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Chagga-Mochi Vowel Phonological Processes at Old Moshi Mashariki Ward in Kilimanjaro Region, Tanzania

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Abstract

Vowel processes play an important role in Bantu morphophonology, yet their operation in specific varieties remains insufficiently documented. This paper examines vowel processes in Chagga-Mochi, identifies their conditioning environments, and explains their operation within words. The study adopted a qualitative approach and a descriptive ethnographic design. Data were collected through focus group discussions, naturalistic speech recordings, and written materials, involving twelve fluent native speakers selected through convenience sampling from Kidia and Mahoma villages in Moshi Rural District, Tanzania. Guided by Lexical Phonology, the analysis compared underlying and surface forms, identified morphological boundaries, and formulated rules accounting for the observed alternations. The findings identify four vowel processes: vowel deletion, vowel coalescence, glide formation, and glide insertion. Deletion affects noun-class, perfective, agreement, and subject prefixes, while word-final deletion targets the high vowels /i/ and /u/. The prefixes */mu-/* and */me-/* lose their vowels before both vowel-initial and consonant-initial stems. Coalescence combines */a+i/* into *[e]* at the boundary between subject and present-tense markers. Glide formation changes */u/* and */i/* into [w] and *[j]* before another vowel, whereas infinitive formation inserts *[j]* between the prefix */i-/* and vowel-initial stems while preserving both vowels. The study concludes that vowel alternations reflect the interaction of morphological structure, vowel properties, and position within the word. These findings contribute to the description of Chagga-Mochi morphophonology by showing how vowel processes interact with morphological structure and how their application can be explained through rule ordering and lexical strata.

Keywords

Chagga-Mochi, Vowel Deletion, Vowel Coalescence, Glide Formation, Glide Insertion, Lexical Phonology

1. Introduction

1.1. Background and Research Question

Vowel processes in Bantu languages are closely linked to word structure. Grammatical prefixation frequently brings distinct vowels into contact, triggering processes such as deletion, coalescence, or vowel-to-glide alternation [4]. Crucially, as Casali [1] demonstrates, the structural positioning of adjacent vowels during hiatus resolution significantly governs which vocalic quality is ultimately retained or modified. These systemic phonological dynamics necessitate an analytical approach that simultaneously evaluates the sound patterns and the specific morphological constructions in which they occur [1, 4].

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The morphophonemic patterns of Chagga-Mochi analyzed in this study illustrate this interaction. For instance, the noun prefix */mu-/* and the perfective prefix */me-/* systematically shed their vocalic nuclei when preceding both consonants and vowels, whereas other grammatical environments trigger coalescence, glide formation, or epenthetic insertion. Conversely, high-vowel apocope operates at the absolute right boundary of the word. Consequently, this paper investigates how these diverse phonological outcomes correlate with the phonological environment and morphological structure of the word.

This article addresses the primary objective of the foundational dissertation, specifically examining the phonological processes that govern vocalic configurations in Chagga-Mochi [10]. It identifies these processes, isolates their precise conditioning environments, and formalizes their structural operations within the architecture of Lexical Phonology. Consonantal mutations are treated instrumentally, examined only insofar as they elucidate the downstream structural effects of vowel deletion. Processes operating across independent word boundaries remain outside the scope of this investigation. The study asks: Which vowel processes occur in Chagga-Mochi, and in which morphological domains do they operate?

1.2. Linguistic Profile of Chagga-Mochi

Chagga-Mochi, conventionally referred to as Kimochi, is a Bantu language spoken natively by the Chagga community within the Kilimanjaro region of Tanzania [15]. The speech community populates the southern and eastern slopes of Mount Kilimanjaro and the urban and peri-urban environs of Moshi. Historically, their settlement patterns are tied to the complex migrations of diverse Bantu-speaking groups into the fertile foothills of Kilimanjaro [8]. This study draws empirically on primary data elicited from the Kidia and Mahoma speech communities situated in the Old Moshi Mashariki Ward within the Moshi Rural District. Accordingly, the linguistic generalizations advanced herein are representative of the Chagga-Mochi variety native to these specific locales.

Taxonomically, Chagga-Mochi is clustered within the Chagga group of Zone E in the standard Bantu classification [9]. Its grammar is characterised by a symmetrical five-vowel system (*/i, e, a, o, u/*), a robust noun-class prefix system, and highly agglutinative morphology. Prefixes stack recursively onto verbal roots and nominal stems to encode grammatical relations, creating phonological junctures where vowels undergo structural modifications. These morphological characteristics provide the mandatory structural canvas for examining the mechanics of vowel deletion, coalescence, glide formation, and glide insertion explored in this paper.

1.2.1. Vowels in Chagga-Mochi

The vocalic inventory of Chagga-Mochi maintains the classic five-vowel framework symmetrical across many modern Eastern Bantu languages, consisting of the segments */a, e, i, o, u/*. This inventory typifies historical Bantu vocalic shifts, wherein diachronic developments collapsed the ancestral Proto-Bantu seven-vowel system through the systemic merger of high vowels [19, 20]. Furthermore, Chagga-Mochi maintains a phonemic vowel length distinction, featuring a matching set of long counterparts: */a:, e:, i:, o:, u:/*.

Importantly, suprasegmental tonal shifts do not inherently alter or establish distinct vocalic phonemes. Consider the form *kaambia* (‘he/she has received’); the two adjacent surface vowels belong to distinct morphological modules: the initial vowel resides within the prefix */ka-/*, whereas the second constitutes the absolute left edge of the root */ambia/*. Disentangling their underlying morphological affiliations from their surface phonetic quality and tonal exposure is essential. A comprehensive assessment of Chagga-Mochi morphophonology therefore requires tracking how the underlying vowel inventory behaves across variable morphological boundaries and tonal environments.

1.2.2. Syllable Structure

Chagga-Mochi exhibits a flexible array of syllable profiles derived from permissible linear combinations of consonants, vowels, and glides. A well-formed syllable may comprise an isolated vocalic nucleus (V), an autonomous syllabic nasal (N), a standard consonant-vowel sequence (CV), or a consonant followed by a phonemically long vowel (CVV). Additionally, consonants may select a secondary glide articulation to form complex CGV syllables. Table 1 maps these structural configurations.

As modeled in Table 1, purely vocalic syllables (V) manifest in items like *u.o.loru* (‘polite’), whereas *m.pa.re* (‘hit him/her’) highlights the capacity of homorganic nasals to bear syllabic weight independently. The initial sequences in *de.ma* (‘dig’) reflect the canonical CV profile, while *i-laa* (‘sleep’) captures the lengthened CVV layout. Finally, the terminal syllables *kja* in *ko.m.kja* (‘it has dawned’) and *rjo* in *i-fi.hi.rjo* (‘to be cried for’) represent the structurally maximized-onset CGV shape. These distributions showcase the exact structural pathways by which consonants, vowels, and glides organize phonotactically within the Chagga-Mochi syllable.

Table 1. *Syllable Typology and Structural Environments in Chagga-Mochi.*

Syllable structure	Examples	Gloss
V	*u.o.loru; u.i.ndi; a. ítʃi*	'polite'; 'obedience'; 'knows'
N	*m.pa.re; n.nda*	'hit him/her'; 'banana tree'
CV	*de.ma; ku.re*	'dig'; 'wake up'
CVV	*i-daa; i-laa; i-wee*	'smell'; 'sleep'; 'breast'
CGV	*ko.m.kja; i-fi.hi.rjo*	'it has dawned'; 'to be cried for'

Note. A dot (.) marks an internal syllable boundary, whereas a hyphen (-) indicates an underlying morpheme boundary. V = vowel; N = syllabic nasal; C = consonant; G = glide; CV = consonant-vowel; CVV = consonant followed by a long vowel; CGV = consonant-glide-vowel.

2. Literature Review

2.1. Vowel Processes and Morphological Domains

Current morphophonological theory emphasizes that vocalic alternations cannot be explained purely by surface acoustic or phonotactic sequences; instead, they require a multi-dimensional approach that accounts for morphological structure and position-sensitive faithfulness [1, 4]. While Casali [1] establishes structural generalizations regarding which segment is targeted for deletion during vowel hiatus resolution, Hyman [4] contextualizes these patterns within the architectural constraints of the Bantu word. When synthesized, these frameworks demonstrate that the linear phonological string alone is insufficient for predicting surface outputs. Thus, a structural distinction must be maintained between prefix-vowel elision operating at morphological junctions and apocope occurring at the absolute right edge of the word [1, 4].

Linguistic research within East Africa further illustrates how phonological processes are restricted by specific morphological domains. Mndeme and Ligembe [11] document a wide range of processes, including deletion, gliding, insertion, and coalescence, in Shambaa, demonstrating that inputs like */ma+ino/ → [meno*] introduce complex constraints on vowel duration into the grammar. Similarly, Mpobela [13] demonstrates how deletion, coalescence, and glide formation operate at the junction of compounding elements in Runyamigongo dialect of Runyambo. Although these studies examine distinct constructions, they collectively confirm that morphophonemic changes are constrained by specific grammatical domains.

The closest point of comparison for this study is Moshi and Ismail's [12] description of Kimochi (Chagga-Mochi). They report widespread glide formation, vowel loss, and */a+i/* coalescence, noting that some coalesced outputs exhibit compensatory lengthening. While the data analyzed in the present study similarly reveal *[e]* as the target output for underlying */a+i/* sequences, acoustic measurements establishing absolute phonetic duration remain absent. Therefore, while cross-study comparisons confirm consistent target vowel qualities, they do not assume identical temporal timing or syllable weights across separate datasets.

A separate line of inquiry is required to account for word-final vocalic loss. Pacchiarotti and Bostoen [18] analyze final-vowel loss across Lower Kasai Bantu languages, framing it as a diachronic shift driven by intensive language contact. While their historical account proves that consonant-final surface structures are permissible within the Bantu family, it does not establish a historical cause for the patterns observed in the Kilimanjaro region. In this study, final */i/* and */u/* apocope are analyzed strictly as a synchronic pattern documented within the source corpus.

Finally, glide insertion introduces a complex analytical question regarding segment underlying representations: does an intervening glide represent an epenthetic segment inserted to resolve hiatus, or is it a non-syllabic realization of an existing underlying vowel? Davidson and Erker [2] challenge the insertion account for hiatus resolution in American English, arguing instead for a phonetic transition model. Although their findings emerge from a typologically distinct language family, their analytical distinction is highly relevant to Bantu. The Chagga-Mochi data presented here support a provisional insertion analysis, as transcriptions reveal that the underlying */i/* is preserved before the epenthetic glide *[j]*, yielding an *[ijV]* sequence rather than triggering complete vocalic substitution.

2.2. Theoretical Framework: Lexical Phonology

Lexical Phonology provides an explicit architecture for modeling this interaction by separating phonological rules that apply inside the lexicon alongside morphological derivation from post-lexical rules that operate across word boundaries [6]. As Katamba [5] notes, cyclic word formation operates through successive morphological layers: a root or stem defines the initial domain, the attachment of an affix creates an expanded structural environment, and the resulting phonological output is passed to the next cycle. This framework provides a system-

atic way to determine exactly when a vowel sequence becomes accessible for phonological evaluation.

Within this architecture, each successive morphological layer creates a distinct domain for phonological rules [5, 6]. For instance, in the derivation *[nga-[me-itʃo]]*, the prefixation of the perfective marker */me-/* provides the immediate structural context for */e/*-deletion. Similarly, in *[na-[i-terewo]]*, the attachment of the subject marker */na-/* brings the vowels */a/* and */i/* into contact. These bracketed representations illustrate how underlying environments emerge across analytical stages; they model structural steps in the grammar rather than separately recorded phonetic utterances.

It is crucial to distinguish cyclicity from stratal organization. Cyclicity refers to the iterative evaluation of a word as it acquires morphemes, whereas a stratum represents a distinct level within the lexicon where specific blocks of morphological and phonological rules apply [5, 6]. Thus, a stem, an inner prefix, and an outer prefix may define successive cycles without necessarily implying the existence of three independent lexical strata. The Chagga-Mochi data analyzed here permit a proposed mapping of these morphological domains but do not provide sufficient evidence to model the language's entire stratal organization.

Finally, the principle of structure preservation restricts lexical operations from producing structures or segments that violate the language's core inventory [5, 6]. The surface segments *[e]*, *[w]*, and *[j]* generated by these processes align with the phonemic inventory established for Kimochi by Moshi and Ismail [12]. However, structural shifts resulting from deletion require close attention to phonotactic constraints: prefix-vowel loss frequently leaves a nasal onset before a root consonant, whereas word-final apocope creates a closed, consonant-final syllable. The analysis must therefore evaluate both the derived segments and the resulting syllable structures against the permissible phonotactics of the language.

3. Materials and Methods

3.1. Research Design and Sample Selection

This study adopted a qualitative, descriptive ethnographic research design to investigate naturalistic speech variations within their original social contexts. Empirical data were collected from the Kidia and Mahoma villages, located within the Old Moshi Mashariki Ward of the Moshi Rural District in Tanzania. The sample consists of twelve (12) fluent, native speakers of Chagga-Mochi, balanced evenly with six participants from each village. Given the specialized linguistic focus on native intuitive judgments, participants were selected using convenience sampling after meeting strict linguistic criteria: they must have acquired Chagga-Mochi as their first language and continue to use it as their primary medium of daily communication. Local administrative leaders assisted in identifying the initial participant pool. Sociolinguistic profiles, including childhood home language, language acquisition history, and current domain specific usage, were collected during a screening interview to confirm eligibility.

3.2. Data Collection and Elicitation Procedures

Fieldwork was conducted over a four-week period using three distinct methods to ensure rigorous data triangulation. Primary qualitative data were gathered through focus group discussions, with one formal session conducted in each village. These discussions were guided by open-ended prompts regarding daily routines, agricultural practices, and community history, which successfully elicited unmonitored vernacular speech from the participants.

To supplement the discussions, the study gathered naturalistic recordings of spontaneous daily interactions. These sessions captured traditional greetings, family conversations, and informal community exchanges while keeping researcher intervention to a minimum. Finally, textual extraction provided comparative lexical and orthographic evidence. Material was systematically pulled from written Chagga-Mochi documentation, focusing primarily on Mrikaria's [14] Kimochi lexicon alongside regional religious texts. To ensure the reliability of the written data, all orthographic claims were cross-checked and verified against native speaker judgments and speech recordings.

3.3. Data Processing and Analysis

The speech recordings were replayed, phonetically transcribed using the International Phonetic Alphabet (IPA), and cross-referenced with related grammatical paradigms to ensure structural consistency. Where supported by morphological analysis, words were segmented into underlying prefixes and stems to isolate the targeted vowel and its phonological environment. The analytical phase focused on evaluating how a vowel's linear position and morphological construction influenced its phonological outcome. Structural patterns are displayed using descriptive tables designed to show qualitative distributions and structural contexts rather than token frequencies or statistical variations between the two speech communities.

Glides were identified through auditory transcription of the recordings and comparison of the underlying and surface forms. In the proposed glide-formation analysis, */u/* and */i/* are transcribed as non-syllabic *[w]* and *[j]* before a retained vowel. In the proposed insertion analysis, the infinitive vowel */i/* remains before [j], giving *[ijV]*. No spectrographic analysis or instrumental measurements of duration or formant transitions were undertaken.

To ensure the reliability of the dataset, transcription and interpretation errors were mitigated by separating formal elicited material from spontaneous speech and checking ambiguous forms with consultants. Performance errors or mispronunciations were systematically filtered out during this process.

The ultimate stage of the analysis involved mapping these variations onto the analytical levels of Lexical Phonology. This allowed the study to propose the morphological stages at which the observed changes apply.

3.4. Ethical Considerations

The study was conducted with the St. Augustine University of Tanzania clearance and permissions from all Kilimanjaro Regional administrative secretaries and local government authorities. Participants provided informed consent before data collection, were informed of their right to withdraw at any stage without penalty, and were fully anonymized using alphanumeric codes. All audio recordings and transcriptions were stored in encrypted, secure digital repositories. This article represents a targeted reanalysis of the existing dissertation corpus focusing specifically on the vowel, rather than a new round of primary fieldwork.

4. Results

The empirical data gathered from Kidia and Mahoma speech communities reveal four primary morphophonological processes: vowel deletion, vowel coalescence, glide formation, and glide insertion. Vowel deletion operates systematically across several grammatical prefix combinations and at absolute word-final boundaries. The following subsections present these language data paradigms, isolate their precise conditioning environments, and map each phonological operation onto its corresponding morphological domain. The formalized phonological rules summarize the systemic patterns observed within these structural domains.

4.1. Vowel Deletion

4.1.1. Deletion Within the Noun Prefix /mu-/

The Class 1 and Class 3 nominal prefix */mu-/* systematically undergoes high back vowel elision (*/u/*-deletion) when brought into contact with both consonant-initial and vowel-initial stems. Table 2 presents the empirical distributions across both phonotactic environments. While the morphosemantic identity of the prefix remains constant, the segmental properties of the subsequent stem dictate how the remaining bilabial nasal is structurally resyllabified.

Table 2. *Vowel Deletion and Morphophonemic Alternations in Class 1 and Class 3 /mu-/ Nouns.*

Underlying representation	Surface representation	Gloss
/mu-soro/	*[msoro]*	man
/mu-ndo/	*[mndo]*	sickle
/mu-ndu/	*[mndu]*	person
/mu-ana/	*[mana]*	child
/mu-alimu/	*[malimu]*	teacher
/mu-odo/	*[modo]*	fire

Source: Field Data (2026).

The morphophonemic alternations detailed in Table 2 illustrate that in item */mu-soro/* → *[msoro]*, the high vowel */u/* is elided before the voiceless alveolar fricative */s/*. Conversely, in item */mu-ana/* → *[mana]*, the same vowel is lost when adjacent to the low central vowel */a/*. This structural reduction shows that high-vowel elision occurs regardless of whether the following stem has a consonantal onset or a vocalic nucleus. The common structural denominator across these forms is the nominal prefix */mu-/*, which systematically surfaces as the bare bilabial nasal marker *[m-]* within Class 1 and Class 3 morphological paradigms. This systemic pattern is formalized in rule (1):

$$u \rightarrow \emptyset \ within \ the \ noun \ prefix \ /mu-/ \quad (1)$$

Under a proposed cyclic analysis within the framework of Lexical Phonology [5, 6], the lexical stem forms the initial domain of phonological evaluation (Cycle 1), and the subsequent attachment of the class prefix generates the next domain (Cycle 2). The derivations proceed iteratively from underlying representations to surface forms:

$$/soro/_{\text{Cycle 1}} \rightarrow [mu_soro]_{\text{Cycle 2}} \rightarrow [msoro]$$

$$/ana/_{\text{Cycle 1}} \rightarrow [mu_ana]_{\text{Cycle 2}} \rightarrow \ [mana]$$

In each grammatical derivation, the deletion rule is proposed to apply at the junction created when the prefix */mu-/* attaches to the stem, requiring no subsequent outer phrasal or syntactic cycles.

The retained nasal is syllabified differently depending on

the sound that follows it. Before a vowel-initial stem, it forms the onset of the following syllable, as in */mu-ana/ → [mana]*. Before a consonant-initial stem, it is analysed as a syllabic nasal, as in */mu-soro/ → [msoro]*. In both cases, */u/* is deleted from the prefix */mu-/*, while the nasal remains.

4.1.2. Deletion Within the Perfective Prefix /me-/

Empirical field data demonstrate that the Chagga-Mochi perfective prefix */me-/* systematically undergoes front mid-vowel elision (*/e/*-deletion), surfacing uniformly as the bare bilabial nasal marker *[m-]*. Critically, this morphophonemic reduction operates across both vowel-initial and consonant-initial stems. Because these alternating environments show the same structural change with the same grammatical marker, they fall under a unified synchronic process. Table 3 illustrates these empirical paradigms.

Table 3. *Vowel Deletion Patterns within the Chagga-Mochi Perfective Prefix /me-/.*

Underlying representation	Surface representation	Gloss
/nga-me-itʃo/	*[ngamitʃo]*	I have heard
/o-me-ida/	*[omida]*	You have passed
/wa-me-ira/	*[wamira]*	They have carried
/nga-me-henda/	*[ngamhenda]*	I have already gone
/nga-me-marisa/	*[ngammarisa]*	I have already finished
/nga-me-kure/	*[ngamkure]*	I have already woken up

Source: Field data (2026).

In vowel-initial environments, the prefixal nucleus */e/* is deleted while the root-initial vowel is faithfully retained. For example, underlying */nga-me-itʃo/* yields surface *[ngamitʃo]*, and */o-me-ida/* collapses into *[omida]*. In these instances, the perfective marker reduces to the single consonant *[m-]*, which linearizes with the retained stem vowel to form a new syllable onset. While this reduction superficially resembles standard vowel hiatus resolution driven by phonotactic constraints against adjacent vocalic nuclei, the consonant-initial data demonstrate that structural vowel contact is not a mandatory conditioning factor for this process.

As demonstrated by the consonant-initial stems in Table 3, the same vowel loss occurs in forms such as */nga-me-henda/ → [ngamhenda]* and */nga-me-kure/ → [ngamkure]*. Similarly, */nga-me-marisa/* surfaces as [*ngammarisa*], where the adjacent surface nasals reflect distinct underlying morphemes: the first constitutes the reduced perfective marker, while the second marks the left boundary of the root */marisa/*. Because */e/*-elision targets the perfective prefix regardless of whether the following stem begins with a vocalic peak or a consonantal onset, the process is formalized as an unconditioned rule with respect to the downstream phonological segment:

$$\boxed{/me-/ \rightarrow [m-] \quad \text{(PFV)}} \qquad (2)$$

Rule (2) establishes that the perfective prefix */me-/* surfaces as the bare nasal *[m-]* based purely on morphological conditioning rather than phonological context. The rule applies strictly to this grammatical morpheme and does not imply a general, unconditioned deletion of all mid-vowels within the language. Examples i (a) and i (b) model the specific morphological composition and glossing alignments for both structural paths. PFV denotes perfective; the gloss 1SG.SM denotes a first-person singular subject marker (1 = first person; SG = singular; SM = subject marker).

i (a) ngamitʃo
nga-me-itʃo
1SG.SM-PFV-hear
'I have heard.'
i (b) ngamhenda
nga-me-henda
1SG.SM-PFV-go
'I have already gone.'

This dependence on a specific grammatical morpheme supports an analysis of the process as operating within the lexical module of the grammar, aligning with the core architectural tenets of Lexical Phonology [5, 6]. Morphophonemic reduction occurs within the verbal word template during the cycle where the perfective prefix subcategorizes for the verbal stem. Although its phonetic string is reduced, its underlying morphosemantic features remain intact. Therefore, while hiatus resolution occurs naturally before vowel-initial stems, it operates as a secondary structural consequence rather than the primary grammatical driver of the deletion rule.

Evaluating these forms through iterative morphological cycles [5] provides a proposed ordering of morphological stages. Under this analysis, the bare verbal root constitutes the pri-

mary domain (Cycle 1). The subsequent attachment of the perfective prefix creates the immediate structural domain for vowel elision (Cycle 2), after which the subject prefix attaches at the outermost layer (Cycle 3). Table 4 tracks this cyclic progression across both stem profiles.

Table 4. *Cyclic Derivation of Vowel-Initial and Consonant-Initial Verbal Stems.*

Morphological cycle	Vowel-initial stem	Consonant-initial stem
Cycle 1: Stem	*/itʃo/*	*/henda/*
Cycle 2: Perfective attachment & deletion	*/me-itʃo/ → /m-itʃo/*	*/me-henda/ → /m-henda/*
Cycle 3: Subject-prefix attachment	*/nga-m-itʃo/ →* [*ngamitʃo*]	*/nga-m-henda/ →* [*ngamhenda*]

Note. The derivations show the interaction between prefix attachment and vowel deletion during the formation of the verbal word.

Table 4 shows how morphology and phonology interact during the formation of the perfective verb. The stem provides the starting point in Cycle 1. In Cycle 2, the perfective prefix */me-/* attaches to the stem, and its vowel */e/* is deleted, producing */m-itʃo/* and */m-henda/*. In Cycle 3, the subject prefix */nga-/* attaches to these forms, producing *[ngamitʃo]* and *[ngamhenda]*. The subject prefix therefore combines with a form that has already undergone perfective-prefix vowel deletion. This ordering illustrates the interaction between morphological attachment and phonological rules described in Lexical Phonology [5, 6]. The same deletion applies before both vowel-initial and consonant-initial stems because it targets the perfective prefix /me-/ regardless of the following sound.

The retained nasal is syllabified differently depending on the sound that follows it. Before a vowel-initial stem, it forms the onset of the following syllable, as in *[ngamitʃo]*. Before a consonant-initial stem, it is analysed as a syllabic nasal, as in *[ngamhenda]*. In both environments, the perfective prefix retains its grammatical function after the deletion of */e/*.

From the perspective of structure preservation [6], deletion leaves segments that already belong to the Chagga-Mochi sound system. The retained *[m]* forms either an onset before a vowel or a syllabic nasal before a consonant, following the syllable patterns described for the language. The change therefore affects the pronunciation of the perfective prefix while preserving its grammatical role.

4.1.3. Vowel Deletion in Agreement and Noun-Class Prefixes

The data show deletion of a prefix-final vowel before a vowel-initial element within a word. Table 5 includes agreement forms with */-ose/* and noun forms with */ʃi-/*. In both constructions, the prefix vowel is deleted, and the vowel beginning the following element remains. Table 5 presents the examples.

Table 5. *Vowel Deletion in Agreement and Noun-Class Prefixes in Chagga-Mochi.*

Underlying representation	Surface representation	Gloss
/a-ose/	*[ose]*	anyone
/wa-ose/	*[wose]*	all people
/ʃi-ose/	*[ʃose]*	all things
/ʃi-uma/	*[ʃuma]*	domestic animals
/ʃi-uri/	*[ʃuri]*	mortar
/ʃi-unga/	*[ʃunga]*	surrounding area

Source: Field data (2026).

The forms containing -ose illustrate deletion in different agreement prefixes. In */wa-ose/ → [wose]* and */ha-ose/ → [hose]*, the prefix vowel */a/* is deleted before */o/*. Similarly, */i/* is deleted in */ʃi-ose/ → [ʃose]*, while */u/* is deleted in */ku-ose/*

→ *[kose]*. In each case, the initial vowel of -ose remains. In */a-ose/* → *[ose]*, deletion removes the whole vowel-only prefix, leaving no audible segment to express agreement. Its grammatical role is nevertheless recoverable from the construction in which the form occurs.

The Class 7 noun /ʃi-uma/ → [ʃuma] 'domestic animals' shows deletion beyond agreement forms with /-ose/. The prefix vowel /i/ is lost before stem-initial /u/, leaving [ʃ-] to mark the noun class. The forms /ʃi-uri/ and /ʃi-unga/ show the same vowel change. Table 5 therefore includes deletion before /o/ and /u/. Examples ii (a)-ii (c) distinguish agreement morphology from the noun prefix.

$$V \rightarrow \emptyset \; / \; __ \; V \qquad (3)$$

restricted here to the final vowel of a prefix before a vowel-initial element within the word.

ii (a) wose
wa-ose
CL2.AGR-all
'All people.'
ii (b) ʃose
ʃi-ose
CL7.AGR-all
'All things.'
ii (c) ʃuma
ʃi-uma
CL7-domestic.animals
'Domestic animals.'
Note. CL = noun class; AGR = agreement; the following number identifies the class.

The rule applies to the final vowel of a prefix at the boundary with a vowel-initial element. Its domain is therefore morphological, while its immediate trigger is phonological: prefix attachment brings two vowels into contact. In the forms examined, deletion removes the first vowel and preserves the vowel beginning the following element. The derivation of */ʃi-uma/* in Example ii (c) illustrates the process: underlying representation: */ʃi-uma/*→morphological combination: */ʃi-uma/*→proposed vowel deletion: */ʃi-uma/* → */ʃuma/*→surface representation: *[ʃuma]*.

In Example ii (c), */ʃi-/* is the Class 7 noun prefix, whereas in Example ii (b) it expresses Class 7 agreement with */-ose/*. Example ii (a) illustrates the corresponding Class 2 agreement prefix */wa-/*. All three constructions create a vowel sequence at an internal morphological boundary. Deletion affects the prefix vowel, preserving */u/* in the noun and */o/* in the agreement forms.

This prefix-element interaction is represented by a proposed two-cycle lexical analysis. Cycle 1 supplies */uma/* or */ose/*. In Cycle 2, the noun or agreement prefix attaches and phonology resolves the new vowel sequence: */ʃi-uma/* → *[ʃuma]* in Example ii (c), */ʃi-ose/* → *[ʃose]* in Example ii (b), and */wa-ose/* → *[wose]* in Example ii (a). The change is evaluated on the larger construction created by prefixation. Class 7 morphology is retained through *[ʃ-]*, whether the prefix forms a noun or expresses agreement.

The outputs preserve permitted segments and syllable patterns. The Class 7 prefix retains *[ʃ]*, which forms an onset before the stem vowel in *[ʃuma]*. In *[ʃose]*, the same consonant precedes the retained vowel of */-ose/*. Deletion therefore removes hiatus and produces a permitted consonant-vowel sequence without introducing a new segment.

The finding is comparable to Casali's [1] account of vowel elision as a means of resolving contact between adjacent vowels. His discussion highlights the need to identify which vowel is lost. In the Chagga-Mochi examples, the deleted vowel belongs to the prefix, while the initial vowel of the following element is retained. The morphological boundary therefore helps explain the direction of deletion.

France [3] provides a comparison through the analysis of Kinyambo segmental alternations during affixation. The common analytical issue is the interaction between a prefix and the following morphological element. The Chagga-Mochi examples specifically show deletion of the prefix vowel with retention of the following vowel; the surface forms in Table 5 contain no accompanying vowel lengthening.

4.1.4. Word-Final High-Vowel Deletion

Word-final high-vowel deletion, also called apocope, removes */u/* or */i/* at the right edge of the forms presented in Table 6. The affected vowel occurs in different words and constructions. This pattern is analysed at the completed-word level because its domain is the word's final position.

Table 6. *Word-Final High-Vowel Deletion in Chagga-Mochi.*

Underlying representation	Surface representation	Gloss
/limu/	*[lim]*	one
/ʃilimu/	*[ʃilim]*	harvests
/kirumu/	*[kirum]*	wheezing
/pfumu/	*[pfum]*	spear
/ngameɲi/	*[ngameɲ]*	morning
/kaɲi/	*[kaɲ]*	at home

Source: Field data (2026).

The examples show that final */u/* is deleted in forms such as */limu/* → *[lim]*, while final */i/* is deleted in forms such as */ngameɲi/* → *[ngameɲ]*. The process is therefore triggered by two conditions: the vowel must be high and must occur at the right edge of a word. The rule can be stated as follows:

$$i, u \rightarrow \emptyset \; / \; __ \qquad (4)$$

at the end of a phonological word.

This rule means that a high vowel is deleted when it occurs in word-final position. The derivation of */limu/* may be presented as: underlying representation: */limu/* → identification of word-final */u/*→word-final high-vowel deletion → surface representation: *[lim]*.

Within Lexical Phonology, this analysis places apocope at the completed-word level. The relevant environment is the final high vowel rather than a particular prefix-stem boundary. The derivation */limu/* → *[lim]* shows that the final syllable loses its vowel and becomes consonant-final.

In relation to cyclic word formation, apocope is provisionally evaluated at word completion, after the internal construction of the word. The analysis takes the whole-word representation */limu/* as its input and produces *[lim]*; */pfumu/* similarly produces *[pfum]*, while */ngameɲi/* produces *[ngameɲ]*. These are word-level evaluations rather than deletion at each inner prefix boundary. The cycle discussion therefore locates apocope at the final lexical word domain, with its precise lexical or post-lexical timing still to be established, without assigning additional affixation stages to these whole-word inputs.

Word-final vowel loss is known in Bantu languages. Pacchiarotti and Bostoen [18], for example, document final-vowel loss in several Lower Kasai Bantu languages. Their study shows that final-vowel loss may alter the characteristically open syllable structure inherited from Proto-Bantu and produce consonant-final words. However, they interpret the Lower Kasai pattern mainly as a historical, contact-induced change. The Chagga-Mochi data are analysed synchronically because speakers alternate between forms containing the final high vowel and shortened surface forms. The two cases are therefore similar in their structural result but differ in their proposed status and historical motivation [18].

Mndeme and Ligembe [11] describe the deletion of */i/* and */u/* from Shambaa prefixes, accompanied by nasal syllabification. This is comparable in the affected vowels but differs in domain: The Chagga-Mochi pattern in Table 6 concerns high vowels at the word's right edge. The comparison therefore distinguishes prefix-vowel deletion from word-final apocope.

In the forms presented, deletion removes the final vowel and leaves the preceding consonant at the end of the word. In */limu/* → *[lim]* and */pfumu/* → *[pfum]*, the loss of */u/* leaves *[m]* in final position. Similarly, deleting */i/* in */ngameɲi/* → *[ngameɲ]* and */kaɲi/* → *[kaɲ]* leaves *[ɲ]* at the end. As transcribed, these forms are analysed with closed final syllables. This outcome differs from prefix-vowel deletion before a consonant, where the retained prefix nasal is provisionally analysed as a syllable nucleus.

4.1.5. Deletion of */i/* in the Subject Prefix */ndʒi-/*

The field data show deletion of /i/ from the first-person singular subject prefix /ndʒi-/ before a consonant-initial verbal element. In /ndʒi-kora/, for example, removal of the prefix vowel is proposed to give the intermediate form /ndʒ-kora/. The verb stem remains unchanged.

$$i \rightarrow \emptyset \,/\, ndʒ __ C \quad (5)$$

within the subject prefix /ndʒi-/.

The forms are provisionally analysed with a stem cycle followed by a subject-prefix cycle. Cycle 1 supplies /kora/, /leha/ or /sanja/. In Cycle 2, /ndʒi-/ attaches and phonology deletes its final /i/: /ndʒi-kora/ → /ndʒ-kora/, /ndʒi-leha/ → /ndʒ-leha/, and /ndʒi-sanja/ → /ndʒ-sanja/. Prefix attachment creates the morphological domain for this adjustment.

The derivation below illustrates a feeding relationship between vowel deletion, consonant reduction, and nasal assimilation. First, /i/ is deleted from /ndʒi-/, producing /ndʒ-kora/. The remaining prefix sequence /ndʒ/ then reduces to /n/, giving /n-kora/. Finally, /n/ assimilates to the place of articulation of the following velar consonant /k/ and is realised as [ŋ], producing [ŋkora]. Each operation provides the input for the next, showing how the rules interact within the prefixed word.

/ndʒi-kora/ → /ndʒ-kora/ → /n-kora/ → [ŋkora].

4.2. Vowel Coalescence

Vowel coalescence occurs when two adjacent vowels combine to form a single vowel. In the Chagga-Mochi data, the vowels */a/* and */i/* combine to produce *[e]* when the subject marker */na-/* is followed by the present-tense marker */i-/*. The pattern is illustrated in Table 7.

Table 7. *Vowel coalescence in Chagga-Mochi.*

Underlying form	Surface form	Gloss
/na-i-lungo/	*[nelungo]*	He/she is together with others
/na-i-terewo/	*[neterewo]*	He/she is being asked
/na-i-taramo/	*[netaramo]*	He/she is congratulated
/na-i-itʃeo/	*[netʃeo]*	He/she offers congratulations on a new arrival
/na-i-ambada/	*[neambada]*	He/she offers New Year wishes

Source: Field data (2026).

The examples show that */a+i/* is realized as *[e]* at the boundary between the two grammatical markers. For example, */na-i-terewo/* becomes *[neterewo]*. The subject marker */na-/* and the present-tense marker */i-/* retain their grammatical functions, although their vowels combine in the surface form.

Similarly, */na-i-tʃeo/* becomes *[netʃeo]* 'he/she offers congratulations on a new arrival'. The vowel */a/* in the subject marker */na-/* combines with the present-tense vowel */i-/* to form *[e]*, while the stem */tʃeo/* remains unchanged. The process is represented by the rule in (6).

$$/a + i/ \rightarrow [e] \,/\, na__\ i_ \qquad (6)$$

Rule (6) states that */a/* and */i/* combine to form *[e]* when the subject marker */na-/* precedes the present-tense marker */i-/*. The rule describes the pattern observed in the supplied data; additional examples are needed to determine whether it applies in other morphological environments. Example iii illustrates the process.

iii Vowel coalescence in */na-i-terewo/*

[neterewo]

na-i-terewo

3SG.SM-PRS-be.asked

Note. 3SG.SM = third-person singular subject marker (3 = third person); PRS = present tense.

'He/she is being asked.'

The underlying form is */na-i-terewo/*, while the surface form is *[neterewo]*. The vowels */a/* and */i/* combine to produce *[e]*, resulting in the observed surface form.

Cyclic Derivation

The process can be represented in three stages, following the proposed cyclic analysis.

Cycle 1: $/terewo/$

Cycle 2: $/i_terewo/$

Cycle 3: $/na_i_terewo/$

→ $[neterewo]$

In Cycle 1, the verbal stem */terewo/* is established. In Cycle 2, the present-tense marker */i-/* is attached to the stem. In Cycle 3, the subject marker */na-/* is added. This creates the adjacent vowel sequence */a+i/*, which is realized as *[e]*.

The derivation shows how the proposed morphological structure creates the environment for coalescence. However, further evidence is needed to establish whether the process must apply cyclically or can be explained by a general phonological rule.

Comparison with Other Bantu Languages

Similar vowel alternations have been reported in other Bantu languages. Mndeme and Ligembe [11] discuss the Shambaa form */ma-ino/* → *[meno]*, meaning 'teeth'. Mpobela [13] reports the Runyamigongo alternation */a+o/* → *[u]* in compound formation. These examples show that vowel alternations can occur when morphemes or lexical elements combine. However, the processes differ in their input vowels, output vowels, and morphological environments. The Chagga-Mochi pattern involves */a+i/* at the boundary between a subject marker and a tense marker, producing *[e]*.

In summary, the Chagga-Mochi data show a consistent relationship between the underlying sequence */a+i/* and the surface vowel *[e]* in the five reported forms. The proposed rule captures this pattern, while the cyclic analysis provides a possible account of how the relevant vowels become adjacent.

4.3. Glide Formation

Glide formation is a productive vowel-related process in Chagga-Mochi. It occurs when the high vowels */u/* and */i/* lose their syllabic status before another vowel and become *[w]* and *[j]*, respectively. The process resolves vowel hiatus by allowing the following vowel to remain the syllable nucleus, while the high vowel becomes the onset. Two patterns are discussed: the formation of *[w]* from */u/* and the formation of *[j]* from */i/*.

4.3.1. Formation of the Glide *[w]*

The first gliding pattern changes high back */u/* to *[w]* before another vowel. Table 8 contains nominal and verbal forms, with the following vowels */o/*, */i/* and */e/*. The morphological constructions differ, but each places */u/* directly before the vowel that remains syllabic.

Table 8. *Formation of the Glide [w] in Chagga-Mochi.*

Underlying representation	Surface representation	Gloss
/ongu-o/	*[ongwo]*	explain
/uoloru/	*[woloru]*	politeness
/halu-o/	*[halwo]*	answer
/uluinenge/	*[ulwinenge]*	give us
/kuipfo/	*[kwipfo]*	there is
/lu-e-deda/	*[lwededa]*	we were speaking

Source: Field data (2026).

Table 8 shows */u/* becoming *[w]* before */o/*, */i/*, and /e/. In */ongu-o/* and */halu-o/*, the stem-final */u/* precedes final */o/*. In */lu-e-deda/*, the sequence occurs between the subject and past-tense markers. The */u/* before */i/* in */uluinenge/* and */kuipfo/* and the initial */u/* before */o/* in */uoloru/* show the same sound change at other positions. The identification of *[w]* was based on listening to the speech recordings during transcription. In these forms, the sound corresponding to underlying */u/* was interpreted as non-syllabic, occurring with the following vowel rather than forming a separate syllable nucleus. For example, in *[lwededa]*, *[w]* was analysed as part of the onset before the vowel *[e]*. This interpretation was based on auditory evidence and comparison of the underlying and surface forms.

$$u \rightarrow w \,/\, __\ i, e, o \qquad (7)$$

iv (a) lwededa

lu-e-deda

1PL.SM-PST-speak

'We were speaking.'

Note. 1PL.SM = first-person plural subject marker (PL = plural); PST = past tense.

iv (b) ongwo
ongu-o
explain-FV
'Explain.'
Note. FV = final vowel.

iv (c) halwo
halu-o
answer-FV
'Answer.'

The parsing in Example iv (a) shows that the sequence */u+e/* is created when two grammatical prefixes combine. The vowel */u/* occurs at the end of the first-person plural subject marker */lu-/*, while */e/* is the vowel of the following past-tense marker. When these prefixes combine within the verbal word, */u/* becomes adjacent to */e/*. The vowel */u/* subsequently loses its syllabicity and is realised as *[w]*, producing *[lwededa]*.

Example iv (a) is represented by a proposed analysis with an inner tense cycle and an outer subject cycle. Cycle 1 supplies */deda/*. Cycle 2 adds past-tense */e-/* to form */e-deda/*. Cycle 3 adds subject */lu-/*: *[lu-/e-deda/]* → */luededa/* → *[lwededa]*. The outer cycle creates */u+e/*, and phonology changes */u/* into *[w]*. The root and the tense vowel remain intact. This is the point in the proposed cyclic derivation at which glide formation changes the representation.

The process also demonstrates structure preservation within the lexical component. Although */u/* changes from a vowel into a glide *[w]*, the resulting segment is not foreign to the phonological system of Chagga-Mochi. The glide *[w]* is an independently permitted segment in the language and can occur in syllable-onset position. Glide formation therefore produces a structure that conforms to the established phonological inventory and syllable patterns of Chagga-Mochi. In */lu-e-deda/* → *[lwededa]*, the resulting sequence *[we]* has *[w]* as the onset and *[e]* as the syllable nucleus. The process therefore resolves the underlying vowel hiatus and produces a permissible CV syllable without introducing a new segment or an unacceptable syllable structure.

The Chagga-Mochi finding is consistent with studies showing that the change */u/* → *[w]* is used to resolve vowel hiatus in some Bantu languages [4, 7, 17]. Mndeme and Ligembe [11], for example, report a similar process in Shambaa, where */u/* becomes *[w]* before another vowel. France [3] also discusses glide formation, while Mpobela [13] reports gliding among the vowel changes found in Runyamigongo compound words.

4.3.2. Formation of the Glide *[j]*

The second glide-formation pattern involves the high front vowel */i/*. When */i/* occurs before a vowel of a different quality, it loses its syllabic status and becomes the palatal glide *[j]*. This process resolves vowel hiatus by making the following vowel the syllable nucleus. The data are presented in Table 9.

Table 9. *Formation of the Glide [j] in Chagga-Mochi.*

Underlying representation	Surface representation	Gloss
/ki-awo/	*[kjawo]*	of them
/ki-ala/	*[kjala]*	cow dung
/ki-ela/	*[kjela]*	food
/ki-umu/	*[kjumu]*	very difficult
/ki-umbo/	*[kjumbo]*	a kind of food
/ki-ose/	*[kjose]*	all of it

Source: Field data (2026).

$$i \rightarrow j \; / \; __ \; V \qquad (8)$$

where the following vowel in Table 9 is /a, e, o/ or */u/*.

In the prefixed forms, */ki-/* combines with a vowel-initial element and its */i/* becomes *[j]*. Noun-class morphology and agreement morphology can therefore create the same sound environment. The noun forms retain the stem vowel, while */ki-ose/* preserves the vowel of the agreeing element. The resulting *[j]* is a permitted palatal glide and forms part of the onset preceding the retained vowel.

The prefix-element construction is represented by a proposed cyclic analysis. Cycle 1 supplies */ose/*. In Cycle 2, */ki-/* attaches, creating */ki-ose/*; phonological evaluation changes prefix */i/* into *[j]*, giving *[kjose]*. The gliding rule therefore applies in the cycle that introduces the vowel sequence. The prefixed forms in Table 7 likewise preserve the following vowel while adjusting the high vowel in the enlarged lexical construction.

The Chagga-Mochi outcome can be compared with Bantu high-vowel gliding [4, 17]. Nyoni [16] discusses hiatus repairs in Tshivenda, including forms that add a glide while retaining the input vowels. That outcome should be distinguished from the present */i/* → *[j]* pattern, in which the original vowel itself loses syllabicity.

4.4. Glide Insertion

Glide insertion is another strategy used by Chagga-Mochi to resolve vowel hiatus. Unlike glide formation, which changes an existing high vowel into a glide, insertion introduces *[j]* between two vowels while preserving both of them. The process occurs when the prefix */i-/* combines with a vowel-initial stem.

Table 10. *Glide Insertion in Chagga-Mochi.*

Underlying representation	Surface representation	Gloss
/i-adaɲa/	*[ijadaɲa]*	to listen
/i-oloka/	*[ijoloka]*	to fall
/i-ende/	*[ijende]*	to bring
/i-uma/	*[ijuma]*	to become dry

Source: Field data (2026).

In these forms, */i-/* is an infinitive marker comparable in grammatical function to the Kiswahili infinitive marker */ku-/*. It combines with the vowel-initial verb stems */adaɲa/* 'listen/hear', */oloka/* 'fall', */ende/* 'bring' and */uma/* 'become dry'. When the infinitive marker attaches to these stems, it creates the vowel sequences */i+a/*, */i+o/*, */i+e/* and */i+u/* across a prefix-stem boundary. The palatal glide *[j]* is inserted between the two vowels, producing *[ijadaɲa]*, *[ijoloka]*, *[ijende]* and *[ijuma]*. Glide insertion is therefore morphologically conditioned because it is triggered by the combination of the infinitive prefix /i-/ with a vowel-initial verb stem.

$$\emptyset \rightarrow j \,/\, i + __\ V \qquad (9)$$

at the boundary between infinitive /i-/ and a vowel-initial verb stem

v (a) ijadaɲa
i-adaɲa
INF-listen
'To listen.'
Note. INF = infinitive.

v (b) Nalelaho ijadaɲia mondu.
na-le-laho i-adaɲia mondu
3SG.SM-PST-appoint INF-listen case
'He/she was appointed to listen to the case.'

This means that the palatal glide *[j]* is inserted between the infinitive prefix */i-/* and a vowel occurring at the beginning of a verb stem. The derivation of *[ijadaɲa]* in Example v (a) begins with the infinitive prefix */i-/* and the verb stem */adaɲa/* 'listen/hear'. During prefixation, the two morphemes combine and produce the intermediate form */i-adaɲa/*. This combination brings */i/* and */a/* together across a prefix-stem boundary, creating vowel hiatus. In the proposed word-level analysis, *[j]* is inserted between the two vowels, producing *[ijadaɲa]*. The glide becomes the onset of the syllable beginning with */a/*, while both underlying vowels are retained. The resulting surface form is *[ijadaɲa]* 'to listen/hear'.

Example v (a) illustrates a proposed cyclic organisation of infinitive formation. Cycle 1 supplies the stem */adaɲa/*. In Cycle 2, infinitive */i-/* attaches: */i-adaɲa/* → *[ijadaɲa]*. Phonology inserts *[j]* in the prefix-stem domain created by this attachment. Both vowels are retained, and the completed infinitive is then available for syntax, as in Example v (b). The larger sentence supplies a syntactic context for the infinitive rather than another affixation cycle. The inserted *[j]* belongs to the Chagga-Mochi inventory, supporting structure preservation.

The finding supports Hyman [4] and Odden [17], who describe different Bantu strategies for resolving vowel hiatus. It differs from the glide formation reported by Mpobela [13], where an existing vowel becomes a glide during compound formation. Chagga-Mochi instead inserts *[j]* while retaining infinitive */i-/*. The present analysis relates this adjustment to the morphological cycle that creates the infinitive prefix-stem boundary.

5. Discussion of Findings

The findings reveal that Chagga-Mochi employs four major morphophonological processes: vowel deletion, vowel coalescence, glide formation, and glide insertion. These processes occur at different morphological boundaries and provide evidence of systematic interaction between morphological structure and phonological patterns. Vowel deletion affects noun-class, agreement, subject, and perfective prefixes, as well as word-final high vowels. Vowel coalescence combines adjacent */a+i/* into *[e]* in the reported subject-tense marker sequence. Glide formation changes high vowels */u/* and */i/* into *[w]* and *[j]*, respectively, while glide insertion introduces *[j]* between the infinitive prefix */i-/* and a vowel-initial stem.

A central finding is that these processes frequently occur when morphological elements are combined. The direction of vowel deletion, the conversion of high vowels into glides, and the insertion of *[j]* demonstrate different strategies for managing vowel sequences and syllable structure. Although several processes involve vowel contact, the processes are not interchangeable: deletion removes a vowel, coalescence produces a single vowel from two adjacent vowels, glide formation changes an existing vowel into a non-syllabic segment, and glide insertion adds a segment while retaining the original vowels. Deletion within */mu-/* and */me-/* also occurs before consonants, while apocope is conditioned by word-final position.

The findings also suggest that morphological boundaries play an important role in conditioning phonological alternations. The proposed cyclic analysis accounts for the timing of several processes by locating them in the morphological domain in which the relevant prefix or grammatical marker attaches. However, the available data support this analysis as a plausible account rather than conclusive proof of a fully established cyclic or stratal system. Further investigation of additional morphological environments, speaker variation, and acoustic evidence would help establish the precise conditioning and phonetic realization of the processes, particularly syllabic nasals and the reported vowel-coalescence outputs.

Overall, the results show that Chagga-Mochi morpho-phonology involves several distinct but related processes through which morphological combinations influence surface pronunciation. The findings contribute to the description of Chagga-Mochi sound patterns and provide a basis for comparison with similar processes documented in other Bantu languages.

6. Conclusion

This study shows that vowel processes in Chagga-Mochi reflect both the grammatical identity of morphemes and their position within a word. The loss of vowels in */mu-/* and */me-/* before both consonants and vowels demonstrates that prefix-vowel deletion extends beyond the resolution of vowel contact. Other patterns arise where vowels meet during word formation or where high vowels occur at the word's final boundary. These differences show why the sound environment and morphological structure must be considered together when explaining vowel alternations. Through Lexical Phonology, the analysis relates these changes to the word-building stages that create their environments. The study adds to the documentation of Chagga-Mochi by showing how its vowel patterns operate within particular grammatical constructions.

Abbreviations

AGR	Agreement
C	Consonant
CL	Noun Class
CV	Consonant-vowel
CVV	Consonant Followed by a Long Vowel
CGV	Consonant-glide-vowel
FV	Final Vowel
G	Glide
INF	Infinitive
IPA	International Phonetic Alphabet
N	Syllabic Nasal
PFV	Perfective
PL	Plural
PRS	Present Tense
PST	Past Tense
SG	Singular
SM	Subject Marker
V	Vowel
1	First Person in Grammatical Glosses
3	Third Person in Grammatical Glosses

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Conflicts of Interest

The authors declare no conflicts of interest.

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