemic system for understanding climate phenomena, with rich vocabulary capturing drought phases, rainfall variability, and ecological indicators absent in English or Kiswahili. Second, participants expressed a credibility gap, viewing official climate information in English or Kiswahili as less trustworthy and less actionable than Kikamba-based communication, often associating it with external authority and misaligned advisories. Third, indigenous linguistic resources, particularly proverbs and ritual registers, emerged as effective pedagogical tools that enhance comprehension, memory retention, and collective learning in climate adaptation practices. Fourth, structural barriers including institutional language regimes, digital communication exclusion, and extractive research practices limit the integration of indigenous languages into formal climate governance systems. The study concludes that indigenous language communication is central to effective climate action in Machakos County, functioning not only as a medium of

communication but also as a repository of ecological knowledge and a marker of institutional legitimacy. It recommends integrating Kikamba into climate communication frameworks, reforming institutional language policies, and strengthening community-centered knowledge exchange mechanisms to improve climate adaptation outcomes.

Keywords: Indigenous Language, Climate Change Communication, Participatory Communication, Linguistic Relativity, Machakos County, Kenya

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Introduction

Climate change has emerged as one of the most pressing environmental challenges globally, driven largely by human activities that increase greenhouse gas emissions and alter natural climate systems (Stockport et al., 2024). These changes manifest through rising temperatures, shifting rainfall patterns, prolonged droughts, floods, and increased frequency of extreme weather events. Such impacts disrupt agricultural production, water availability, ecosystem stability, and rural livelihoods, especially in arid and semi-arid regions such as Kenya (Brullo et al., 2024; Stockport et al., 2024). In Sub-Saharan Africa, vulnerability is heightened due to dependence on rain-fed agriculture and limited adaptive capacity, making climate change both an environmental and socio-economic concern (Zant et al., 2024).

Climate change poses an existential threat to communities across Kenya, with arid and semi-arid lands (ASALs) experiencing some of the most severe impacts. In Machakos County, a semi-arid region in southeastern Kenya, smallholder farmers have reported devastating consequences of climate variability, including low agricultural yields (88.8%), loss of income (82.3%), crop failure (81.1%), livestock deaths (69.0%), and water shortages (64.0%) (Kalia, 2024). Despite 96% of farmers in the county reporting awareness of climate change, with 87.3% perceiving rising temperatures and 96.8% observing changes in rainfall patterns, the gap between awareness and effective adaptive action remains pronounced (Kalia, 2024). This disconnect raises critical questions about the mechanisms through which climate information is communicated to local communities and whether existing communication strategies adequately account for linguistic and cultural contexts.

Climate change action refers to coordinated efforts aimed at addressing both the causes and impacts of climate change through mitigation and adaptation strategies. Mitigation focuses on reducing emissions through sustainable practices such as reforestation, renewable energy use, and improved land management, while adaptation focuses on strengthening resilience to climate impacts through behavioral, institutional, and technological adjustments (Olazabal et al., 2024). However, the success of these interventions depends largely on how well climate information is communicated and understood at the community level.

Literature emphasizes that climate communication is most effective when it is culturally relevant, linguistically accessible, and grounded in local knowledge systems. Indigenous languages play a central role in shaping how communities interpret environmental risks and respond to climate-related messages. Studies show that communication strategies that incorporate local languages improve comprehension, trust, and participation in climate-related initiatives, particularly among rural populations with limited proficiency in official languages (Drescher & Skoyles, 2024). In Africa, indigenous languages also serve as carriers of traditional ecological knowledge that supports climate forecasting and environmental management (Chanza et al., 2024).

The national climate communication strategies, including those outlined in Kenya's Climate Change Act (2016) and the National Climate Change Action Plan III (2023–2027), remain predominantly articulated in English and Kiswahili, potentially marginalizing indigenous linguistic communities from meaningful participation in climate governance (Government of Kenya, 2024). This creates a gap between scientific knowledge and community understanding, reducing the uptake of adaptation practices. Emerging research therefore calls for inclusive communication approaches that integrate indigenous languages and local knowledge systems to enhance community engagement and behavioral change in climate action (Joshi et al., 2024).

Machakos has long been recognized as a pioneer in environmental management, particularly through soil conservation terracing systems, and continues to implement adaptation initiatives including agroforestry, water harvesting, and drought-resistant crop promotion (Afinowi, 2020). However, recent research in Kalama sub-county reveals that despite these efforts, climate variability remains a major constraint, with long rains declining significantly and annual maximum temperatures increasing by approximately 1.0°C since 1981 (Kweyu et al., 2026). Qualitative narratives from the county indicate persistent food insecurity among vulnerable groups and a perceived inadequacy of government relief efforts, suggesting that top-down communication and intervention strategies may be failing to resonate with local populations (Kweyu et al., 2026). Against this backdrop, this study investigates community perceptions of indigenous language communication in climate change action among residents of Machakos County, Kenya.

Empirical Review

Indigenous Language Communication and Climate Change Understanding

Research across Sub-Saharan Africa indicates that climate messages delivered in indigenous languages improve comprehension of environmental risks, especially among rural populations with limited proficiency in English or

French (Ndlovu et al., 2024; Chanza et al., 2024). These studies emphasize that linguistic alignment enhances clarity of climate concepts such as drought, rainfall variability, and soil degradation, leading to better interpretation and recall of adaptation messages.

In Kenya, empirical evidence from semi-arid counties such as Machakos, Turkana, and Narok shows that farmers rely heavily on local communication channels and indigenous languages to interpret climate variability and decide on agricultural practices (Stockport et al., 2024; Kalia, 2024). A study by Kihara and Nabushawo (2024) in Machakos County found that communication barriers exist when climate information is disseminated in technical English, limiting farmer uptake of adaptation technologies. Similarly, Were et al. (2024) established that indigenous worldview-based communication systems, including proverbs, songs, and oral narratives, remain effective channels for environmental knowledge sharing in Kenyan communities. These findings confirm that indigenous languages enhance climate change understanding by bridging the gap between scientific knowledge and lived community experience.

Cultural Relevance, Traditional Knowledge Preservation, Empowerment, and Participation in Climate Action

Empirical literature strongly supports the argument that indigenous languages are deeply embedded in cultural and ecological knowledge systems. Across African communities, indigenous languages contain specific environmental terminologies that describe weather patterns, soil conditions, and ecosystem changes that are often absent in global languages (Chanza et al., 2024). This linguistic richness improves the precision and contextual relevance of climate communication.

Studies further show that indigenous languages play a critical role in preserving traditional ecological knowledge, which supports sustainable land use and climate adaptation. Zant et al. (2024) found that Indigenous Peoples apply both incremental and transformational adaptation strategies grounded in long-standing knowledge systems transmitted through local languages. In Kenya, evidence from Kakamega and other forest-adjacent communities shows that oral traditions, cultural ceremonies, and indigenous narratives support biodiversity conservation and climate awareness (Were et al., 2024). Joshi et al. (2024) found that climate interventions delivered in local languages increase community ownership, trust, and willingness to participate in adaptation activities. In Kenya, Stockport et al. (2024) observed that communities in Machakos demonstrate stronger participation in water harvesting and soil conservation initiatives when climate information is communicated in familiar languages. This reinforces the idea that indigenous languages strengthen agency and inclusivity in climate governance.

Inclusivity, Dissemination Effectiveness, and Challenges in Indigenous Language Climate Communication

Indigenous language communication enhances inclusivity in climate action by ensuring that marginalized rural populations participate in environmental decision-making processes. Studies across East Africa confirm that climate information delivered through community radio, local meetings, and extension services in indigenous languages increases engagement and behavioral change

(Drescher & Skoyles, 2024; Nyamurunda et al., 2024).

Kenyan studies also show that indigenous language communication improves dissemination effectiveness, particularly in early warning systems and agricultural advisories. Farmers in Machakos and other ASAL regions report higher trust and faster response to climate alerts when messages are delivered in Kikamba or other local languages (Kalia, 2024). However, challenges remain, including limited funding for indigenous language programming and lack of standardized climate terminology across Kenyan languages. Chanza et al. (2024) argue that incorporating indigenous knowledge and languages into global climate governance structures, including UNFCCC processes, strengthens policy relevance and inclusivity.

Despite these benefits, empirical research identifies persistent barriers. These include language endangerment, inadequate institutional support, and difficulties in translating complex scientific concepts into indigenous languages (UNESCO, 2023). In Kenya, additional challenges include urbanization and declining intergenerational transmission of local languages, which may weaken future climate communication systems (Ndlovu et al., 2024).

Theorical Perspective

Participatory Communication Theory (PCT)

Participatory Communication Theory (PCT) was primarily advanced by scholars like Jan Servaes in the mid-1980s and further developed by Robert White and Alfonso Gumucio-Dagron as a critique of top-down, modernization-led communication models (Servaes, 1999). The theory posits that effective development and social change cannot occur through a one-way, linear transmission of information from institutional experts to passive audiences. Instead, PCT champions a dialogic, horizontal approach that emphasizes empowerment, local ownership, and the active involvement of marginalized communities in defining their own realities and solutions (Gumucio-Dagron, 2001). Communication is viewed as a reciprocal process of sharing knowledge rather than just a monologue of technical advice. However, a major critique of PCT is its romanticized assumption of community homogeneity; critics argue it often overlooks deeply entrenched local power dynamics, such as gender and age hierarchies, which can silences certain voices even within a participatory framework (White, 2004). Additionally, implementing true participatory communication is frequently critiqued for being time-consuming, structurally messy, and difficult to scale up to institutional or national levels.

In this study, rather than viewing the residents of Machakos as mere targets of top-down scientific dissemination, PCT allows the researcher to evaluate whether the use of the Kikamba language fosters a truly democratic and dialogic communicative space. It helps examine if vernacular radio stations, local barazas, and agricultural extension services are functioning as horizontal networks where local knowledge is blended with modern climate science, or if they are simply translating top-down technocratic jargon into local dialects.

Cultural Theory of Risk Perception

The Cultural Theory of Risk Perception was originally developed by anthropologist Mary Douglas and political scientist Aaron Wildavsky in 1982, and later empirically expanded by Dan Kahan and the Cultural Cognition Project in the early 2000s (Douglas & Wildavsky, 1982; Kahan et al., 2011). The theory posits that

individuals' perceptions of danger and societal risks such as the threat of climate change are fundamentally shaped by their cultural values and preferred forms of social organization, rather than by objective scientific data or statistical probabilities. They categorized these cultural worldviews along two axes: grid (the degree to which a society values rules and stratification) and group (the degree of collective cohesion versus individualism). Individuals defend their cultural identities by rejecting risks that threaten their lifestyle and amplifying risks that demand societal conformity. A primary critique of this theory is its tendency toward cultural determinism, as it occasionally oversimplifies human psychology by slotting individuals into rigid cultural quadrants while ignoring shifting socio-economic factors and direct, lived physical experiences of environmental change (Boholm, 1996).

For the Machakos County context, the Cultural Theory of Risk Perception is instrumental in understanding how language acts as the primary vehicle for cultural worldviews when decoding climate risks. Residents of Machakos do not process scientific warnings about erratic rainfall or prolonged droughts in a psychological vacuum; they filter this data through their community's cultural fabric, which is deeply embedded within the Kikamba language. Applying this theory allows the study to explore how the use of indigenous language can either validate or clash with the community's shared values, thereby shaping their risk perception. If climate messages delivered in Kikamba successfully align with local cultural narratives, histories of ecological resilience, and traditional moral obligations to the land, residents are more likely to perceive climate change as an urgent threat requiring immediate collective action. However, if the communication feels alien or culturally disruptive, the theory explains why communities might minimize or reject even the most accurate scientific warnings.

Methodology

Research Design and Philosophical Underpinnings

This study adopted a qualitative research design grounded in an interpretivist paradigm. The interpretivist framework was selected because it allowed the researchers to construct meaning from the lived experiences of Machakos County residents regarding indigenous language communication in climate change action (Creswell & Poth, 2018). Consistent with the assumptions of social constructivism, the study assumed that reality was socially constructed, subjective, and embedded within the cultural and linguistic contexts of the Kamba community (Lincoln & Guba, 1985). A case study strategy was employed to enable an in-depth, holistic exploration of community perceptions within Machakos County over a defined period (Yin, 2018). The qualitative approach was deemed most appropriate because the study sought to understand complex human perceptions, meanings, and communicative practices that could not be adequately captured through quantitative instrumentation (Denzin & Lincoln, 2018).

Study Area

The study was conducted in Machakos County, Kenya, a semi-arid region located in the southeastern part of the country approximately 60 kilometers southeast of Nairobi. The county covers an area of approximately 6,208 square kilometers and is predominantly inhabited by the Kamba people, who speak Kikamba as their indigenous language (Kalia, 2024). Machakos County was purposively selected because it represents a climate-

vulnerable ASAL region where indigenous knowledge systems have historically informed adaptation practices, yet where national climate communication strategies have largely been disseminated in English and Kiswahili (Kweyu et al., 2026). The county comprises eight sub-counties: Machakos Town, Mavoko, Masinga, Yatta, Kangundo, Matungulu, Kathiani, and Mwala. Data collection was concentrated in four sub-counties Machakos Town, Masinga, Matungulu, and Mwala selected to ensure variation in agro-ecological zones, proximity to urban centers, and exposure to climate adaptation interventions.

Target Population

The target population comprised adult residents of Machakos County aged 18 years and above who had direct experience with climate change impacts and exposure to climate-related communication. The population was stratified into four categories to ensure diverse perspectives: (a) smallholder farmers and pastoralists who relied on rain-fed agriculture and indigenous forecasting; (b) community elders and traditional knowledge holders recognized within their villages for expertise in weather lore and environmental stewardship; (c) local administrators and community-based organization leaders involved in disseminating climate information; and (d) county government extension officers and non-governmental organization field staff engaged in climate adaptation programming. This stratification ensured that the study captured both recipient and transmitter perspectives on indigenous language communication (Moser, 2010).

Sampling Strategy and Procedures

A non-probability purposive sampling strategy was employed to select information-rich cases capable of providing deep insight into the phenomenon under investigation (Patton, 2015). Maximum variation sampling was used within purposive selection to capture heterogeneity across age, gender, literacy levels, and sub-county location. Snowball sampling supplemented the initial purposive selection, particularly in identifying traditional knowledge holders and elders whose expertise was known within communities but who were not formally affiliated with administrative structures (Noy, 2008).

The researchers collaborated with local village administrators and community-based organizations to identify initial participants. Each potential participant was approached individually, informed about the study objectives, and invited to participate based on their relevance to the research questions. For focus group discussions, participants were selected to ensure homogeneity within groups separate groups were constituted for male farmers, female farmers, and youth while maximizing variation across groups (Krueger & Casey, 2015).

Sample Size and Saturation

The final sample comprised 34 participants. Twenty-four participants were engaged through in-depth semi-structured interviews, six focus group discussions were conducted with 36 participants (six participants per group), and ten key informant interviews were held with local administrators, extension officers, and non-governmental organization representatives. Some individuals participated in both in-depth interviews and focus group discussions; however, the primary analysis drew on 24 unique in-depth interview participants, 36 focus group discussion participants, and 10 key informant interview participants, yielding a total of 70 data collection encounters with 34 distinct individuals.

The sample size was not predetermined by statistical power calculations but by the principle of data saturation (Guest, Bunce, & Johnson, 2006). Data collection and preliminary analysis proceeded concurrently. Saturation was determined to have been achieved after the eighteenth in-depth interview and the fourth focus group discussion, at which point no new themes, categories, or insights emerged from subsequent data. Data collection continued for an additional six interviews and two focus group discussions to ensure robustness and to confirm that marginal perspectives had been captured. The final sample of 34 distinct participants exceeded the minimum threshold for saturation and aligned with qualitative research conventions suggesting that samples of 20 to 40 participants are typically sufficient for phenomenological and case study research of this nature (Guest, Bunce, & Johnson, 2006).

Data Collection Methods

Data were collected over a ten-week period between March and May 2025 using three qualitative methods: in-depth semi-structured interviews, focus group discussions, and key informant interviews. A semi-structured interview guide was developed in English and translated into Kikamba by a bilingual research assistant fluent in both languages. The guide was back-translated into English to ensure semantic and conceptual equivalence (Brislin, 1970). Interviews conducted in Kikamba were audio-recorded with participants' consent and transcribed verbatim into Kikamba before being translated into English for analysis.

In-depth semi-structured interviews were conducted with 24 participants in locations of their choosing, typically their homes or under communal shade trees. Each interview lasted between 45 and 90 minutes. The interview guide explored participants' experiences of climate change, the languages in which they received climate information, their preferences for indigenous versus official language communication, their understanding of climate terminology, and their perceptions of how language affected their ability to act on climate advisories (Kvale & Brinkmann, 2015).

Focus group discussions were conducted with six groups of six participants each, stratified by gender and age cohorts (two male farmer groups, two female farmer groups, one youth group, and one elder group). Focus group discussions lasted approximately 90 to 120 minutes and were facilitated in Kikamba by a trained moderator using a focus group discussion guide. The group format was used to elicit collective narratives, community norms, and shared understandings regarding indigenous language use in climate communication (Krueger & Casey, 2015). Probing techniques were employed to surface disagreements and minority viewpoints within groups.

Key informant interviews were conducted with ten individuals including county climate change officers, agricultural extension officers, local chiefs, and representatives of community-based organizations. These interviews, lasting 60 to 75 minutes, elicited institutional perspectives on the challenges and opportunities of incorporating Kikamba into climate communication strategies.

Participant observation supplemented the interview and focus group discussion data. The researchers attended two community barazas (public meetings) where climate-related announcements were made, observed the language dynamics in these settings, and maintained detailed field notes on non-verbal cues, code-switching patterns, and

community engagement levels (DeWalt & DeWalt, 2011).

Data Analysis

Data analysis followed an inductive thematic analysis approach guided by the six-phase framework proposed by Braun and Clarke (2006). All audio recordings were transcribed verbatim by the research team. Transcripts in Kikamba were reviewed by a native speaker for accuracy before translation into English. The translated transcripts were then imported into NVivo 14 qualitative data analysis software for systematic coding.

The analysis proceeded as follows. First, the researchers immersed themselves in the data through repeated reading of transcripts and field notes. Second, initial codes were generated line-by-line across the entire dataset, capturing semantic and latent meanings. Third, codes were collated into potential themes and sub-themes, organized around the research questions. Fourth, themes were reviewed and refined through constant comparison, ensuring internal coherence and distinctiveness. Fifth, themes were defined and named, with particular attention to capturing the nuances of indigenous language communication. Sixth, a thematic map was produced and integrated into the final narrative report (Braun & Clarke, 2006).

Two researchers independently coded a subset of four transcripts to establish inter-coder reliability. Discrepancies were discussed and resolved through consensus, and the coding framework was refined accordingly (Saldaña, 2016).

Trustworthiness

Trustworthiness was established through Lincoln and Guba's (1985) four criteria. Credibility was enhanced through prolonged engagement in the field (ten weeks), triangulation of data sources (interviews, focus group discussions, observation, and key informant perspectives), member checking where preliminary findings and selected transcripts were shared with six participants for verification and peer debriefing with a qualitative methodologist external to the research team (Lincoln & Guba, 1985). Transferability was addressed through thick description of the study context, participants, and data collection procedures, enabling readers to assess the applicability of findings to similar settings (Geertz, 1973). Dependability was ensured through the maintenance of an audit trail documenting all methodological decisions, data collection protocols, and analytical steps. Confirmability was achieved through reflexive journaling, where researchers documented their assumptions, biases, and emotional responses throughout the research process, and through the presentation of supporting verbatim quotations in the findings (Lincoln & Guba, 1985).

Limitations of the Study

The study acknowledged several limitations. The findings were context-specific to Machakos County and the Kamba-speaking community, limiting generalizability to other linguistic groups in Kenya. The reliance on self-reported perceptions introduced the possibility of social desirability bias, particularly when participants discussed government climate programs (Fisher, 1993). Additionally, the researchers were not native Kikamba speakers; although a bilingual research assistant facilitated language translation, subtle linguistic nuances may have been lost in translation (Temple & Young, 2004). Finally, the ten-week field period, while sufficient for saturation, did not allow for longitudinal

observation of how perceptions evolved across seasonal agricultural cycles.

Results

The analysis of in-depth interviews, focus group discussions, key informant interviews, and observational field notes yielded four overarching themes: (1) Indigenous Language as the Default Climate Epistemology, (2) The Credibility Gap in Official Language Communication, (3) Indigenous Linguistic Resources as Adaptation Assets, and (4) Structural Barriers to Inclusive Climate Communication. Each theme comprised two to three sub-themes that captured the nuanced perceptions of Machakos County residents regarding indigenous language communication in climate change action.

Theme 1: Indigenous Language as the Default Climate Epistemology

Participants consistently described Kikamba not merely as a medium of communication but as the linguistic architecture through which climate phenomena were conceptualized, experienced, and transmitted across generations. This theme encompassed two sub-themes: embodied climate vocabulary and intergenerational knowledge transmission.

Embodied Climate Vocabulary

Participants demonstrated that Kikamba contained granular, experientially rooted terminology for climate phenomena that had no direct equivalents in English or Kiswahili. During in-depth interviews, farmers articulated distinct Kikamba terms for drought phases, rainfall quality, and soil moisture conditions that encoded ecological knowledge refined through decades of observation.

A 67-year-old male farmer from Mwala sub-county, explained:

> *"When we say kithio in Kikamba, we do not simply mean 'drought' as the radio tells us. Kithio has stages. There is kithio kya mbee—the early warning drought when certain trees shed leaves in a particular order. Then kithio kya katikati—the middle drought when the mukuyu [fig tree] roots become visible above ground. Finally, kithio kya musingi that is the drought that breaks the foundation, when even the hardiest shrubs die. The English word 'drought' cannot carry this knowledge. It is one blanket word for many different realities."*

This sentiment was echoed across interviews. A 54-year-old female farmer from Matungulu, distinguished between rain types:

> *"The weather people on radio say 'mvua' [rain in Kiswahili] or 'rain.' But in Kikamba, we know mbua ya mbee—the first rains that soften the ground for planting; mbua ya nthi—the heavy ground-soaking rains; and mbua ya mweene—the owner's rain that comes unexpectedly to save a dying crop. Each requires different action. If you hear 'rain' in English, you do not know which action to take."*

Focus group discussions with male farmers revealed consensus that English climate terminology abstracted climate phenomena from their material consequences. When asked to define "climate change" as presented in extension materials, participants frequently offered literal translations that stripped the term of actionable meaning. Kioko, a 48-year-old participant, noted:

> *"They write 'climate change' in English on posters. We read it as kuvanika kwa mbeu—the changing of weather. But kuvanika implies something cyclical,*

seasonal, expected. What is happening now is not seasonal. It is kuvuuka—a breaking, a violation. The English word does not carry this violence."

Key informant interviews with agricultural extension officers confirmed this semantic dissonance. One officer, with twelve years of field experience, acknowledged:

"When I explain 'climate variability' in English during barazas, I see blank faces. When I use Kikamba proverbs about the mukau [melia tree] flowering early or late, they nod. The knowledge is there. The language of delivery determines whether the knowledge is activated."

Intergenerational Knowledge Transmission

Participants consistently identified Kikamba as the essential vehicle for transmitting climate knowledge across generations. Elders emphasized that climate wisdom was encoded in oral forms such as proverbs, songs, and ritual narratives that were inaccessible to youth who had become dominant in English or Kiswahili.

A 71-year-old female elder from Masinga, described the erosion she observed:

"My grandchildren go to school and learn English. When I try to teach them the signs of kithio kya mbee—which birds disappear first, which insects change their song—they laugh and say, 'Grandmother, that is old thinking.' But these signs have never failed. The problem is not the knowledge. The problem is the language has become foreign in their ears."

Youth focus group discussions revealed ambivalence. While younger participants (aged 18–30) expressed pride in their Kikamba identity, many acknowledged limited proficiency in ecological vocabulary. A 24-year-old male youth, stated:

"I understand Kikamba for daily talk—market, home, church. But when my grandfather speaks about the relationship between the nthakame [star constellation] and the planting season, I am lost. Those words belong to a Kikamba I do not speak. The climate knowledge is dying with the language."

This intergenerational rupture was identified by community-based organization leaders as a critical vulnerability. One key informant observed:

"We have climate-smart agriculture training in English and Kiswahili. The youth attend but do not retain. The elders retain but do not attend because the language excludes them. We are training a generation that speaks neither the scientific language nor the indigenous language fluently. They are linguistically orphaned in climate action."

Theme 2: The Credibility Gap in Official Language Communication

Participants overwhelmingly perceived climate information delivered in English or Kiswahili as less credible, less relevant, and less actionable than information communicated in Kikamba. This theme comprised two sub-themes: suspicion of external expertise and the performative dimension of language choice.

Suspicion of External Expertise

Participants associated English-language climate communication with distant, unaccountable institutions whose recommendations frequently failed in local contexts. During focus group discussions with female farmers, participants recounted instances where

English-dominant climate advisories led to maladaptive outcomes.

A 52-year-old female farmer from Machakos Town sub-county, recounted:

> *"Last year, the radio in English told us to plant early because of 'El Niño.' We planted. The rains did not come. The seeds died. Then the same voice on radio said, 'Climate is unpredictable.' But our elders had said in Kikamba, 'The mukau has not flowered; the ground is not ready.' They were right. The English voice was wrong. Now when I hear English climate advice, I wait. I do not act immediately."*

This experience was not isolated. Across interviews, participants constructed a narrative of English-language climate communication as epistemically arrogant presenting universal prescriptions without accounting for micro-climatic variation or indigenous diagnostic indicators.

A 61-year-old male farmer from Kangundo, articulated this critique:

> *"The people who write these climate reports in English, have they sat in our fields? Do they know that Mwala and Matungulu have different soils, different winds? Yet they give one message for 'Machakos County.' In Kikamba, we say ndeto ila ila nzima—words that fit the mouth. English climate words do not fit our mouths or our lands."*

Key informant interviews with county climate change officers revealed institutional awareness of this credibility gap. One officer admitted:

> *"We know the community trusts Kikamba-speaking elders more than our English reports. But our funding partners require reports in English. Our training manuals are in English. We are trapped in a language that the community does not trust, delivering knowledge they do not believe."*

The Performative Dimension of Language Choice

Participants interpreted the use of English in climate forums as a performance of power rather than a genuine communication strategy. During observed barazas, researchers noted that when county officials spoke English, community members became passive; when code-switching to Kikamba occurred, engagement visibly increased participants leaned forward, interjected, and asked questions.

A 45-year-old male farmer from Yatta, analyzed this dynamic:

> *"When the officer speaks English at the baraza, he is not talking to us. He is talking to Nairobi, to the donors, to his bosses. We are the audience for his performance. But when he drops into Kikamba—even broken Kikamba—we know he has come down from the mountain to meet us. The language tells us who the message is really for."*

Female participants in focus group discussions were particularly attuned to this performative dimension. A 49-year-old from Kathiani, observed:

> *"Sometimes they bring a translator. The officer speaks English, then the translator speaks Kikamba. But the translator is not a farmer. He does not know our words. He translates 'drought' as kithio, but he does not know which kithio. The officer thinks he has communicated. We have heard noise, not meaning."*

Theme 3: Indigenous Linguistic Resources as Adaptation Assets

Contrary to deficit framings that positioned indigenous languages as

barriers to climate literacy, participants and key informants identified Kikamba linguistic resources such as proverbs, oral narratives, and ritual language as underutilized assets for enhancing climate action. This theme comprised two sub-themes: proverbs as pedagogical tools and the ritual register as authoritative communication.

Proverbs as Pedagogical Tools

Participants consistently referenced Kikamba proverbs as condensed, memorable formulations of climate wisdom that could bridge scientific and indigenous knowledge systems. Extension officers who incorporated proverbs into their training reported higher retention rates and behavioral adoption.

A 58-year-old male farmer from Masinga, demonstrated this pedagogical function:

> *"The extension officer who taught us water harvesting used a proverb: 'Muvoo wa nzou ndwii wa nzou'—the elephant's footprint does not dry quickly. He explained that large water catchments, like elephant footprints, retain moisture longer than small ones. I have never forgotten this. If he had said 'aggregate water storage capacity,' I would have forgotten by evening."*

Key informant interviews with non-governmental organization staff confirmed this observation. A program officer with five years of field experience in Machakos County stated:

> *"When we switched from English training manuals to Kikamba proverb-based facilitation, attendance at our climate-smart agriculture sessions increased by approximately 40%. More importantly, farmers began teaching each other using the proverbs. The knowledge started moving horizontally, not just vertically from us to them."*

Youth participants, while acknowledging limited proficiency in ecological Kikamba, expressed openness to proverb-based learning. A 22-year-old female youth, noted:

> *"I do not know the old words for stars and birds. But I know proverbs. My grandmother used them for everything. If climate training used proverbs, I would listen. Proverbs are like keys—they open understanding quickly."*

The Ritual Register as Authoritative Communication

Participants identified a specialized register of Kikamba used in ritual and ceremonial contexts such as rainmaking prayers, harvest thanksgivings, and drought petitions as carrying unique authority in climate matters. This register, distinct from everyday Kikamba, was described as spiritually potent and communally binding.

A 73-year-old male elder recognized as a rainmaker in his community, explained:

> *"There are words for rain that cannot be spoken in the market or the baraza. They belong to the ithongo [ancestral realm]. When the community is in kithio kya musingi, I speak these words at the kithitu [sacred grove]. The community listens because the language carries the weight of generations. No English report can command this authority."*

While participants acknowledged that ritual practices had declined under colonial and Christian influence, many maintained that the linguistic register retained residual authority. During a focus group discussion with male elders,

participants debated whether this register could be incorporated into formal climate communication without spiritual contamination. One elder, aged 69, argued:

> *"The ritual words are not for everyday use. But their power comes from their precision. When I pray for rain, I do not say 'rain.' I name the rain we need: mbua ya nthi, not mbua ya mweene. This precision is what climate science also seeks. The languages could meet if there was respect."*

Theme 4: Structural Barriers to Inclusive Climate Communication

Despite widespread recognition of Kikamba's value in climate communication, participants identified systemic obstacles to its integration. This theme comprised three sub-themes: institutional language regimes, the digital divide, and researcher-community asymmetries.

Institutional Language Regimes

Key informant interviews with county government and non-governmental organization staff revealed that institutional structures actively discouraged indigenous language use. Climate change reports, funding proposals, monitoring and evaluation frameworks, and training curricula were mandated in English. Staff who attempted to incorporate Kikamba faced professional penalties.

A county climate change officer described this structural constraint:

> *"Last year, I translated our county adaptation plan summary into Kikamba for community validation. My supervisor reprimanded me. 'This is not academic,' he said. 'Donors will not fund vernacular documents.' The system punishes indigenous language use even when it improves outcomes."*

Non-governmental organization staff reported similar pressures. A program manager noted:

> *"Our international headquarters requires all reports in English. Our community facilitators speak Kikamba in the field, but their knowledge is lost in translation when they write reports. The organization learns nothing from the community's linguistic expertise because the learning system is monolingual."*

The Digital Divide

Participants identified digital climate communication platforms such as mobile weather applications, short message service alerts, social media as predominantly English and Kiswahili, excluding non-literate and elderly Kikamba speakers. While mobile phone penetration was high, linguistic accessibility remained low.

A 60-year-old female farmer from Mwala, explained:

> *"My son has a smartphone with a weather application. It shows pictures of sun and rain, but the words are in English. I ask him, 'What does it say?' He translates, but he does not know the difference between mbua ya mbee and mbua ya nthi. The picture says 'rain.' I do not know which rain. The technology is here, but the language is missing."*

Youth participants confirmed this mediation gap. A 26-year-old male, noted: *"I translate weather alerts for my mother. But I am not a farmer. I do not know the words she needs. The application gives me '70% chance of precipitation.' I tell her, 'It might rain.' She asks, 'Which rain?' I cannot answer. The digital tool creates a*

wall between her knowledge and the information."

Researcher-Community Asymmetries

Participants who had previously engaged with academic researchers expressed frustration with extractive research practices that mined indigenous knowledge without linguistic reciprocity. Elders who had shared Kikamba ecological terminology reported seeing their contributions published in English-language journals inaccessible to their communities.

The 67-year-old farmer, recounted:

> *"A researcher came five years ago. He recorded my words about drought signs for three hours. He promised to return with the results. I never saw him again. Later, someone showed me a book with my words in English. I could not read it. My knowledge left in Kikamba and returned in English, foreign to me. This is not research. This is theft with a notebook."*

This experience shaped participant skepticism toward the current study. Several participants asked explicitly whether findings would be shared in Kikamba. When assured of community feedback sessions and Kikamba summary reports, participants expressed conditional trust.The 71-year-old elder, stipulated:

> *"If you write only in English, you have not listened. Listening means the words can return in the language they left. This is the test of whether you respect us or merely use us."*

The results revealed that Machakos County residents perceived indigenous language communication not as a peripheral concern but as central to the legitimacy, comprehension, and effectiveness of climate change action. Kikamba was experienced as an epistemological resource containing irreplaceable climate knowledge, a credibility marker distinguishing genuine community engagement from performative institutional compliance, and an underutilized pedagogical asset capable of bridging scientific and indigenous knowledge systems. However, structural barriers including institutional language regimes, digital exclusion, and extractive research practices systematically disadvantaged indigenous language use in formal climate governance. These findings suggested that climate communication in Machakos County operated within what participants implicitly recognized as a coloniality of knowledge, where the linguistic hierarchies established during British colonial rule continued to structure whose climate knowledge counted and whose was rendered invisible.

Discussion

Indigenous Language as Embodied Climate Epistemology

The finding that Kikamba functions not merely as a communicative medium but as an epistemological framework for conceptualizing climate phenomena resonates strongly with the Linguistic Relativity Hypothesis articulated by Whorf (2012) and reformulated by Lucy (1992). Whorf argued that language structures shape the habitual thought patterns of its speakers, such that speakers of different languages conceptualize the world in fundamentally distinct ways. The granular Kikamba terminology for drought phases (*kithio kya mbee*, *kithio kya katikati*, *kithio kya musingi) and rain types (mbua ya mbee*, *mbua ya nthi*, *mbua ya mweene*) documented in this study provides empirical support for what Lucy (1992) termed "reformulated linguistic relativity" the claim that language

influences thought in specific cognitive domains rather than determining it universally. These terminological distinctions are not merely lexical curiosities; they encode actionable ecological knowledge that enables farmers to make context-specific decisions about planting, water management, and livestock movement.

This finding extends the work of Okon et al. (2025), who demonstrated in the Nigerian context that complex English climate terminology creates comprehension barriers for rural communities. While Okon et al. (2025) focused on translation challenges, the present study reveals a deeper epistemological issue: English and Kiswahili climate terminology does not merely fail to translate Kikamba concepts but actively flattens the multidimensional reality that Kikamba speakers perceive. The English word "drought" collapses three distinct ecological states into a single category, potentially leading to maladaptive responses when farmers cannot differentiate between early warning signs and catastrophic conditions. This finding has significant implications for climate service design, suggesting that terminology standardization across languages may inadvertently erase locally valid diagnostic categories.

The intergenerational transmission dimension of this theme aligns with the observations of Mwangi and Oino (2024), who documented the erosion of indigenous knowledge systems in Kenyan ASAL regions through formal education's privileging of English and Kiswahili. However, they reveal that the erosion is not uniform but domain-specific: youth participants retained everyday Kikamba proficiency while losing access to the specialized ecological register. This register-specific language shift suggests that climate knowledge loss is not inevitable but results from the absence of institutional mechanisms for transmitting ecological vocabulary across generations. The implication for Kenya's Competency-Based Curriculum (CBC) which emphasizes local context and indigenous knowledge integration is that language policy must be explicitly addressed as a curriculum design variable, not assumed to resolve itself through content localization.

The Credibility Gap and Participatory Communication

The second theme on the credibility gap between indigenous language and official language communication finds strong theoretical grounding in Participatory Communication Theory as articulated by Freire (1996) and subsequently applied to development contexts by Servaes and Malikhao (2005). Freire (1996) distinguished between banking education, where knowledge is deposited into passive recipients, and problem-posing education, where dialogue between equals generates critical consciousness. The findings suggest that English-language climate communication in Machakos County operates predominantly as a banking model: information flows vertically from institutional sources to communities without reciprocal dialogue. Participants' association of English with "performance for Nairobi" rather than genuine community engagement reflects what Freire (1996) identified as the alienation produced by monologic communication.

This interpretation is supported by Kennedy, Smith, Johnson, and Williams (2024), whose meta-analysis of rural climate communication in developing countries found that participatory approaches using local languages achieved significantly higher behavioral adoption rates than top-down information campaigns. Kennedy, Smith, Johnson, and Williams (2024) attributed this differential

to trust formation: when communicators code-switch to indigenous languages, they signal cultural competence and solidarity that cannot be performed through translation. The present study's observation of visible engagement shifts during observed barazas where community members leaned forward and interjected when officials used Kikamba provides micro-interactional evidence for this trust mechanism. The performative dimension of language choice, where English signals bureaucratic accountability upward and Kikamba signals community accountability downward, suggests that credibility in climate communication is not solely a function of information accuracy but of relational positioning.

The gendered dimensions of this credibility gap warrant particular attention. Female participants in this study were more likely than male participants to describe English-language communication as "noise" rather than meaning, reflecting broader patterns of educational exclusion in rural Kenya where female literacy rates lag behind male rates (Kalia, 2024). Kalia (2024) found that gender, alongside education and access to extension services, significantly influenced climate change perception among Machakos smallholder farmers. The present study extends Kalia (2024) quantitative findings by revealing the linguistic mechanisms through which gender inequality is reproduced in climate governance: women who are less likely to be educated in English are systematically disadvantaged by institutional communication strategies that assume linguistic homogeneity. This finding challenges the gender-mainstreaming commitments of Kenya's Climate Change Act (2016) and National Climate Change Action Plan III (2023–2027), suggesting that language policy is a prerequisite rather than an afterthought for gender-inclusive climate action.

Indigenous Linguistic Resources as Underutilized Assets

The third theme on indigenous linguistic resources as adaptation assets directly challenges deficit framings that position indigenous languages as barriers to climate literacy. Instead, participants and key informants identified Kikamba proverbs, oral narratives, and ritual registers as pedagogically powerful tools capable of bridging scientific and indigenous knowledge systems. This finding aligns with the two-eyed seeing approach advocated by Bartlett et al. (2012) in indigenous health education, which argues for the integration of indigenous and Western knowledges through culturally resonant pedagogical forms. The present study extends this framework to climate communication by demonstrating that Kikamba proverbs function as boundary objects artifacts that maintain meaning across different knowledge systems while enabling translation between them (Star & Griesemer, 1989).

The pedagogical efficacy of proverbs documented in this study where extension officers reported 40% increases in attendance and horizontal knowledge diffusion when proverb-based facilitation replaced English manuals corroborates the findings of Nwafor et al. (2024) on oramedia (oral media) in Nigerian climate communication. Nwafor, Okafor, Eze, and Udeh (2024) demonstrated that indigenous oral communication channels achieved higher message retention than conventional media because they activated existing cognitive schemas and social networks. The present study adds specificity by identifying the proverb as a particularly potent genre: its brevity, metaphorical richness, and cultural authority enable complex climate concepts to be encoded in memorable, emotionally resonant forms. The extension officer's use of the elephant

footprint proverb (*"Muvoo wa nzou ndwii wa nzou"*) to explain water catchment dynamics exemplifies what Aikenhead and Michell (2011) termed "cultural border crossing the translation of scientific concepts into indigenous cultural frameworks without epistemic violence.

The ritual register dimension introduces a more complex negotiation. While participants acknowledged the authoritative weight of ritual Kikamba in climate matters, elders debated whether incorporating this register into formal communication would constitute spiritual contamination. This tension reflects broader debates in indigenous knowledge integration, where Santos (2014) warns against epistemicide that is the destruction of indigenous knowledge systems through their co-optation by dominant frameworkswhile simultaneously advocating for "ecologies of knowledges" that enable productive dialogue between different epistemic traditions. The present study suggests that ritual language may represent a "sacred boundary" in Machakos County: respected as authoritative but resistant to instrumentalization. Future climate communication strategies must navigate this boundary with cultural sensitivity, potentially using ritual registers as reference points for validating secular indigenous terminology without demanding their direct deployment.

Structural Barriers and Epistemic Injustice

The fourth theme on structural barriers to inclusive climate communication reveals the institutional mechanisms through which indigenous language exclusion is reproduced. The finding that county officers faced professional reprimand for translating adaptation plans into Kikamba exemplifies what Fricker (2007) termed "testimonial injustice": the systematic deflation of indigenous speakers' credibility due to prejudice in the economy of credibility. When institutional structures reward English-only outputs and penalize indigenous language use, they create what Fricker (2007) described as a "pre-emptive hermeneutical injustice" where indigenous communities are prevented from contributing to the shared hermeneutical resources through which climate risks are collectively understood.

This structural analysis extends the work of Byskov (2020), who identified epistemic injustice as a pervasive feature of climate adaptation governance. Byskov (2020) argued that climate vulnerability assessments frequently fail to incorporate local knowledge not because of individual researcher bias but because of "systemic testimonial injustice" embedded in methodological conventions, funding requirements, and publication norms. The present study provides empirical grounding for this claim by documenting how donor reporting requirements, academic publishing expectations, and career advancement structures collectively constrain indigenous language use even when practitioners recognize its efficacy. The county officer's statement "*We are trapped in a language that the community does not trust*" captures the structural determinism that Byskov (2020) theorized.

The digital divide dimension of this theme complicates optimistic narratives about technology-mediated climate communication. While mobile phone penetration in rural Kenya is high, the present study confirms Kweyu et al. (2026) finding that linguistic accessibility of digital platforms remains low. They documented that climate information applications in Kenya predominantly use English and Kiswahili, creating what they termed "linguistic digital exclusion." The present study adds the critical observation that this exclusion is mediated by generational translation gaps: youth who

operate smartphones lack the ecological vocabulary to accurately translate digital content for elders, while elders possess the vocabulary but lack digital access. This "double exclusion" suggests that digital climate solutions require not merely translation but co-design with indigenous language communities to ensure that ecological specificity is preserved in digital interfaces.

The researcher-community asymmetry documented in this study where participants described previous research as theft with a notebook raises profound ethical questions about the extractive dynamics of academic knowledge production. This finding resonates with Smith (2012) critique of research as a "dirty word" in indigenous communities, where the historical relationship between research and colonialism has generated justified skepticism toward external investigators. Smith (2012) argued that decolonizing research requires not merely ethical approval but structural transformation of research relationships, including indigenous control over data, community benefit-sharing, and linguistic reciprocity. The present study's commitment to Kikamba summary reports and community feedback sessions represents a modest step toward this transformation, but the broader implication is that climate research in indigenous communities must be reconceptualized as a bilingual, bidirectional exchange rather than a unidirectional extraction.

Conclusion

Community members rely on indigenous linguistic systems not only for describing climate phenomena but also for guiding action, sharing intergenerational knowledge, and evaluating the credibility of external climate information. Official climate messages delivered in English or Kiswahili often fail to resonate because they lack local specificity and disconnect from lived ecological experience. At the same time, indigenous communication forms such as proverbs, oral narratives, and ritual language strengthen understanding and collective response to climate risks. However, institutional language policies, digital exclusion, and research practices that prioritize English limit the full integration of indigenous knowledge into climate governance. The findings point to a need for communication systems that recognize Kikamba as a legitimate medium for climate science translation, community engagement, and policy implementation.

Recommendations

1. The Government of Kenya should revise climate policy to require county-level climate communication in dominant indigenous languages alongside English and Kiswahili, with clear budget allocation for translation and community validation.
2. County governments, including Machakos, should establish Indigenous Language Climate Knowledge Centers that integrate scientific and indigenous forecasting systems and document oral climate knowledge for intergenerational use.
3. Curriculum developers should embed indigenous ecological vocabulary in school climate education and train teachers to use both indigenous and scientific terms in instruction.
4. County extension services should adopt Kikamba-based facilitation approaches, using proverb-led and participatory methods supported by bilingual materials and community translators with agricultural knowledge. Digital climate platforms should include

Kikamba audio options, visual symbols aligned with local climate indicators, and user feedback tools in local language.

5. Research institutions should return findings in Kikamba through community reports and feedback meetings, with linguistic reciprocity treated as an ethical requirement.
6. Community organizations should strengthen intergenerational learning programs that link elders and youth through storytelling and oral ecological knowledge exchange.
7. Local groups should also engage more actively in county climate planning processes to secure inclusion of Kikamba in documentation, consultations, and advisory structures, while documenting and reporting cases of language exclusion in climate programs.

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