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DOCTORAL RESEARCH UNIT FOR
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THE PHONOLOGY OF AJUMBU

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DEDICATION

To my loving dad Ndom André

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ABSTRACT

This study describes the sound system, the syllable structure and the phonological processes of Ajumbu, a language spoken by about 300 speakers in Fungom Subdivision, Menchum Division, in the Northwest Region of Cameroon (Di Carlo & al., 2020: 4). It also proposes an alphabet coupled with some orthographic rules. The present research originates from the fact that up to date, Ajumbu counts very few scientific works, and linguists have still not yet been able to retrace its linguistic classification despite some proposals. The data used for this work are drawn from personal fieldwork and existing unpublished corpora on Ajumbu. Qualitative methods like interviews and questionnaires were used to collect data. The content analysis method was used to read, classify and analyse data. Consulted theories for data analysis and interpretation were the classical phonemic theory, the feature theory, and the autosegmental phonology theory. The phonological analysis reveals that the sound system of this language has 27 consonant phonemes, 11 vowel phonemes and 3 underlying tones. Common syllable structures in verb and noun roots are CV and CVC whereas pronouns present V, N, and CV syllable structures. Major processes are assimilation, deletion, insertion, reduplication and tone polarity. These findings are considered altogether while designing Ajumbu orthography. A phonemic based alphabet of 33 letters is proposed in this study. It will reduce spelling and reading inconsistencies observed in available works in Ajumbu. The results of this study provide necessary materials to linguists, educators and language planners that will help in the production of didactic materials and literacy in Ajumbu. This study equally contributes to the description of Ajumbu, an endangered language, by working towards its preservation, and improving its documentation and revitalisation.

Keywords: Ajumbu, phonology, phonemes, phonotactics, syllable, alphabet, orthography

RÉSUMÉ

Ce mémoire décrit le système phonologique, la structure syllabique, et les processus phonologiques de l'ajumbu, langue comptant environ 300 locuteurs et parlée dans l'Arrondissement de Fungom, département de la Menchum, région du Nord-Ouest Cameroun (Di Carlo & al., 2020: 324). Cette étude esquisse également une proposition d'alphabet enrichie de quelques règles d'orthographe de la langue ajumbu. Ce travail tire sa source du constat selon lequel la langue ajumbu est très peu décrite à ce jour. Bien qu'il existe quelques travaux effectués sur l'ajumbu, les linguistes ne sont pas encore parvenus à retracer sa filiation généalogique avec exactitude. Les données utilisées pour ce travail sont issues des travaux personnels effectués lors d'une descente de terrain et des corpus existants non publiés sur la langue Ajumbu. Les méthodes qualitatives, les entretiens et les questionnaires, ont été utilisées pour recueillir les données. La méthode d'analyse de contenu a permis de lire, classer et éliciter les données. Il a été fait recours à une approche éclectique alliant la théorie phonémique classique, la théorie des traits et la théorie de la phonologie autosegmentale pour l'analyse et l'interprétation des données. Au terme de cette étude, il en ressort que le système phonologique de l'ajumbu compte 27 phonèmes consonantiques, 11 phonèmes vocaliques et 3 tonèmes. Les structures syllabiques courantes dans la langue sont V, N, CV et CVC. Les radicaux nominaux et verbaux ont la structure CV et CVC tandis que les pronoms présentent les structures V, N et CV. Les processus phonologiques majeurs sont l'assimilation, la suppression, l'insertion, la reduplication et la polarité tonale. Ces résultats ont été pris en compte lors l'élaboration de la proposition d'alphabet de l'ajumbu qui compte 33 lettres et signes. Cette étude permet de réduire les incohérences d'orthographe et de lecture observées dans les productions scientifiques disponibles en ajumbu et les projets de standardisation et d'alphabétisation. Ces résultats fournissent également aux linguistes, aux éducateurs et aux planificateurs linguistiques les ressources nécessaires pouvant contribuer à la production du matériel didactique et d'alphabétisation, et à l'enseignement de l'ajumbu. En somme, cette étude contribue également à la description de l'Ajumbu, langue en danger, en œuvrant pour sa promotion, sa préservation, sa vitalité et en apportant une plus-value à la qualité des travaux futurs.

Mots-clés : phonologie, phonèmes, phonotactiques, syllabe, alphabet, orthographe

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ACRONYMS, ABBREVIATIONS AND SYMBOLS

Acronyms

CABTAL	Cameroon Association for Bible Translation and Literacy
KPAAM-CAM	Key Pluridisciplinary Advances on African Multilingualism-Cameroon
SIL	Summer Institute of Linguistics
SLIG	Sociolinguistic Interview Guide
SLIP	Sociolinguistic Interview Profile

Abbreviations

AACL	Administrative Atlas of Cameroon Languages
AGLC	General Alphabet of Cameroon Languages
C	Consonant
CNC	Consultant Name Code
H	High tone
HL	High Low falling tone
HM	High Mid falling tone
IPA	International Phonetic Alphabet
L	Low tone
LH	Low High rising tone
LM	Low Mid rising tone
M	Mid tone
sp.	species
V	Vowel

Symbols

C – C	Inter consonantal position
V – V	Inter vocalic position
#	Word boundary
# -	Word initial position
- #	Word final position
→	Is realised as ...
-	Absent feature
+	Present feature
‘...’	English gloss
ø	The feature or sound is deleted
[...]	Phonetic transcription
/ ... /	Phonemic transcription
ˈ	High tone
ˌ	Low tone
ˋ	Mid tone
ˊ	High mid falling tone
ˋ	Low mid rising tone
ˋ	Rising tone
ˋ	Falling tone

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GENERAL INTRODUCTION

The purpose of this dissertation entitled *the phonology of Ajumbu* is to provide a synchronic description of the sound system of Ajumbu in order to identify and establish the different phonemes, and to propose a writing system for the language. The analysis takes a close look at phones, phonemes, tonemes, tone patterns, the syllable, syllable structure, and phonological processes involving segments and tones. It proposes an alphabet and orthographic principles based on the phonological analysis done in this study. This introductory section is organised as follows: Section 0.1 states the objectives of the study; Section 0.2 discusses the motivations; Section 0.3 the significance of the study; Section 0.4 presents the scope of the research; Section 0.5 provides information background on Ajumbu and its people; and Section 0.6 presents the work outline.

0.1 Objectives

The general objective of this study is to analyse the sound system of Ajumbu. The specific objectives include:

1. To examine and establish phonemes that exist in Ajumbu and their distribution;
2. To describe the various phonological processes of Ajumbu speech forms;
3. To propose a phonologically based writing system for Ajumbu as a stepping stone towards Ajumbu's promotion, documentation and preservation.

0.2 Motivations

The interest of working on the Ajumbu language arose when I took part to the KPAAM-CAM 2023 training session in the Littoral Region. While discussing with one of the instructors, he gave me a list of languages that were still less documented in the project and he recommended me to read Good & al. (2011). While reading Good & al. (2011), on page 133, I was captured by the Ajumbu language because the authors were unable to trace its genealogical affiliation. They deplored the fact that previous works on this language provided two different classifications. They proposed a third classification geographically motivated because according to them, a classification of the Ajumbu language relying on a comparative analysis based on very few words (126) from Ajumbu and potential related languages reveals premature and not linguistically very convincing. Therefore, I decided to research on Ajumbu in order to provide material that will contribute to settle the debate on the genetic affiliation of Ajumbu

by proposing to describe its phonology in order to provide sufficient material that will help in comparing Ajumbu and neighboring languages on a phonological basis.

My second motivation originates from the endangered status of Ajumbu as depicted in Hamm & al. (2001), Good & al. (2011) and Di Carlo (2011). According to Hamm & al. (2001:21) "... it is possible that because of intermarriage and a small population, Mbu' (Ajumbu) is an endangered language and could become a moribund language in the future." More so, Good & al. (2011:133) and Di Carlo (2011:83) equally report the high rate of exogamy in Ajumbu which leads to multilingual parents giving birth to children having a different language as L1 instead of Ajumbu. Consequently, the intergenerational transmission of Ajumbu language is hindered. Also, during my interviews I noticed that none of the consultants was married to an Ajumbu native speaker like him or her. I asked them which language they speak with their children at home. Some responded English, others Kung. A general observation made is that parents communicate with their kids in any other language different from Ajumbu. Only one consultant replied that his children speak Ajumbu. This therefore motivated and encouraged me to study Ajumbu in order to contribute to its preservation for the future generations.

A third motivation comes from Good & al. (2011) who state that Ajumbu is not related to any language in and outside of Lower Fungom exception made from the Lung language, an endangered language counting four speakers in 2011. Ajumbu has no dialect. The anglophone crisis that started in 2016 negatively impacted Ajumbu village since some native speakers were killed and the majority left and migrated to other areas of Cameroon. The displacement restricted the domain of usage of Ajumbu language to the familial context, exposing thus the language to endangerment.

It is thus against the aforementioned backdrop that the strong will of studying an aspect of the Ajumbu grammar, its phonology more specifically, arose with the aim to contribute to its documentation, standardisation, promotion and revitalization; drawing alongside the attention of other linguists who may be interested in endangered languages in general, and in Ajumbu in particular.

0.3 Significance of the Study

A phonological description constitutes a starting point for further linguistic descriptions namely, morphology, syntax, semantic and discourse analysis. This study contributes to the discussion on the genetic affiliation of Ajumbu since the output enables linguists to compare Ajumbu's phonological system with that of neighbouring Ring languages as proposed by

Hombert (1980:96), or to that of Western Beoid languages as proposed by Hamm & al. (2001:3). This work will be disseminated wherever necessary, in faculties and department libraries, and on the KPAAM-CAM online output. The resulting alphabet and orthographic principles will be tested later, shared and transferred to the Ajumbu community in order to encourage Ajumbu parents and children to have more interest in the learning and transmission of their language and culture.

Similarly, working hand in gloves with the Ajumbu speakers during data collection and elicitation stages helped the latter to reactivate their linguistic and cultural knowledge and ameliorate their skills. Equally important, this work will contribute in shedding more light on the Ajumbu language and facilitates its codification, classification and insertion in further reference works dealing with the linguistic classification of Cameroon languages as it is not mentioned in the Linguistic Atlas of Cameroonian Languages published by Binam Bikoï et al. in 2012. In addition, the Ajumbu alphabet and orthographic guide proposal will serve as a stepping stone towards the standardisation of Ajumbu, and the development of didactic materials for literacy programs.

0.4 Scope of the Research

This study investigates aspects of the phonology of Ajumbu in a systematic and organised manner as proposed by the structuralist approach to establish the phonemes of the language. On the one hand, after presenting the methodology, theoretical framework and literature review, we will study the paradigmatics paying attention to phones and phonemes. On the other hand, the chapter on syntagmatics will focus on the distribution of consonant and vowel phonemes at the initial, middle and final positions. The number of occurrences of phonemes and tonemes will equally be given. The syllable types and structures, the phonotactics, tone patterns and phonological processes will be covered leading to the proposal of a writing system for Ajumbu. In a nutshell, this work is limited to the identification of phonemes, the explanations of phonological variations and the establishment of an alphabet and orthographic principles based on a thorough phonological analysis of Ajumbu.

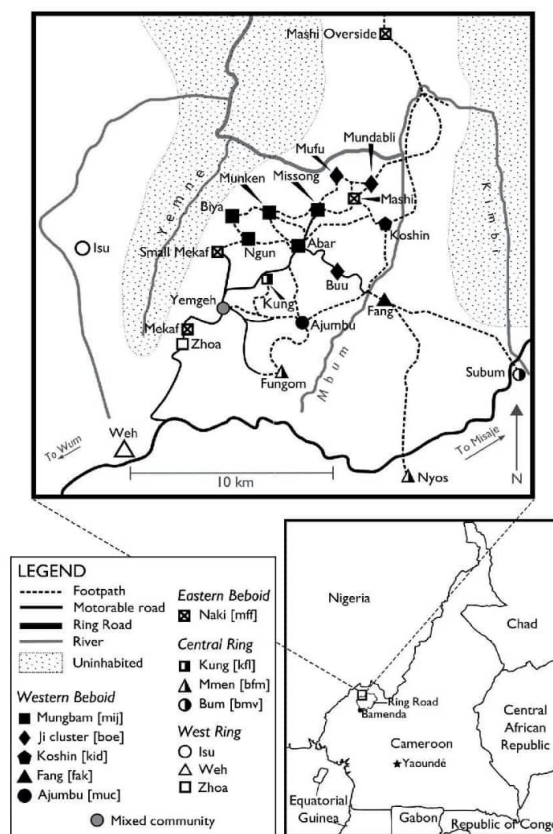
0.5 Background Information

This subsection provides the reader with the geographical location of the Ajumbu village (0.5.1) followed by the historical (0.5.2), political (0.5.3), socio-economic (0.5.4), and linguistic (0.5.5) backgrounds, the latter spiced up with some ethnographic features.

0.5.1 Geographical Location

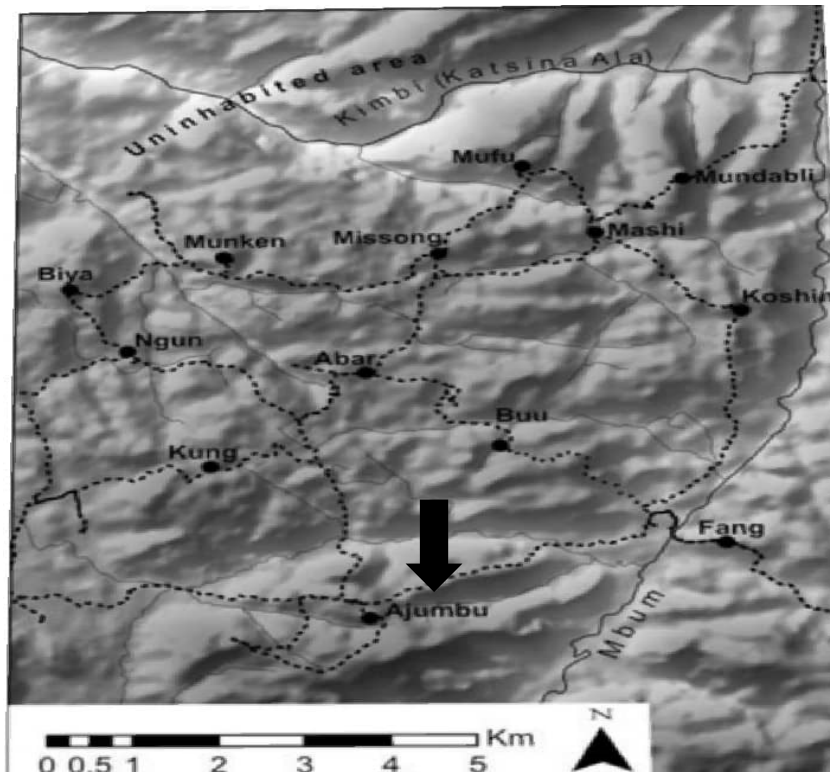
The Ajumbu language is spoken by 300 people (Di Carlo & al. 2020:4) in a village called Ajumbu whose geographical coordinates are WGS84 6° 32'N, and 10° 15'E (Glottolog, 2022). Ajumbu is located in the Northwest region of Cameroon, Menchum Division, Fungom Subdivision. Lower Fungom comprises 13 acknowledged villages (including Ajumbu) bordered to the West by river Yemne and to the North and East by river Kimbi. Its Southern border approximately runs from East to West, between Ajumbu and Fungom villages. Figures 1 and 2 capture Lower Fungom, its villages, languages and the surrounding areas, respectively.

Figure 1: Lower Fungom with surrounding areas and languages



Source: Di Carlo (2011:57)

Figure 2: Physical map of Lower Fungom locating Ajumbu Village



Source: Di Carlo & Pizziolo (2012: 160)

0.5.2 Historical Background

Historically, Mr Bam Malaki the Sub-Chief of Ajumbu and Mrs Ngong Rebecca (personal conversation) say the Ajumbu people migrated from the Tikaris during the First World War. They first settled in an area near Fungom but were asked to leave because the population of the Fungom clan was increasing. They went and settled in a low-land called B̀̀tsímá ‘foundations’ near the Kung where they equally had to forcefully leave because of tribal rivalries between the Kung and them. They finally settled on the highland known today as Ajumbu.

0.5.3 Political Background

Politically, as it is the case for the majority of Grassfield communities, the Ajumbu people use a kingship governing, and its sociopolitical organisation is as follows: the King or Chief, the Sub-Chief, the traditional council, and the other members of the community. The Chief is the highest authority in the village and has the final decision on all the matters concerning the village. He is followed by a Sub-Chief in cases he is not available. After the Chief and the Sub-Chief, come the members of the traditional council called Ntsuin (Di Carlo 2011:83). There

are three Ntsuin houses in Ajumbu with the most powerful one in the Chief's Palace compound. Di Carlo (2011:83) further states that Ajumbu has not yet reached the degree of political stability that characterises Lower Fungom as a whole because it is recently unified as a village.

0.5.4 Socio-economic Background

Economically, Di Carlo (2011:61) reports that the village mainly relies on subsistence farming. The farm products are mostly consumed by their producers and little accumulation for trade in Wum and Weh markets. Main cultivated crops are ground-nuts, beans, corn, egg yolk coco yams, bananas, plantain and cassava. As far as animal rearing is concerned, only domestic animals like cows, pigs and goats are reared. Hunting nowadays is limited to cane rats because many animals are reported to have almost disappeared in the village. Socio-culturally, Ajumbu is a patrilineal community. Ajumbu people are conservative and cherish their customs and traditions despite their exposure to modernisation and christianity. All the important ceremonies are still strongly influenced by ancestral traditions and beliefs. The settlements are compacted and composed of exogamous quarters. Di Carlo (2011:62) observes that the boundaries between the quarters are not readily discernible. There is a low intermarriage rate between Ajumbu and the rest of Lower Fungom apart from Kung and Buu and their social relations are more polarised towards the South (Di Carlo 2011:83). The outbreak of the anglophone crisis of 2016 greatly affected the Northwest region of Cameroon in general and Ajumbu in particular. There were losses in human and animal lives; and farmlands, houses and shops were burnt. The increasing rate of insecurity in the village pushed many inhabitants to forcefully migrate to other areas in the country. The current research was carried out with the Ajumbu internally displaced persons leaving presently at Souza and Bomonoga, in the Littoral Region of Cameroon.

0.5.5 Linguistic background

Ajumbu language has several names. It is called Ajuh by certain Ajumbu elders, Mbu' by (Hamm & al. 2001:5), and Ajumbu by Good & al. (2011:133). For the purpose of this research, we adopted the name Ajumbu. Cameroon is a linguistically diverse country counting about 288 national languages and two official languages (Eberhard, Simons & fennig 2025). Good & al. (2011:3) and Di Carlo & al. (2020:6) acknowledge Lower Fungom as one of the most linguistically diverse area of Cameroonian grassfields with seven distinct languages spoken in 13 recognised villages. Ajumbu language does not have dialects, and the only related language to Ajumbu is Lung which counted four native speakers in 2011 (Good & al. (2011:133). The

following subsections discuss multilingualism and genetic affiliation questions in relation to the Ajumbu language.

0.5.5.1 Multilingualism

The rate of multilingualism is high in Ajumbu village. The main factor that accounts for this high rate of multilingualism in Ajumbu is social integration with other Lower Fungom communities. In order to easily communicate and interact with their neighbours, the Ajumbu speakers are bound to learn the languages of the surrounding villages because their own language is said to be very difficult and the other communities are not interested in learning it. Therefore, Ajumbu native speakers learn other languages like Kung, Buu, Weh, Aghem, Fang, Isu, and others in order to interact with the speakers of these languages. Other reasons that explain the high rate of multilingualism in Ajumbu include:

Trade: Ajumbu farmers and fishermen go to sell their products in other villages, Wum and Weh. They are obliged to learn the language spoken at the market in order to attract and interact with their customers. Additionally, the inhabitants of neighbouring villages such as the Fang pass through Ajumbu village to reach the market place. These repetitive stays in Ajumbu village favour language contact between Ajumbu and the languages spoken by the traders.

Increase rate of exogamy in Ajumbu: Hamm & al. (2001:21) and Di Carlo (2011: 83-84) report that the people of Ajumbu seldomly marry among themselves. They greatly intermarry with people originating from other areas such as Buu, Mundabli, Kung and even beyond the boundaries of Lower Fungom. I equally had confirmation of the aforementioned practice among Ajumbu people during the collection of my informants' metadata. None of the consultant, be it a man or a woman had an Ajumbu as spouse, not even those that were polygamous. For all, their love partners originate from other villages. Thus, all of them are able to speak or hear the languages of their in-laws. All the consultants were plurilingual, familiar to at least four known languages. Consequently, exogamy increases multilingualism and plurilingualism both in the community and among its people. Many Ajumbu people are plurilingual because they and/or their relatives are married to people originating from different other linguistic communities.

0.5.5.2 Ajumbu Language: Which Genetic Affiliation?

Ajumbu is generally classified as a southern bantoid language. It presently has the following linguistic coordinates: code ISO 639-3 [muc] by Eberhard, Simons & Fennig (2025); and the glottocode: mbuu1238 (Campbell & al. 2022). Three previous researchers who worked on Ajumbu did not come to a consensus regarding the genetic linguistic classification of Ajumbu language. They proposed three different genealogical trees for this language as illustrated on figure 3. Hombert (1980:96) quoted by Good & al. (2011:133) classified Ajumbu as a ring variety. Hamm & al (2001:13) classify Ajumbu as belonging to the Western Beoid family. Finally, Good & al. (2011:133) rename the linguistic family from Western Beoid to Yemne Kimbi group on the basis that both Hombert and Hamm genetic affiliations do not have enough linguistic evidences, and that any attempt to linguistically classify Ajumbu is premature. Figure 3 presents the different classification of Ajumbu as proposed by Hombert (1980), Hamm & al (2001) and Good & al (2011).

Figure 3: The Different Linguistic Classifications of Ajumbu

Authors	Hombert (1980:96)	Hamm & al (2001:13)	Good & al (2011:133)
Linguistic classifications	Benue-Congo ↓ Southern Bantoid ↓ Grassfield ↓ Western Grassfield ↓ Ring ↓ Ajumbu	Benue-Congo ↓ Bantoid ↓ Southern ↓ Beoid ↓ Western ↓ Ajumbu	Benue-Congo ↓ Bantoid ↓ Southern ↓ Yemne Kimbi ↓ Ajumbu
Sources	adapted from Akumbu (1999:6)	adapted from Ousmanou (2014:8)	adapted from Boutwell (2020:6)

Figure 3 illustrates the three different classifications of the Ajumbu language.

0.6 Structure of the Work

This dissertation counts six chapters preceded by a general introduction and followed by a general conclusion.

The introductory section provides a succinct overview of what this study is all about. It outlines the objectives, the motivations, the relevance and scope of the study, background information on Ajumbu and its people, and it ends with the organisation of the study.

Chapter 1 presents the methodology governing this research; it covers the research design, methods, techniques and instruments of data collection and analysis and presents the consultants from whom the data was collected.

Chapter 2 comprises the review of existing literature in the language and the theoretical framework of this study.

Chapter 3 deals with the phonological analysis of Ajumbu consonants. The main task in this chapter is to identify consonant phonemes among consonant phones, then classify and define them.

Chapter 4 elaborates the phonological analysis of vowels and tones. The main aim here is similar to that of chapter 2, identify vocalic phonemes, classify and define them. The chapter closes with a comparative analysis of the sound system of Ajumbu, Koshin (beboid language) and Weh (ring language) to classify Ajumbu phonologically.

Chapter 5 lays emphasis on the description of the syllable, its structure, and the phonotactics. Tone patterns are equally described in this chapter.

Chapter 6 studies phonological processes and rules undergone by consonants, vowels, tones, and syllables in Ajumbu.

Chapter 7, proposes a writing system for Ajumbu based on the GACL model with some orthographic principles to help read and write Ajumbu language correctly.

The dissertation closes with the summary of key findings, proposals for future research, references followed by the appendixes made up of a representative sample list of verbs, nouns, pronouns, adjectives, adverbs collected and used for this study.

CHAPTER ONE: RESEARCH METHODOLOGY

The present chapter is divided into three sections. Section 1.1 provides information on how, with whom, where, and when the data used in this study was collected and analysed. Section 1.2 deals with published works related to this study, and section 1.3 sheds some light on theories used in analysing the Ajumbu data.

1.1 Methodology

This section provides discussions on the research design, methods and instruments of data collection and analysis, the tools used, a summary of the fieldwork, and the presentation of the data and the consultants.

1.1.1 The Research Design

Leedy (1997:195) defines research design as *a plan for a study, providing overall framework for collecting data*. This research is based on the qualitative design in general and the descriptive design in particular. According to Hassan (2023), the descriptive research design is *a research methodology that aims to describe or document the characteristics, behaviours, attitudes, opinions or perceptions of a group of people being studied*. The cross-sectional type is adopted and not the longitudinal type of research design because the data is collected at a specific point in time and not repeatedly over an extended period of time. The descriptive qualitative design is used in this work because it permits to identify, classify and describe the sounds of our corpus gaining an in-depth understanding of underlying processes that segments and tones exhibit in Ajumbu. Also, this research design generates rich, detailed and valid data that contribute to the elaboration of the Ajumbu orthography. In addition, since qualitative research takes place within the socio-cultural context of the target linguistic community, it involves an interaction between the researcher and the consultants, facilitating thus the understanding of the socio-cultural environment within which the Ajumbu internally displaced (ID from here and henceforth) speakers live.

1.1.2 Data Collection Methods

The following data methods were used for the present analysis.

1.1.2.1 Interview

Creswell (2012:32) states that *a qualitative interview occurs when a researcher asks to one or more participants in general, open-ended questions and records their answers*. Nine interviews were conducted at the KPAAM-CAM's office with nine Ajumbu speakers living in Souza,

Douala and Bomonoga in order to have their sociolinguistic information so as to see if they fill the criteria needed for them to be part of the sample. Eight (8) interviews which lasted each at most one and a half hour were undertaken to collect the SLIG from each consultant. About 18 other interviews of at least three hours each were conducted to collect and elicit a wordlist with the six selected consultants. Consultants were individually interviewed except one, NRN (see 1.1.9.6), who required an interpreter on her first day of interview because she is not proficient in English. For the other sessions with her, I decided to solely collect nouns with her, and I arranged to download illustrative pictures for each nouns of the corpus we were to work on a day before the working session. The consultants were very relaxed and opened. We exchanged on a diversity of themes, namely, the intergenerational transfer of Ajumbu, their tradition, meals, linguistic habits, and religion. Each interview session was preceded by a coffee break, and followed by lunch at midday. During these moments of exchange, I took time to explain to them what I needed and the importance of their collaboration and the advantage of this study especially to the future generations. I enjoyed listening to them singing and talking about their language and culture. Communication became easier between them and me thanks to the convivial moments shared during meal breaks. The first day was a bit tensed but as from the second day, we became more friendly, and interviews much more pleasant and relax.

1.1.2. 2 Sampling

Mujere (2016:15) defines sampling as *the act, process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of a whole population*. This research has as target population the ID Ajumbu speakers. The accessible population is the ID Ajumbu speakers living in Bomonoga and Souza, in the Littoral Region of Cameroon. This method was useful because it permitted to select a representative sample of Ajumbu IDPs from which data was collected.

1.1.2.3. Recording

Recording is described as the process of capturing and storing audio or visual information for future playbacks or reference using technological instruments such as phones, computers, recorders or cameras. Creswell & Poth (2018:20f.) say *in qualitative research, data recording plays a critical role in ensuring the accuracy and preservation of collected information. The general purpose of data recording is to set the information in a retrievable form and preserve the integrity of the research process*. Recording spoken data has therefore become very popular in current research especially in linguistics as compared to text data because recording spoken data is the most convenient way of maintaining originality in the primary data collected. We

decided to record our data to set it in writing, to recheck sensitive linguistic elements like tones, and to preserve it for future studies. We recorded the collection of the socio-linguistic interview guide (SLIG) (see 1.1.3.1), a set of questions on the linguistic background of a speaker before collecting linguistic data from him (for detail see 1.1.3.1). We equally recorded a wordlist, two songs and one story in Ajumbu language narrating the history of Ajumbu people.

1.1.3 Data Collection Instruments

This section describes the research instruments used in collecting data.

1.1.3.1 The SLIG

This is a semi-structured interview guide made up of 43 questions provided by KPAAM-CAM project to obtain the sociolinguistic profile (SLIP) of consultants before they are chosen as samples. The SLIG is composed of closed and open-ended questions for the researcher to obtain the social and linguistic background of consultants. The SLIG permits to check whether the referents are ID or not, and the validity of their linguistic data. It also enables to understand individual linguistic variations during the collection of the wordlist. The participants are required to provide their educational background information (including primary, secondary and tertiary institutions attended), their places of birth, their travel history and that of their parents within and out of Lower Fungom. A question requires them to state whether they speak more than one native language, excluding English and French. As far as this question is concerned, they are expected to make a self-assessment of their competences in other languages they speak based on five levels of proficiency (understand a bit, understands but doesn't speak, speaks a bit, speaks well, fully fluent). They equally have to provide information on where, how and with whom they learned these languages. They have to precise in which life activities they use these languages and how they feel when speaking these languages.

1.1.3.2 Purposive Sampling

Creswell & Poth (2023:21) says purposive sampling is *the act of selecting participants that might provide into your research question*. This technique was used to select the six consultants that constitute the sample of this study out of the 9 interviewed. The eligibility criteria include the following:

1. Be born in Ajumbu Village;
2. Must have left the village because of the anglophone crisis;
3. Have all the teeth especially the incisors;
4. Must understand English or Pidgin for easy communication;

5. Be fluent in Ajumbu;
6. Be aged between 18 and 65 years:
7. Live nearby Bassa;
8. Come from different quarters in Ajumbu.

The criteria listed above coupled with the answers obtained from the SLIG permitted to select the appropriate consultants and collect the representative sample of data required for this study.

1.1.3.3 Audio Recording

A ZOOM H4n Pro Handy recorder and an external microphone were used. The recordings were in wav format at 44.1 kHz sampling rate and 16-bit resolution. The recording sessions took place at the KPAAM-CAM's office. Before the recording procedure started, consultants were informed that their speech was going to be recorded for further analyses. At the beginning of every recording session, the consultants introduced themselves and they were asked whether or not they agree to be recorded for the purpose of this study. They were individually invited into the office and the objectives of the study were presented. They were also familiarised with some gestures and signs to be used during recording sessions. Using audio recording for the collection of the SLIG and the wordlist in this study facilitates data analysis and validity since the researcher and any other person can check the different sounds and tones found in this work by playing back the recorded audios.

1.1.3.4. Flex

This software helps to manage linguistic and cultural data. It supports tasks ranging from the initial entry of collected data to the development of dictionaries and morphological analysis. Collected data was typed using this software and uploaded on Phonology Assistant software for an automatic phonological analysis since both softwares work in synergy.

1.1.4 Method of Data Analysis

The empirico-inductive method is used for this analysis. It is a qualitative research method that requires the researcher to gather observable real world data, reads through the data, allows codes to emerge, and names concepts as they emerge. It's more of a 'bottom-up' analytic strategy because conclusions are drawn from the specific to the general. There are many forms of inductive analysis, but some common practices are open coding (sometimes called initial coding), in vivo coding (codes developed from participants own words), and constant comparative analysis (Bingham & Witkowsky 2022). This method helped to select

representative examples for the inventories of phonic elements, to select findings and to explain them using existing phonological theories.

1.1.5 Instruments of Data Analysis

This section presents instruments used in analysing Ajumbu data.

1.1.5.1 Content Analysis

Hsieh & Shannon (2005:1278) describe the content analysis technique as *the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns*. This instrument was used to identify surface consonants, vowels and tones in our corpus. Phonic elements are described using phonetic features. Phonemes were established, presented and classified. The nature of semivowels, prenasals, long vowels, palatalised, labialised and labio-palatalised sequences are discussed and the phonetic variations of segments and tones are explained through phonological rules and processes. The alphabet and orthographic principles of this language are provided thanks to this technique.

1.1.5.2 Phonology Assistant Software

This software provided by SIL does an automatic phonological analysis of segments. It automatically generates phone charts, syllable structures, distinctive features matrices, distribution tables of segments at word initial, middle and final positions, the distribution and number of occurrences of segments at different syllable positions. Nevertheless, this work only uses the phonotactics generated by the software because of the following limitations: Minimal pairs generated by the software are solely formed based on functionalism, leaving thus aside the phonetic distance/closeness required by the distributionalist approach used in this study. Tones are not inventoried, and they are rather fused with vowels bearing them. Equally, this software provides no analysis for tones. The inventories, charts, minimal pairs and distribution patterns derived by this software are limited to consonants and vowels.

1.1.6 Research tools

The tools used in the collection and analysis of data were: pens, rulers, pencils, erasers, microphones, a recorder, batteries, a computer, a phone, hard drive, USB stick, SD cards, notebooks, earphones, photocopies of the SLIG, and wordlists.

1.1.7 Source of Data

This work uses both primary and secondary data. Primary data were collected directly from Ajumbu ID speakers during the administration of the SLIG and the elicitation of the KPAAM-

CAM Geo 2019 revised wordlist. The KPAAM-CAM Geo 2019 revised wordlist includes 577 nouns and 545 verbs all based on the realities of the grassfields items and activities. Numerals, Adverbs, Adjectives, Interrogatives, subject and object pronouns are also listed in the wordlist. Unpublished wordlists of more than 600 nouns and 500 verbs collected by Dr. Nelson Tschonghonge in 2019 on Ajumbu language were consulted to enrich the data used for the phonological analysis done in this work.

1.1.8 Summary of the Field trip

The data used in this dissertation build on a field trip conducted from the 9th to the 25th of October 2023 in Bassa Village in the Littoral Region of Cameroon. I effectively started working on the 10th of October at KPAAM-CAM technical office at Bassa. The first 3 days, the SLIG was used to collect the Ajumbu speakers' metadata. At first, I intended to work with four consultants for the collection of my wordlist, but I ended up working with 6 consultants because some were very busy and they could only be available to work with me one day in the week. The SLIG was collected in one session. The session with each consultant lasted between 29 minutes to one hour depending on the number of languages in the linguistic repertoire of the consultant. The wordlist was collected during three sessions of three hours each with every consultant. Recordings were carried out in a controlled environment. However, the environment was very noisy at times making recording impossible. Sixty-three (63) audios including two (2) videos of songs and one (1) story about the migratory tract of the Ajumbu people were recorded in total. I encountered some difficulties. First, my consultants were very busy with their personal daily duties. In order to achieve my goals, I collected needed materials, on their free days. We were forced to work continuously for several hours per days and sometimes till very late in the night. Working late, however, had an advantage; we could work in a peaceful and calm atmosphere without noise and interruptions. Second, my batteries were not powerful enough to sustain long sessions of data collection and elicitation. More than once, they got drained in the middle of a session without me noticing that, and I had to replace them, play the last audio in order to find out where the recording was interrupted before continuing recording. As a consequence, working sessions were longer and tiring. Third, I was faced to language barriers with some consultants who could only speak Pidgin or Ajumbu. My inability to speak Pidgin and the difficulty to find a free Ajumbu speaker with skills in both pidgin and Ajumbu who could act as a translator was challenging. Thus, I limited workload with such informants to the collection of noun thanks to illustrative pictures for each noun downloaded on Google. They could see the picture, identify the noun and provide it in Ajumbu.

Furthermore, the fact that the office was surrounded by other buildings, some external noise from these buildings interfered in the recordings. Also, noise from cars and motorcycles originating from the close traffic interfered in the recordings on several occasions forcing us to stop recording sessions. I adopted a 'pause and resume' strategy to handle this. Sometimes, due to persistent external noise, we were forced to make a pause and continue later after the noise has reduced. At times, I had to transcribe collected data directly while expecting for a calm environment to pursue with recordings. I had recourse to this mixed approach in order to gain in time and avoid workless period. More so, non-verbal communication (raising of fingers and face gestures) was applied to stop them from speaking until the noise had passed and to remind them to repeat the word twice or more. This reduced the background noise in the audios. Some of them could hardly recall the instructions (which I taught them initially) before starting the new recording or after we have had a pause before. This made the recording sessions longer and tiring.

1.1.9 Presentation of consultants

For the realisation of this study, I worked with three men and three women of different ages and from different quarters in Ajumbu village to collect a representative corpus. All the consultants were explicitly asked to give their consent to allow us use and publish contents with their data. Their approval was recorded before the beginning of the SLIG collection sessions. In the following sub-sections, each consultant is presented and attributed a code which is used throughout this dissertation.

1.1.9.1 AS

Mr Azu Simon was born in 1976 at Ajumbu-Afung. He grew up speaking Ajumbu and Kung. He ended school in class 7 at Government School Kung. He equally speaks Buu, Mundabli, English, French and Pidgin. He left the village in 2017 under the threat of the separatists and came back after some years. He left the village once again. He speaks Ajumbu with his children.

1.1.9.2 CGA

Mr Che Gilbert Assah was born in 1980 at Ajumbu-Abwerbong. He grew up speaking Ajumbu and Kung. He ended school in standard seven. He left the village for the first time and went to Gabon where he learned Fang and French, and he returned to Ajumbu. He equally speaks Fang, Weh, Aghem, Fungom, Isu, Pidgin and English. He left the village for the second time in 2021 because his store, house and farm lands were burnt by the separatists.

1.1.9.3 NCS

Miss Ngong Chantal Sih was born in 1995 at Ajumbu-Abwerbong. She grew up speaking Ajumbu and Fungom. She ended school in year one at the Teacher's Training College of Wum. She equally speaks English and Pidgin. She left the village in 2018 because their house was burnt by the separatists.

1.1.9.4 KS

Mr Kah Samuel, born in 1995 at Ajumbu-Abwerbongse, grew up speaking Ajumbu and Kung. He ended school in Uppersixth. He equally speaks English, French and Pidgin. He speaks Pidgin in the house. He left the village in 2017 for safety purposes.

1.1.9.5 NJS

Mrs Ngong Jackeline Sih, born in 1982 at Ajumbu-Tarfemar, grew up speaking Ajumbu, Kung and Bafmen. She ended school in standard seven. She equally speaks Weh, Isu, Pidgin and English. She speaks Ajumbu and Kung with her children but they refuse to learn Ajumbu and prefer to speak Kung which is her husband's language. She left the village in 2017 because her former husband and father were killed by the separatists.

1.1.9.6 NRN

Mrs Nchah Rebecca Nigeh was born in 1967 at Ajumbu-Abwerbong. She grew up speaking Ajumbu. She never stepped outside of the village. She equally speaks Fang, Kung, Bafmen and Pidgin. She never went to school. She speaks Ajumbu with her children. She left the village because medical facilities were inaccessible due to the crisis that struck the village. The table below summarises the list of consultants.

Table 1.1: List of consultants

N ⁰	Name	Code	Age	Former residence	New Residence	Profession
1	Azu Simon	AS	1976	Ajumbu	Bomonoga	Farmer
2	Che Gilbert Assah	CGA	1980	Ajumbu	Souza-Mundani	Bike rider
3	Ngong Chantal Sih	NCS	1995	Ajumbu	Souza-Mundani	Teacher
4	Kah Samuel	KS	1995	Ajumbu	Souza-Mundani	Teacher
5	Ngong Jackeline Sih	NJS	1982	Ajumbu	Souza-kappa	Trader

6	Ngong Rebecca Ngeh	NRN	1967	Ajumbu	Souza-Kappa	Farmer
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1.1.10 Data presentation

Examples in this thesis are given in their surface representation, and are transcribed using IPA 2015 version. In cases where (morpho-) phonological rules have been applied, the underlying form is represented between slashes while the surface form is represented within brackets. For the phonological analysis, nouns and verbs are presented in their root forms. This is so because all the roots in Ajumbu start with consonants. Thus, it is easy to identify the roots from the affixes of nouns and verbs. We adopted this strategy because it eases the presentation of data, facilitates the understanding of the phonological analysis and equally because most nouns have lost their singular prefix markers. However, the glossary in the index has nouns with their singular prefix markers and verbs with their infinitive markers. For each example used in this analysis, a consultant name code (henceforth CNC) referring to the consultant that produced it is mentioned. For data collection, the consultants were divided into two groups of three. Nouns were collected with one of the groups and verbs with the other. As a consequence, it will be frequent to find minimal pairs with items from different consultants. Also, nouns and verbs having the same phonetic form like chain for example, an indefinite article ‘a or an’ precedes the item if it is a noun. For the case of verbs, the preposition comes first.

Conclusion

This chapter presented the medological framework adopted for investigating the sound system Ajumbu. It outlined the research design, the selection of language consultants, and the methods of data collection and analysis. The chapter also highlighted the ethical considerations up held during fieldwork. The next chapter presentd the literature review and theories consulted for this work.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Literature Review

This subsection explores existing works on the Ajumbu language, laying the ground work for studying the aspects of the Ajumbu phonology.

2.1.1 Conceptual Review on Phonologica Processes

Phonological processes are systematic changes that occur to sounds in specific contexts, reflecting the structure and organisation of the sound system of a language. They are crucial

for understanding not only the segmental and tonal inventory of Ajumbu but also the interaction between morphology, syntax, and prosody. In African languages, particularly Grassfields Bantu languages, phonological processes provide insights into historical development, typological patterns, and language universals.

In Ajumbu, segmental and tonal processes remain largely undocumented, creating an opportunity to make a significant contribution of this study to Africanist phonology. This review examines how linguists have conceptualised key phonological processes, highlights theoretical approaches, and identifies gaps in the literature that justify the present study. The review starts by exploring segmental processes: assimilation, vowel harmony, lenition/fortition, nasalization, deletion/epenthesis, palatalization, devocalization. Then, tonal processes: spreading, sandhi, polarity, downstep, floating tones and contour tone formation.

2.1.1.1 Assimilation

Assimilation involves a segment taking on features of a neighboring segment. It can be regressive (anticipatory) or progressive (perseveratory), affecting place, manner, or voicing. On the one hand, Bloomfield (1933) and Pike (1947) describe assimilation as an allophonic process, predictable from the phonetic environment while Hyman (2003) distinguishes between phonetic assimilation, driven by articulatory ease, and phonological assimilation, which is categorical and contrast-preserving. Odden (1995) shows that nasal-place assimilation is a widespread phenomenon in Bantu and Grassfields languages.

Hedinger, (1984) says that in Cameroon Grassfields languages, stops and nasals show anticipatory assimilation, especially across morpheme boundaries

Ajumbu Relevance:

/n + kú/ → [ŋkú] ‘chief’

/m + bí/ → [mbí] ‘world’

Documenting these patterns provides both descriptive data and typological comparison points, particularly because assimilation in Ajumbu has not been previously described.

2.1.1.2 Vowel Harmony

Vowel harmony is a process in which vowels within a domain (word, morpheme, or sentence) agree in certain features, such as ATR (advanced tongue root), height, or rounding. Clements (1983) proposes autosegmental representations for vowel harmony, which allow features to spread independently of segmental structure. Hyman (2011) observes prefix-root harmony in Grassfields languages, where affixes harmonize with root vowels for ATR and rounding.

Ajumbu Relevance:

/b^wê- + mtsó/ → [b^wómtsó] ‘rainy season’

/á- + nsàné/ → [ánsána] ‘friends’

2.1.1.3 Lenition

Lenition is the weakening of consonants, it often occurs in intervocalic or syllable-final position. Hyman (2003) shows that intervocalic lenition in Grassfields languages often follows phonological and morphological conditioning, affecting stops and fricative while natural phonology (Stampe, 1973) frames lenition and fortition processes as universal articulatory tendencies, where speech is simplified in rapid or unstressed contexts.

Ajumbu Example:

/bǎfǎ/ → [fǎβǎ] ‘faces’

These patterns provide insight into morphophonemic alternations and contribute to understanding historical sound change tendencies in the region.

2.1.1.4 Deletion

Deletion (elision) removes segments, often vowels, while epenthesis inserts a segment to maintain phonotactic constraints.

Hyman (1975) describes vowel syncope and epenthesis in Grassfields languages as mechanisms for syllable structure repair. Lenition or devocalization can trigger epenthesis to maintain CV syllable structures, a strong typological feature in Bantu languages.

Ajumbu Examples:

/lámé/ → [lám] ‘tongue’

/wámə/ → [wám] ‘conduct with stick’

These processes reveal the interaction of phonotactics and morphophonology in Ajumbu.

2.1.1.5 Palatalization of the Alveolar Nasal

The alveolar nasal /n/ is palatalized ([ɲ]) before front vowels or palatal consonants.

Hyman (1975) and Mutaka (2000) document this process in Grassfields languages. This process is often triggered by front vowel adjacency or morphological context. Generative analyses treat this as a feature-changing rule, where [+palatal] spreads to /n/.

Ajumbu Examples:

/bájɲ/ → [bájɲ] ‘fold arms’

/tájɲ/ → [tájɲ] ‘to deny’

This process remains unreported in previous Ajumbu work, making it an important empirical contribution.

2.1.1.6 Devocalization

Devocalization involves weakening, deleting, or transforming a vowel, sometimes producing a glide. Stampe (1973) frames devocalization as natural phonological simplification, while Chomsky & Halle (1968) analyze it in rule-based generative frameworks. It often interacts with syllable weight and stress patterns. Mutaka (2000) says gliding is a phonological process in which high vowels become glides when they occur another vowel. The change results from coarticulation.

Ajumbu Examples:

/kíú/ → [kʲú] ‘enter’

/kúó/ → [kʷó] ‘snore’

/kúúú/ → [kʲú] ‘country’

Devocalization highlights interactions between segmental reduction and morphophonology in Ajumbu.

2.1.1.7 Tone Processes

Hyman (1975, 2011) and Goldsmith (1976) describe the following processes:

- Tone spreading: Extends a tone to neighboring TBUs, often conditioned by morphological or prosodic factors.
- Tone sandhi: Adjustments of tones at word or phrase boundaries.
- Tone polarity: Morphologically conditioned tone reversal.
- Downstep / Floating tones: H-tone lowering triggered by underlying or floating tones.
- Contour tone formation: Single syllables exhibiting rising or falling tones, often marking derivational or inflectional morphology

Ajumbu Examples (previously unstudied):

Tone spreading: /mǎɲənə/ → [mǎɲéná] ‘to raise’

Tone sandhi: /kǎ + kʷǎlǎ / → [kǎ-kʷǎlǎ] ‘robes’

Tone polarity: /kpàràkpara/ → [kpàràkpára] ‘mat’

Contour tones: /búè/ → [bʷê] (falling) ‘rain’,

2.1.1.8 Research Gap and Significance

Segmental and tonal processes in Ajumbu have not been studied. Documenting these processes fills a major gap in Grassfields phonology. This study contributes to typological knowledge, orthography development, and linguistic theory testing.

2.1.2 Empirical Review

Empirical review also called systematic review is the review type that examines previous studies related to a research topic. The purpose of this review is to discover gaps in the literature, if any exists. So far, Ajumbu has not been subject to enough linguistic studies. The two published works found so far, mostly focused on the languages of Lower Fungom in general and not on Ajumbu as an individual language. The subsequent paragraphs provide information on the aforementioned descriptive works and their findings.

Hamm & al. (2001), in their work entitled *A Rapid Appraisal Survey of Western Beoid Languages*, propose a genetic classification of the languages of Lower Fungom. They classified these languages into two groups, namely: Western and Eastern Beoid; and Ajumbu as a language belonging to the Western Group. The rapid appraisal by Bergman 1991 is the method used in their work. Hamm & al. (2001) used the AL Campaign wordlist made up of 126 words to collect words in Lower Fungom languages they later analysed using the lexicostatistical program, WORDSURV by Wimbish 1989. They arrived at the conclusion that Ajumbu (called Mbu in their work) presents lexical similarities with the following languages: Buu 65%, Fang 56%, Abar 68%, Mekaf 54%, and Koshin 61%. They further observed that due to intermarriages between Ajumbu people and neighboring communities, and its little number of speakers, Mbu is endangered and could become a moribund language in the future. Notwithstanding, Hamm & al. (2001) did not provide linguistic explanations to justify why they decided to classify some Lower Fungom languages as Western and others as Eastern Beoid.

Good & al. (2011: 102) assert that, till then, the languages of Lower Fungom have not been subjected to extensive linguistic investigation. Their book, entitled *Languages of Lower Fungom: Grammatical Overview*, offers sketches of consonant and vowel inventories, pronominal noun class systems, and verb stem alternations in six languages out of the seven that Lower Fungom counts. The debate on Ajumbu turns around its linguistic classification. Hombert (1980:96) seems to classify Ajumbu as a Ring language. On the contrary, Hamm et al. (2001:13) classify Ajumbu as a Beoid language on the basis of a lexicostatic analysis. In their work, they propose a new classification they label Yemge-Kimbi group in reference to the two rivers at the West and East borders of the Ajumbu Village. They opt for this classification because, according to them, classifying Ajumbu linguistically without enough linguistic data on the language is premature. In Hamm et al. (2001), Ajumbu consonant system comprises: 26 consonants: 7 oral stops, 7 fricatives, 4 affricates, 1 lateral, 4 nasals and 3 glides as illustrated in Table 1.2.

Table 1.2: Ajumbu consonants chart (Good & al. 2011: 38)

	b	t	d				k	g	kp	gb
f	v	s	z	ʃ	ʒ			gh		
		ts	dz	c	j					
	m		n			ny		ŋ		
						ɥ	y			w
			l							

Concerning vowels, they inventoried 10 vowels: 4 close, 2 mid-close, 1 mid, 2 mid-open and 1 open as illustrated in Table 1.3.

Table 1.3: Ajumbu vowels chart (source: Good & al. 2011: 40)

ĩ	ĩ	ʉ	u
e	ə		o
ɛ			ɔ
	a		

The noun class system of Ajumbu, according to Good & al. (2011), is displayed as in Table 1.4.

Table 1.4: Ajumbu noun classes (source: Good & al 2011:138)

Singular			Plural		
1	ø-	w`	2	a-	b´
5	ø-	y´	6	a-	y´
5	ø-	y´	7	(a) kə . . (-lə)	k´
7	kə	k´	8	bə	b´
9	`	y`	10	`	y´
19	fə	f´	18	m-	m´
6a	m	m´			

Quoting Hyman (1979:27f; 2010), Good & al. (2011) claim that some of the noun class markers are dropped from nouns which are followed by concordial elements, in a pattern similar to, though not as grammatically complex as, what has been described for Aghem. While not exhaustively examined, this phenomenon seems to only affect Classes 7 (including the prefixal portion of 7a), 8, and 19. (Good & al. 2011: 138). For the tones, they identified three level (the high, the mid and the low) and two contour (the mid-low and the falling) tones. Concerning syllable structures they found monosyllabic and dissyllabic roots. They say phonemes /m/ and /p/ are frequently encountered at the coda position contrarily to the alveolar nasal /n/ which does not appear at this position in Ajumbu.

1.2.2 Observations on the Review

The present dissertation differs from Good & al. (2011) and Hamm & al. (2001) quoted above in the following:

This work presents a phonological analysis of the sound system of the Ajumbu language departing from the phonic inventories to the classification of each phoneme. On the other hand, Good & al. (2011) analysis directly presents phonemic inventories. In addition, this work arrives at a phonemic system of 27 consonants 11 vowels and 3 level tones as compared to phonemic system of Good & al. (2011), that counts 26 consonants, 10 vowels and 5 tones (level and contour) thanks to an eclectic approach which couples both the functionalist and distributionalist approaches of structural phonology.

Both used a wordlist of 126 words while this work builds on a wordlist of 1122 words made up of 577 nouns, and 545 verbs, numerals, adjectives, adverbs and pronouns.

Equally, this study provides explanations on the nature and formation of complex consonant and vowel sequences such as CG and NC sequences, syllabic nasals and long vowels not mentioned in Good & al. (2011). Moreover, segmental and tonal variations are accounted for under the guidance of Generative Phonology, an aspect not also explored in previous works.

Interestingly, Good & al. (2011) postulate that no word in Ajumbu occurs with the consonant [n] in the coda position. However, in the light of additional data, thanks to the broader wordlist used in collecting data, we identified [n] in coda position in some Ajumbu words as seen in the following table.

Table 1.5: Ajumbu words with [n] in coda position

Word	Glossary	consultant name code
[nín]	‘beg’	CGA
[àkēn]	‘stop’	AS
[bèdēn]	‘to dream’	AS
[bán]	‘to dance’	NCS
[wán]	‘to shout’	NCS
[tʃ ^w án]	‘to scarify’	KS
[zán]	‘leaf’	AS
[k ^u ín]	‘firewood’	KS

Good & al. (2011) describe Ajumbu noun class system and provide some grammatical properties of the verb morphology of this language. Take note that the aforementioned grammatical aspects are beyond the scope of the current study.

Furthermore, this work ends with a phonemic based orthography proposal of Ajumbu while none of the aforementioned works proposed any. Lastly, this work offers a comparative and contrastive analysis of the Ajumbu sound system with that of Koshin (a Western Beoid language) and Weh (a Ring language), all three languages spoken in Lower Fungom, with the aim of attempting a linguistic classification of Ajumbu phonologically, an issue not tackled earlier in Hamm & al. (2001) and Good & al. (2011).

2.2 Theoretical Framework

The analysis of Ajumbu phonology in this dissertation is guided by an eclectic approach including three interrelated theoretical perspectives: classical phonemic theory, generative distinctive features theory, and autosegmental phonology. Each framework provides tools that address different aspects of the Ajumbu sound system. Together, they offer a comprehensive and complementary approach, ensuring that both the segmental and suprasegmental dimensions of the language are adequately described.

2.2.1 Classical Phonemic Theory

The starting point of any phonological description is the identification of the phonemes (the minimal units of sound that serve to distinguish meaning) in the language of study. Classical phonemic theory as proposed by Bloomfield, (1933); Pike, (1947) and Trubetzkoy (1971) provides a methodology for this task, focusing on three main diagnostic criteria:

- Minimal pairs, which establish contrastive sounds;
- Complementary distribution, which identifies predictable allophones; and phonetic similarity, which ensures that allophones of a given phoneme share articulatory or acoustic properties.
- Free variation which identifies allophones sharing the same phonetic context and are used interchangeably without leading to a change in meaning.

Application to Ajumbu:

Minimal pair analysis reveals contrasts such as /tú/ 'to pin' vs. /dú/ 'to talk', showing that /t/ and /d/ are distinct phonemes.

Distributional analysis shows that [k] occurs only at word-initial position, while [ʔ] appears elsewhere, supporting their analysis as allophones of /k/. Vowel nasalization before nasal consonants is predictable in Ajumbu (e.g., /a/ → [ã] before /ŋ/), so nasal vowels in this context are treated as allophones, not separate phonemes.

Free variation shows that kx and kx^j are used interchangeably without a change in meaning.

Without phonemic analysis, the Ajumbu sound inventory would remain vague with 102 consonants, 21 vowels and 7 tones, and later analyses would lack a solid empirical foundation.

2.2.2. Generative Distinctive Features

While phonemic theory captures contrasts, it does not account for the regular alternations found in Ajumbu. For this purpose, the study adopts the linear generative framework of Noam Chomsky & Morris Halle in their book entitled *The Sound Pattern of English* (S.P.E.) wrote in 1968. In this work, the smallest phonological unit is the feature and phonemes are represented as underlying segments where each is defined by a matrix of distinctive features, with each column representing a single phoneme. Speech sounds are represented as bundles of plus-or-minus valued features permitting their classification into natural classes. According to this theory, all the features are presented linearly on a single tier. way. Generally, distinctive features are grouped into major class features, cavity features and tongue body features. The following describe features as proposed by Chomsky & Halle (1968) and revised by Katamba (1989) used in analysing sounds in Ajumbu.

2.2.2.1 Major class features

According to Katamba (1989: 43) *the major class features define the major classes of sounds that are relevant in phonological analysis*. These major class features include sonorant, syllabic, and consonantal.

❖ Sonorant [±son]

This feature characterises sounds articulated with inherent voicing. Generally, vowels, approximants, liquids and nasals are [+son] whereas those that are produced with the vocal cavity disposition that hinders spontaneous voicing, obstruents (stops, fricatives, and affricates), are [-son].

❖ Syllabic [±Syll]

Syllabic sounds are those that function as syllable nuclei while non-syllabic sounds occur at margins of the nucleus. For instance, vowels and syllabic consonants like nasals, laterals and trills are [+syll] while non-syllabic consonants are [-syll].

❖ **Consonantal [±cons]**

Consonantal [+cons] sounds are articulated with a considerable obstruction of air in the phonatory apparatus. Examples include stops, fricatives, affricates and approximants while vowels and glides are [-cons].

2.2.2.2 Cavity features

Cavity features designate features that relate to the place of articulation. Katamba (1989:43) says that these features specify where in the oral tract the active and passive articulators meet to modify the airstream. They are the Coronal, the Anterior and Body Tongue features.

❖ **Anterior [±ant]**

The feature anterior describes sounds that are articulated in the front part of the mouth. This region spreads from the lips to the alveolar ridge. Anterior sounds [+ant] are labials, dentals, and alveolars. Non-anterior [-ant] are post alveolars, palatals, velars, labiovelars, pharyngeals and glotals.

❖ **Coronal [±cor]**

The feature [Coronal] distinguishes sounds that are articulated with the tip or blade of the tongue raised towards the upper teeth, alveolar ridge or the hard palate Katamba (1989). Dental, alveolar, and palato-alveolar consonants are Coronal [+cor] (Chomsky and Hall 1968: 304) while non-coronal [-cor] consonants are labials, velars and glotals.

❖ **Labial [±lab]**

Labials are described as sounds produced with the involvement of the lips as opposed to those that are articulated without the involvement of the lips. According to Katamba (1989), *a sound has the feature labial if it is articulated with a stricture that involves the lips*. Labial consonants [+lab] are bilabials, labiodentals and labiovelars, and all the rest are [-lab]. In addition, vowels that are produced with lips rounding are also labials [+lab]. These include /y, u, ø, ʊ, o, ɔ/. The other vowels are non-labial [-lab].

2.2.2.3 Tongue body feature

Tongue body features refer to the position and shape of the main mass of the tongue during the articulation of speech sounds, especially vowels and some consonants. These features are crucial for describing how speech sounds differ based on the movement of the tongue in the oral cavity (Chomsky & Halle 1968:303ff.). Tongue body features include:

❖ **High [±hi]**

Also called closed vowels, high vowels [+hi] are produced by raising the body of the tongue beyond the neutral position approximately close to the hard palate but without constriction. Vowels [i, ɪ, y, ɨ, ʉ, ʊ, u and ɯ] are [+hi], the rest of the vowels are non-high [-hi]. Equally, palatal consonants like [j and ɲ] are [+hi].

❖ **Low [±lo]**

Low vowels [+low] are produced with the tongue relatively flat and the mouth wide open than mid vowels. Vowels [a] The rest of the vowels are [-low].

❖ **Advanced Tongue Root [±ATR]**

Sounds that are articulated with the root of the tongue pushing forward are described as [+ATR]. Those produced with the tongue retracting backward are [-ATR].

❖ **Rounded [±rd]**

Rounded vowels are those that are articulated with a circular opening of the lips and those that does not require a circular opening of the lips are [-rd].

2.2.2.4 Manner features

Manner features characterise the way air is obstructed during the production of speech sounds in the phonatory apparatus.

❖ **Continuant [±cont]**

Chomsky & Halle (1968: 317) describe continuants as sounds produced with continuous airflow to the oral cavity. Sounds considered as [+cont] are fricatives, laterals, trills, glides, and vowels. The others are [-cont] and they include stops, nasals and affricates.

❖ **Nasal [±nas]**

Nasal sounds are produced with a lowered soft palate which allows part of the air to escape through the nasal cavity. Nasal sounds [+nas] are m, ɱ, n, ñ, ɳ and nasal vowels. Non-nasal sounds [-nas] are those that are articulated with a raised velum preventing the air from

passing through the nasal cavity and escaping only through the oral cavity. All the other consonants except nasal consonants and vowels are [-nas].

❖ **Lateral [±lat]**

Lateral sounds are produced with the front of the tongue raised, touching the hard palate, and the sides lowered to allow the air to escape through the lowered sides. Thus, the tongue is raised in the middle of the mouth allowing air to escape to the sides. Examples of lateral consonants [+lat] are [l, ɭ, ʎ, ʟ and L], all the rest are non-lateral [-lat].

❖ **Delay Release [± del. rel.]**

There are two ways in which a closure in the vocal tract can be released. It is either instantaneous abrupt when it comes to stops and delayed for affricates. In other words, delay released sounds [+del. Rel.] are those produced with a gradual release. Examples are affricates. Stops are non-delay released [-del. Rel.].

❖ **Voicing [±vd]**

Voicing [+vd] is a term used to describe speech sounds such as vowels and consonants which during their production leads to the vibration of vocal folds. Sounds produced without the vibrations of vocal cords are voiceless [-vd].

❖ **Long [±long]**

The feature long [+long] applies to segments produced with a greater duration, as opposed to sounds with a short duration which are [-long].

❖ **Spread Glottis [±s.g.]**

The feature spread glottis characterises sounds produced with the vocal folds pulled apart. Spread glottis sounds [+s.g.] are said to be aspirated, e.g: p^h, t^h.

Application to Ajumbu:

Assimilation: at coda position, an alveolar nasal /n/ surfaces as a palatal nasal [ɲ] before a palatal consonant /j/ or a high unrounded vowel /i/ (e.g., /tájɲ/ → [tájɲ] ‘deny’). This can be captured by a feature-changing rule: [- high] → [+ high] / [+ high]-

Vowel harmony: When [+ATR] vowels spread across a morpheme, we can represent this process in terms of feature spreading rather than listing individual vowels.

Consonant weakening: when intervocalic /b/ becomes [β], the rule is described as a shift from [–continuant] to [+continuant] in that environment.

By using features, Ajumbu alternations are analyzed as manifestations of general phonological principles rather than as arbitrary exceptions.

2.2.3. Autosegmental Phonology

Ajumbu is a tone language, and tonal processes cannot be adequately represented in a linear model. Autosegmental phonology (Goldsmith, 1976) provides a framework that treats tone as an autonomous tier associated with tone-bearing units (TBUs) such as vowels or syllables. This model captures the non-linear and hierarchical nature of tone. This theory is tone important in understanding autodegmental phenomena like tone stability, tone delinking and relinking. Representing tone processes using this model is more adequate rather than using the linear generative model. Autosegmental phonology was used to represent tone processes like tone copying, tone sandhi, tone deletion, tone spreading, tone fusion and contour tone formation

Application to Ajumbu:

Tone spreading: A High (H) tone can spread from one syllable to the next, represented as a single H linked to multiple vowels:

H
| \

V V

For instance /ʃɛnfəɣəŋo/ → [ʃɛnfəɣəŋó] ‘clitoris’

Linear phonological models cannot adequately capture these tonal processes; autosegmental representations are therefore indispensable.

2.2.4. Why the Three Frameworks are Necessary and Complementary

The three frameworks are not competing alternatives but rather complementary approaches that together ensure a complete analysis of Ajumbu phonology:

Phonemic theory establishes the phoneme inventory, grounding the analysis in observable contrasts. Without it, there would be no clear baseline for Ajumbu sound patterns.

Generative distinctive feature theory explains the systematic processes and alternations that go beyond phonemic contrasts. Without it, patterns such as assimilation and vowel harmony would appear random rather than principled.

Autosegmental phonology captures the non-linear tonal phenomena that define Ajumbu's suprasegmental system. Without it, tonal alternations like spreading, floating tones, and downstep would be inadequately represented.

If any one framework were omitted, the analysis would be incomplete:

- Omitting phonemic theory would leave the phoneme inventory undefined.
- Omitting feature theory would obscure the systematic nature of phonological alternations.
- Omitting autosegmental phonology would misrepresent the tonal system, which is central to Ajumbu.

Thus, the three frameworks together form a methodological triad that addresses the segmental, featural, and tonal levels of Ajumbu phonology. Their integration ensures a balanced description that is both empirically grounded and theoretically robust. Conclusively, this chapter reviewed existing literature on Ajumbu and explained the theoretical framework used to analyse the data. It provided a conceptual review on common phonological processes in bantoid languages and an empirical review on work done in Ajumbu language. An eclectic approach of selected theories was provided and the relevance of each theory in the analysis of the sound system of Ajumbu was highlighted. The next chapter will elaborate on the phonological analysis of Ajumbu consonants starting from the presentation of phones to the classification of phonemes.

CHAPTER THREE: THE PHONOLOGICAL ANALYSIS OF CONSONANTS

This chapter deals with the phonological analysis of all surface consonant segments attested in the Ajumbu language based on a corpus collected for this purpose. The analysis begins with the phonic inventory in section 2.1 followed by the phonic chart in section 2.2. Section 2.3 provides phonetic definitions. Section 2.4 examines suspect pairs. Section 2.5 studies opposition in identical context. Section 2.6 studies free variation. Section 2.7 deals with complementary distribution. Section 2.8 inventories consonant phonemes. Phonemes are defined in section 2.9. The classification of consonant phonemes is presented in Section 2.10. Section 2.11 provides consonant phonemes chart, and section 2.12 presents the distribution of consonant phonemes within syllables.

3.1 Consonant phonetic inventory

A consonant is a speech sound produced with a closure or near complete constriction of the vocal tract (Proctor 2021:1). One hundred and two (102) consonant sounds were inventoried in the Ajumbu data collected for this analysis. These consonants are classified based on three main criteria: the place of articulation, the manner of articulation, and voicing. Consonant sounds in Ajumbu can be grouped into 08 points of articulation namely, bilabials, labiodentals, alveolars, prepalatals, palatals, velars, labiovelars and glottals. Concerning manner of articulation, we equally have 08 classes which are plosives, nasals, prenasals, fricatives, affricates, a trill, laterals and glides. Some of these consonants are equally produced with the superimposition of a secondary manner of articulation, namely, palatalisation, aspiration, labialisation and labio-palatalisation. Regarding the state of the glottis, that is whether or not the vocal folds vibrate, Ajumbu differentiates between voiced and voiceless consonants. Below is the inventory of Ajumbu consonant system.

Table 3.1: Ajumbu Consonants inventory

Consonants	Examples in IPA	Gloss	CNC
Oral Stop Sounds			
Bilabials			
[p]	[lápé]	‘palm barren fruit’	NJS
	[bāp]	‘cut thatch grass’	AS
[p ^h]	[p ^h ú]	‘a woven dish’	CGA
	[p ^h ú]	‘trough’	KS
[p ^{hw}]	[p ^{hw} ó]	‘sweat’	CGA
[b]	[bǎ:só]	‘tear’	AS
	[bǎ:nó]	‘danse on toes’	
[bʲ]	[bʲá]	‘palm cone’	CGA
	[bʲóŋ]	‘red’	NCS
[b ^ɥ]	[b ^ɥ ó]	‘heaven’	AS
	[b ^ɥ íŋ]	‘hanged seiling’	NRN
[b ^w]	[b ^w ón]	‘break’	AS
	[b ^w ê]	‘rain’	KS
Alveolars			
[t]	[tá]	‘come’	NCS
	[túŋ]	‘ear’	CGA
[t ^w]	[t ^w ěŋ]	‘gauze’	NJS
	[t ^w ó]	‘cock’	
[tʲ]	[tʲáʔ]	‘power’	KS
[t ^ɥ]	[t ^ɥ íŋ]	‘yellow soup’	KS
[d]	[dú]	‘say’	AS
	[dó]	‘thick’	NCS
[d ^w]	[d ^w àm]	‘body’	CGA
	[tǎd ^w ě:ló]	‘nicely dresses’	NCS
Velars			
[k]	[kú]	‘head’	NJS
	[kí]	‘pay fine’	KS
[kʲ]	[kʲó]	‘upper grinding stone’	NRN
	[kʲǎŋ]	‘align’	KS
[k ^ɥ]	[k ^ɥ ú]	‘village’	KS
	[k ^ɥ õŋ]	‘collapse’	NCS
[k ^w]	[k ^w ó]	‘get well’	KS
	[k ^w òlǎ]	‘hair’	KS

[g]	[gũ:] [gí]	‘owl’ ‘beans’	CGA NRN
[g ^w]	[g ^w ásə] [g ^w ô:]	‘buy’ ‘grind on machine’	NCS
[g ^j]	[g ^j á] [g ^j âŋ]	‘share’ ‘separate’	AS NCS
[g ^ɥ]	[g ^ɥ íŋ] [g ^ɥ ín]	‘war’ ‘put’	NRN NCS
Labio-velars			
[kp]	[kpə] [kpákpálə]	‘die’ ‘mat’	CGA KS
[kp ^w]	[kp ^w ɔ]	‘toilet’	CGA
[gb]	[gbú] [gbáfə]	‘hill’ ‘bad’	NRN NCS
[gb ^w]	[gb ^w ɔ]	‘cut’	AS
Glottals			
[ʔ]	[b ^w áʔtə] [ŋgəʔ]	‘to park’ ‘trouble’	NCS AS

Nasal Stop Sound			
Bilabials			
[m]	[mô:nə] [mí]	‘wasp’ ‘swallow’	KS
[m ^ɥ]	[m ^ɥ í:] [m ^ɥ íŋ]	‘calf’ ‘husband’	NRN
[m ^w]	[m ^w únă:nə] [m ^w ɔ]	‘uncle’ ‘wash’	NRN CGA
[m ^j]	[m ^j ə]	‘lick’	NCS
Alveolars			
[n]	[nánás] [nũ:]	‘pineapple’ ‘see’	CGA NCS
[n ^w]	[n ^w ə] [n ^w á]	‘knee’ ‘ankle’	NJS KS
[n ^ɥ]	[n ^ɥ íŋ]	‘afternoon’	NCS
Palatals			
[ɲ]	[ɲó]	‘vagina’	KS

	[táp]	‘deny’	NJS
[ɲ ^w]	[ɲ ^w é]	‘one hundred’	NRN
	[ɲ ^w ó]	‘peel elephant stalk’	KS
Velars			
[ŋ]	[ŋù]	‘person’	AS
	[góŋ]	‘carry’	NCS
[ŋ ^w]	[ŋ ^w ǎ:fó]	‘belch’	AS
	[ŋ ^w é:nó]	‘be poor’	NJS
[ŋ ^ɥ]	[ŋ ^ɥ ín]	‘dry up tree’	AS
	[ŋ ^ɥ ín]	‘last year’	NCS
Prenasal sounds			
Bilabials			
[mb]	[mbòlɔʔ]	‘cow’	AS
	[límbí]	‘talking drum’	NRN
[mb ^ɥ]	[mb ^ɥ í]	‘salt calabash’	NRN
[mbʲ]	[mbʲótsáyó]	‘world’	KS
	[mbʲǎŋ]	‘walking stick’	
[mb ^w]	[mb ^w ú]	‘pipe’	CGA
Labio-dentals			
[ɱf]	[ɱfù]	‘native cocoyam’	NRN
	[ɱfá:]	‘slave’	KS
[ɱfʲ]	[ɱfʲá:fó]	‘eczema’	NRN
	[ɱfʲáŋ]	‘road junction’	KS
[ɱf ^w]	[ɱf ^w ý]	‘palm tree’	NRN
[ɱf ^ɥ]	[ɱf ^ɥ ín]	‘blood’	NRN
[ɱv]	[ɱvǎló]	‘air’	CGA
	[ɱvùló]	‘wind’	

Alveolars			
[nt]	[ntú]	‘to enthrone chief’	NCS
	[ntápntáp]	‘box’	KS
[nt ^w]	[nt ^w ó]	‘neck’	NRN
[nts]	[ntsín]	‘spit’	KS
[ns]	[nsǎ:ná]	‘friend’	NJS
[nd]	[ndúnó]	‘law’	NRN
	[ndínó]	‘farm ban’	

[nd ^w]	[nd ^w àk ^j átò]	‘sixteen’	NRN
[ndz]	[ndzón]	‘ring worm’	NRN
	[ndzìŋ]	‘a fight’	
[nz]	[nzǒ]	‘a call’	CGA
	[nzá]	‘inherit’	
[nl]	[nlě:sákə]	‘noise’	CGA
	[nləŋ]	‘course’	NCS
Prepalatals			
[ɲ]	[mèɲfílə]	‘hang off’	AS
	[kàɲfí]	‘swear’	
[ɲʒ]	[ɲʒí]	‘buffalo’	NJS
[ɲʈ]	[ɲʈfílə]	‘aged person’	AS
	[ɲʈfúnə]	‘gossip’	KS
[ɲɕ]	[àɲɕóképɛ̀nì]	‘nineteen’	NRN
	[ɲɕùfə]	‘fish’	NJS
[ɲɕ ^j]	[ɲɕ ^j ásə]	‘urine’	NRN
[ɲɕ ^w]	[ɲɕ ^w ě:lə]	‘be good’	NCS
Velars			
[ŋk]	[ŋkómk ^j á]	‘leprosy’	NRN
	[ŋkòŋkónsə]	‘peace plant’	
[ŋk ^j]	[ŋk ^j ǎfə]	‘sugar’	KS
[ŋk ^ɥ]	[ŋùŋk ^ɥ iá]	‘dirty person’	KS
[ŋg]	[ŋgímtò]	‘cow pea’	NRN
	[ŋgón]	‘garden egg’	NJS
[ŋg ^j]	[ŋg ^j âŋ]	‘vein’	NJS
	[ŋg ^j ón]	‘dry up’	NCS
[ŋg ^ɥ]	[ŋg ^ɥ ú]	‘valley’	KS
	[ŋg ^ɥ ý]	‘lake’	
[ŋg ^w]	[ŋg ^w àm]	‘chest’	KS
Labio-velars			
[ŋmkp]	[ŋmkpón]	‘cloud’	NRN
	[ŋmkpá]	‘plate’	KS
[ŋmgb]	[ŋmgbóʔtə]	‘knock the door’	NCS
	[ŋmgbó]	‘grasshopper’	NJS
[mw]	[mwán]	‘drip’	AS

Fricatives			
Bilabial			
[β]	[fàβá]	‘faces’	NRN
	[fáβá]	‘forehead’	

Labio-dentals			
[f]	[fú]	‘testicle’	NJS
	[fífi]	‘cockroach’	NCS
[fʷ]	[fʷɔ̀lò]	‘hairs’	KS
	[fʷê:ló]	‘near’	NCS
[f̥]	[f̥ém]	‘gossip’	NRN
	[f̥á]	‘face’	AS
[fʷ]	[fʷó]	‘meat’	NJS
	[fʷé]	‘roast’	KS
[v]	[vú]	‘yam’	CGA
	[vù]	‘odour’	KS
[vʷ]	[vʷê:ló]	‘run’	AS
	[vʷânó]	‘thatch grass’	
[vʲ]	[vʲú]	‘build house’	NCS
	[vʲú]	‘nostril’	KS
[vʷ]	[vʷó]	‘escape’	NCS
Alveolars			
[s]	[sám]	‘dig’	AS
	[tás]	‘fist’	CGA
[z]	[zén]	‘maggot’	NRN
	[zó]	‘God’	
Prepalatals			
[ʃ]	[ʃö:]	‘heat food’	NCS
	[ʃó]	‘axe’	KS
[ʃ̥]	[ʃ̥á]	‘share’	NCS
	[ʃ̥áŋ]	‘hut’	NJS
[ʃʷ]	[ʃʷáɲ]	‘ignite’	AS
	[ʃʷó]	‘dysentery’	KS
[ʒ]	[ʒíɲó]	‘honey juice’	CGA
	[ʒì]	‘wet’	NCS

[ʒ]	[bèʒʲá]	‘be pregnant’	NCS
Velars			
[ɣ]	[ɣán] [ɣánkòʔ]	‘insist’ ‘chameleon’	NCS NRN
Affricates			
Aveolars			
[ts]	[tsú] [tsìn]	‘pin something’ ‘arm’	KS
[ɖ]	[ɖá] [ɖá]	‘feed’ ‘road’	NCS NJS
[ɖʷ]	[ɖʷɛ:sá]	‘placenta’	NRN
Pre-palatals			
[tʃ]	[tʃú] [tʃó]	‘add’ ‘to beat’	AS

[tʃʲ]	[tʃʲá] [tʃʲâ:]	‘rot’ ‘juju’	AS NJS
[tʃʷ]	[tʃʷáp] [tʃʷó]	‘noise rain’ ‘heat on the table’	NJS NCS
[tʃʷ]	[tʃʷín]	‘bitter leaf’	NJS
[ɖʒ]	[ɖʒù] [ɖʒòŋá]	‘penis’ ‘lizzard species’	KS
[ɖʒʲ]	[ɖʒʲón] [ɖʒʲásá]	‘guard (n)’ ‘urinate’	KS NCS
[ɖʒʷ]	[ɖʒʷó] [ɖʒʷámá]	‘deliver baby’ ‘a hunt’	NCS KS
Velars			
[kx]	[kxó]	‘kernel chaff’	KS
Lateral			
Alveolars			
[l]	[lòkó] [mɛ:ló]	‘cassava’ ‘flat’	NRN NCS
Approximant			
Palatals			
[j]	[jóló]	‘learn’	AS

	[mbǝj]	‘wine’	NJS
Labio-palatal			
[ɥ]	[ɥíkʷé]	‘frog’	KS
	[ɥɔ]	‘moon’	NJS
Labio-velar			
[w]	[wám]	‘swing arm’	AS
	[wán]	‘shout’	NCS
[wʰ]	[wʰíŋ]	‘dry season’	

3.2 Consonants Phonetic Chart

Table 2.2 presents all Ajumbu surface consonants. These sounds are presented and classified according to their place and manner of articulation. Heterogonic sounds like palatalised, labialised, labio-palatalised and aspirated segments are included. In addition, the chart equally contains prenasalised consonants.

Tableau 3.2: Phonic Table of Ajumbu Consonant Segments

	Bilabial	Labio-dental	Alveolar	Prepalatal	Palatal	Velar	Labiovelar	Glottal
Oral stop	p p ^h p ^{hw} b b ^j b ^w b ^q		t t ^j t ^w t ^q d d ^w			k k ^j k ^w k ^q g g ^j g ^w g ^q	kp kp ^w gb gb ^w	ʔ
Nasal stop	m m ^j m ^w m ^q		n n ^w n ^q		ɲ ɲ ^w	ŋ ŋ ^w ŋ ^q		
Prenasalised stop	mb mb ^j mb ^w mb ^q		nt nt ^w nd nd ^w			ŋk ŋk ^j ŋg ŋg ^j ŋg ^q ŋg ^w	ŋmkp ŋmgb	
Fricatives	β	f f ^j f ^w f ^q v v ^j v ^w v ^q	s z	ʃ ʃ ^j ʃ ^w ʒ ʒ ^j		ɣ		
prenasalised fricative		ɱf ɱf ^j ɱf ^w ɱf ^q ɱv	ns nz	ɲʃ ɲʒ				
Affricate			ts ɖ ɖ ^w	tʃ tʃ ^j tʃ ^w tʃ ^q ɖʒ ɖʒ ^j ɖʒ ^w		kx kx ^j gɣ		

Prenasalised Affricate			nts ndʒ	ɲtʃ ɲdʒ ɲdʒ ^w ɲdʒ ^j				
Lateral			l					
Prenasalised lateral			nl					
Glide					j ɥ		w w ^ɥ	

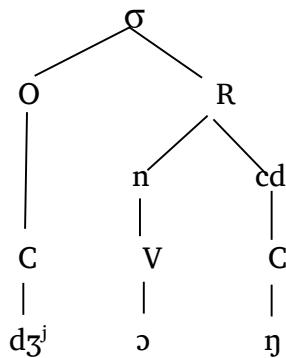
3.3 Interpretation of Complex Consonants

The phonetic system of Ajumbu is made up of modified and unmodified segments. Modified consonants discussed here are prenasals, labialised, palatalised and labio-palatalised segments while unmodified consonants are stops, fricatives, affricates and glides.

The interpretation of modified consonants consists in analysing whether they are considered as a succession of two distinct sounds or one single sound. This matter is solved by proceeding through hypothesis as illustrated below:

2.1.7.3 Hypothesis 1

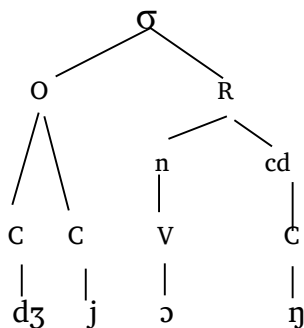
Prenasalised, labialised, palatalised and labio-palatalised consonants are considered as one distinct phoneme. For instance [m + b], [k + w], [k + j], [k + ɥ] is interpreted as [ʰb], [kʷ], [kʲ], [kʲ] and their syllable structure can be illustrated as follows



dʒʲɔŋ ‘guard’ KS

Hypothesis 2

Labialised, palatalised and labio-palatalised consonants are two distinct units for example /k/ + /w/, /k/ + /j/ and /k/ + /ɥ/ and their syllable structure can be illustrated as follows



dʒɔ́ŋ ‘guard’ KS

Conclusion

Labialised, palatalised, labio-palatalised and prenasals consonants are considered as biphonematic in Ajumbu as illustrated in hypothesis 2 because they all exist in simple forms in the language’s sound system as forwarded by Essono (2006). In addition, a duration study on praat reveal that complex segments have longer duration than simple ones. Let’s consider the following :

Word	Duration	Gloss	CNC
kú	1.44s	‘head’	KS
ŋkú	2.73s	‘chief’	KS
kʲú	2.06s	‘enter’	KS
kʷú	2.21s	‘camwood’	KS
kʷú	1.93s	‘country’	KS

This implies that complex sounds in Ajumbu are an association of two underlying distinct consonants and not a distinct sound. If they were a single distinct unit the duration would have been the same since they were analysed in the same environment. More so, Mutaka (2000) interpretes glides as underlying high vowels that have lost their position of syllable peak and are all predictable, so palatalised, labialised and labio-palatalised sounds can’t be treated as distinct phonemes. Further, prenasals in Ajumbu are most appropriately interpreted as NC consonant clusters rather than single prenasalised segments. Phonologically, the nasal component is independent and contrastive, appearing across word classes without any morphological function such as nominalisation. The nasal is consistently homorganic with the following stop, indicating place assimilation which is typical of sequences rather than unit segments. Acoustic evidence further shows that the nasal and stop have distinct temporal intervals, with NC sequences being longer than plain C ones, supporting a cluster interpretation. In addition, the presence of a syllabic nasal elsewhere in the system also confirms that nasals function as full segments in Ajumbu. Importantly, NC sequences are restricted to word-initial position, a common distributional characteristic of onset clusters. Also, the resyllabification of some oral stops in the singular form to NC in the plural form equally advocate for NC as in [kpá] ‘plate’ and [ŋmkpá] ‘plates’ proof prenasals as two distinct

underlying consonants. Collectively, these phonological properties demonstrate that Ajumbu NC sequences pattern as true consonant clusters, not prenasalised stops.

3.4 Opposition in identical context

Opposition in identical context refers to the situation where two consonants, constituting a suspect pair, commute at the same position within couple of words called minimal pairs. Their opposing and substitution within minimal pairs lead to a change in meaning.

3.4.1 [t] / [d]: voiceless / voiced

[t] and [d] opposed in identical context at word initial position in:

(1) ¹	tú	‘pick to eat’	(77)	NCS	tū	‘coagulate’	(112)	NCS
	dú	‘talk’	(61)	NCS	dū	‘fetch’	(89)	NCS

Conclusion: /t/ and /d/ are distinct phonemes.

3.4.2 [s] / [z]: voiceless / voiced

[s] and [z] are opposed at word initial position in:

(2)	sásé	‘fireside stone’	(254)	NRN	sá	‘judge’	(20)	AS
	zásé	‘wound’	(140)	NRN	zá	‘eat’	(66)	AS

Conclusion: /s/ and /z/ are distinct phonemes.

3.4.3 [t] / [ts]: stop / affricate

[t] and [ts] are opposed at word initial position in:

(3)	té	‘ladder’	(207)	NJS	tó	‘seedling’	(296)	KS
	tsé	‘father’	(153)	NJS	tsó	‘piano string’	(298)	KS

Conclusion: /t/ and / ts / are distinct phonemes.

¹ Examples as from here and henceforth are presented in their IPA form, followed by the glossary, the number of the linguistic element in the index, and the Consultant Names Code (CNC) of the consultant.

3.4.4 [m] / [n] / [ɲ] / [ŋ]: bilabial / alveolar / palatal / velar

[m], [n], [ɲ] and [ŋ] are opposed at word initial and final positions in (24) below:

(4)	mú	‘flour’	(278)	NRN	wám	‘swing’	(120)	AS
	nú	‘buttock’	(187)	NRN	wán	‘to shout’	(132)	AS
	ɲú	‘farm’	(233)	NJS	wáɲ	‘to lie’	(62)	AS
	ŋú	‘pour’	(99)	NJS	wáŋ	‘child’	(151)	AS

Conclusion: /m/, /n/, /ɲ/ and /ŋ/ are distinct phonemes.

3.3.5 [ɖ] / [ɗ]: alveolar / prepalatal

[ɖ] and [ɗ] are opposed at word initial position in:

(5)	ɖúnó	‘raffia’	(220)	NRN	ɖú	‘ban’	(296)	NCS
	ɗúnó	‘anus’	(188)	NRN	ɗú	‘sour’	(51)	NCS

Conclusion: /ɖ/ and /ɗ/ are distinct phonemes.

3.4.6 [l] / [ɲ]: lateral / nasal

[l] and [ɲ] are opposed at word initial position in:

(6)	lú	‘restrict’	(57)	CGA	láʔ	‘lack’	(58)	AS
	nú	‘buttock’	(187)	KS	náʔ	‘pay debt’	(116)	AS

Conclusion: /l/ and /n/ are distinct phonemes.

3.4.7 [k] / [g]: voiceless / voiced

[k] and [g] are opposed at word initial position in:

(7)	kú	‘head’	(157)	KS	kú	‘head’	(157)	KS
	gú	‘spear’	(203)	KS	gúfó	‘ride’	(115)	NCS

Conclusion: /k/ and /g/ are distinct phonemes.

3.4.8 [ʃ] / [ʒ]: voiceless / voiced

[ʃ] and [ʒ] are opposed at word initial position in:

(8)	ʃĩ	‘descend’	(146)	NCS	ʃĩ	‘fowl’	(181)	AS
	ʒĩ	‘bury’	(84)	NCS	ʒĩ	‘wet’	(05)	AS

Conclusion: /ʃ/ and /ʒ/ are distinct phonemes.

3.4.9 [tʃ] / [dʒ]: voiceless / voiced

[tʃ] and [dʒ] are opposed at word initial position in:

(9)	tʃó	‘palm nut chaff’	(322)	KS	tʃú	‘add’	(7)	AS
	dʒó	‘rat mole’	(319)	KS	dʒú	‘belch’	(51)	AS

Conclusion: /tʃ/ and /dʒ/ are distinct phonemes.

3.4.10 [g] / [ɣ]: stop / fricative

[g] and [ɣ] are opposed at word initial position in:

(10)	gáŋ	‘slaughter’	(46)	KS
	ɣáŋ	‘insist’	(83)	KS

Conclusion: /g/ and /ɣ/ are distinct phonemes.

3.4.11 [kp] / [gb]: voiceless / voiced

[kp] and [gb] are opposed at word initial position in:

(11)	kpá	‘cough’	(230)	KS	kpáfó	‘money’	(267)	AS
	gbá	‘fall’	(6)	KS	gbáfó	‘bark’	(21)	AS

Conclusion: /kp/ and /gb/ are distinct phonemes.

3.4.12 [j] / [ɟ]: palatal / labio-palatal

[j] and [ɟ] are opposed at word initial position in:

- | | | | | |
|------|--------------------|-----------|-------|-----|
| (12) | jík ^w ê | ‘gizzard’ | (240) | NRN |
| | ɟík ^w ê | ‘frog’ | (224) | NRN |

Conclusion: /j/ and /ɟ/ are distinct phonemes.

3.5 Free Variation

Free variation refers to the linguistic phenomenon where two or more sounds can be used interchangeably at the same position within a word without causing a change in the meaning.

3.5.1 [kʲ] / [kxʲ]: stop / affricate

[kʲ] and [kxʲ] are in free variation at word initial position in:

- | | | | | |
|------|--------|---------|-------|-----|
| (13) | kʲâlô | ‘elder’ | (262) | NRN |
| | kxʲâlô | ‘elder’ | (211) | NRN |

Conclusion: [kʲ] and [kxʲ] are allophones of the same phoneme which is /kʲ/.

3.6 Complementary Distribution

This section lays emphasis on sounds which do not oppose in identical context. The main aim here consists in studying the context of occurrence of couple of sounds constituting suspect pairs within stems. If both sounds are mutually exclusively, then they are allophones of a same phoneme. On the contrary, if both sounds share the same context of occurrence be it at the initial, the middle or the final positions, then they are distinctive phonemes.

3.6.1 [b] / [p]: voice / voiceless

[b] and [p] are contextually distributed as seen below:

(14)		Initial	Middle	Final
	[b]	# - a (256) # - i (314) # - u (31) # - e: (26) # - o (53) # - ɔ̃ (169) # - ə: (322)		

		# - e (335)		
		# - ə (326)		
	[p]	# - ɔ̃ (316)	a – e (265)	a - # (87)
			a – a (311)	
			ə – i (222)	

Conclusion: [b] and [p] are distinct phonemes.

3.6.2 [k] / [kx]: voice / voiceless

[k] and [kx] are contextually distributed as follows:

(15)		Initial	Middle	Final
	[k]	# - a (36)		
		# - i (131)		
		# - u (157)		
	[kx]	# - ə (313)		

Conclusion: [k] and [kx] are allophones of the same phoneme which is /k/.

3.6.3 [b] / [β]: stop / fricative

[b] and [β] are contextually distributed as seen below

(16)		Initial	Middle	Final
	[b]	# - a (256)		
		# - i (314)		
		# - u (31)		
		# - e: (326)		
		# - o (53)		
		# - ɔ̃ (169)		
		# - ə: (322)		
	[β]		a – a (314)	

Conclusion: [b] and [β] are allophones of the same phoneme which is /b/.

3.6.13 [k] / [ʔ]: oral / prenasal

[k] and [ʔ] are contextually distributed as seen below:

		Initial	Middle	Final
--	--	---------	--------	-------

(17)	[k]	# - i (131) # - e (93) # - u (157) # - a (36)	u - ə (25)	
	[ʔ]		a - n (11) ɔ - ɔ (13)	a - # (11)

Conclusion: /k/ and /ʔ/ are allophones of the same phoneme which is /k/.

3.7 Phonemic Inventory

From the phonological analysis in section 2.5, 2.6 and 2.7, it results that Ajumbu counts 97 consonant phonemes illustrated below:

3.8 Definition of Phonemes

The phonemes inventoried in section 2.8 are hereby defined using articulatory features that oppose them and make each sound unique in the Ajumbu sound system. Ajumbu consonant phonemes are defined as below.

- /p/ : labial as opposed to /t/, voiceless as opposed to /b/
- /b/ : labial as opposed to /d/, voiced as opposed to /p/
- /m/ : labial as opposed to /n/, nasal as opposed to /b/
- /f/ : labial as opposed to /s/, voiceless as opposed to /v/
- /v/ : oral as opposed to /ŋv/, voiced as opposed to /f/
- /t/ : alveolar as opposed to /k/, voiceless as opposed to /d/
- /d/ : alveolar as opposed to /g/, voiced as opposed to /t/
- /n/ : alveolar as opposed to /m/, nasal as opposed to /d/
- /l/ : lateral as opposed to /d/, oral as opposed to /n/
- /s/ : alveolar as opposed to /ʃ/, voiceless as opposed to /z/
- /z/ : alveolar as opposed to /ʒ/, voiced as opposed to /s/
- /ʃ/ : prepalatal as opposed to /s/, voiceless as opposed to /ʒ/
- /ʒ/ : prepalatal as opposed to /z/, voiced as opposed to /ʃ/
- /ts/ : affricate as opposed to /t/, voiceless as opposed to /dʒ/
- /dʒ/ : affricate as opposed to /z, d/, voiced as opposed to /ts/
- /tʃ/ : prepalatal as opposed to /ts/, voiceless as opposed to /dʒ/, affricate as opposed to /t, ʃ/
- /dʒ/ : prepalatal as opposed to /dʒ/, voiced as opposed to /tʃ/, affricate as opposed to /d/and /ʒ/
- /ɲ/ : palatal as opposed to /ŋ/, stop as opposed to /j/
- /k/ : velar as opposed to /t, p/, voiceless as opposed to /g/
- /g/ : velar as opposed to /d/, voiced as opposed to /k/
- /ɣ/ : fricative as opposed to /g/

- /kp/ : labio-velar as opposed to /p, k/, voiceless as opposed to /gb/
- /gb/ : labio-velar as opposed to /b, g/, voiced as opposed to /kp/
- /ŋ/ : velar as opposed to /ɲ/, nasal as opposed to /g/
- /j/ : palatal as opposed to /w/, glide as opposed to /ɲ/
- /w/ : labio-velar as opposed to /j/, glide opposed to /gb/

3.9 Classification of phonemes

This section deals with the description of the internal phonological organisation of Ajumbu consonant phonemes based on their manner and place of articulation.

3.10.1 Manner of articulation

Ajumbu consonant phonemes can be ranged in seven distinct manners of articulation as follows:

Plosives: /p, b, t, d, k, g, kp, gb/

Fricatives: /f, v, s, z, ʃ, ʒ, ʎ/

Affricates: /ts, dz, tʃ, dʒ/

Nasals: /m, n, ɲ, ŋ/

Lateral: /l/

Glides: /j, w, ɥ/

3.10.2 Place of Articulation

The classification of Ajumbu consonant phonemes based on their place of articulation is as illustrated below.

Labials : /p, b, m, f, v/

Alveolars : /t, d, n, ts, dz, s, z, l/

Prepalatals : /ʃ, ʒ, tʃ, dʒ/

Palatals : /j, ɥ, ɲ/

Velars : /k, g, ŋ, ɣ/

Labio-velars : /kp, gb, w/

3.11 Phonemic Consonant Chart

Table 3.4: Phonemic Table of Ajumbu Consonants

p		t			k	kp
b		d			g	gb
m		n		ɲ	ŋ	
	f	s	ʃ		ʎ	
	v	z	ʒ			
		ts	tʃ			
		dz	dʒ			
		l				
				j		w
				ɥ		

3.12 Distribution of Consonant Phonemes

The distribution of consonant phonemes is provided here to better understand the environment in which they appear. The phonemes are presented based on the place articulation only.

Table 3.5: Distribution of Consonant Phonemes

Phonemes	Initial	Middle	Final	Distribution
p	+	+	+	6
b	+	+		87
m	+	+	+	96
f	+	+		61
v	+			9
t	+	+		80
d	+			40
n	+	+	+	190
s	+	+	+	140
z	+	+		38
ts	+			15
dʒ	+			30
l	+	+		55
ʃ	+	+		18
ʒ	+			8
tʃ	+			23
dʒ	+			12
ɲ	+	+	+	69
j	+	+	+	23
ɥ	+			8

k	+	+		130
g	+			40
ŋ	+	+	+	140
ɣ	+			8
kp	+	+		18
gb	+			9
w	+			18

Discussion: We observe from this distribution that all consonant phonemes in Ajumbu appear at word initial position without any exception. The middle position is mostly occupied by the glide /j/, some fricatives, nasals, lateral and some stops. All affricates only occur at word initial position. The consonant phonemes /p, s, m, n, ɲ, j, ŋ/ are the only consonants that occur at words final position.

Conclusion

In sum, this chapter studied the consonant sound system of the Ajumbu language. The phonological analysis began with the identification of one hundred and two (102) consonant phones which were analysed in identical context, complementary distribution, and free variation. As a result, twenty-seven (27) consonants out of the 102 were identified as distinct phonemes. Despite the fact that complex consonants, namely, labialised, palatalised, labio-palatalised, and prenasals contrast with their plain counterparts in this language, they are interpreted as consonant clusters because they exist as two distinct phonemes in the sound system of the language. Also, the labiodental nasal stop [ɱ] does not appear in its plain form in the language, it only appears coupled with the labiodental fricatives /f, v/ resulting in [ɱf] and [ɱv] after resyllibification. The following chapter presents the phonological analysis of vowels and tones in Ajumbu.

CHAPTER FOUR: THE PHONOLOGICAL ANALYSIS OF TONES AND VOWELS

The present chapter describes the vocalic and tonal systems of Ajumbu. Section 3.1 deals with vowels, and section 3.2 with tones.

4.1 Vowels

Vowels are classically viewed as one of the two major classes of speech sounds. A vowel can be defined as *a speech sound produced without significant constriction of the oral and pharyngeal cavities, and which typically serves as the syllabic nucleus* (Ladefoged & Johnson 2015: 10). The following subsections identify and describe Ajumbu vowels based on their phonetic characteristics viz., height, backness, roundness, tenseness, and length.

4.1.1 Vowel inventory

Twenty-one (21) vowel sounds were inventoried at the surface level in Ajumbu. In terms of height, the following vowels are listed: five (04) short and closed, two (02) long and closed, two (02) short and near-closed, three (03) mid-closed, two (02) long and mid-closed, one (01) short and mid, one (01) long and mid, two (02) short and mid-opened, two (02) long and mid-opened, one (01) short and opened and one (01) long and opened. In terms of backness, the following vowels are identified: nine (08) front, six (06) central, and height (07) back. In terms of length, nine (09) long, and fourteen (13) short vowels are identified. In terms of tenseness, Ajumbu counts eleven (9) lax vowels and twelve (12) tensed vowels. The phonetic inventory of vowels in Ajumbu is presented in table 4.1.

Table 4.1: The Phonetic Inventory of Ajumbu Vowels

Vowels	Examples in IPA	Gloss	CNC
Short Vowels			
Closed			
[y]	[fýsǎ]	‘door space’	CGA
[i]	[ɲí]	‘to plant’	AS
[ɪ]	[bíŋ]	‘breast’	NJS
[ʊ]	[kúnǎ]	‘indian bamboo’	NRN
[u]	[ɖǔ]	‘sour’	NCS
Near closed			
[ɪ]	[tsɪŋ]	‘arm’	KS
Mid			
Mid-Closed			

[e]	[kádesá]	‘umbilical cord’	AS
[o]	[bó]	‘jump’	NCS
[ø]	[ɲʷlɔmó]	‘to be silent’	AS
[ə]	[màlè]	‘severely’	AS
Mid-opened			
[ɛ]	[bʷê]	‘rain’	NJS
[ɔ]	[vʷò]	‘house’	NJS
Opened			
[a]	[kpá]	‘cough’	KS
Long vowels			
Closed			
[i:]	[ʃi:]	‘duck’	NJS
[u:]	[mú:]	‘to visit’	NCS
Near closed			
Mid			
Closed			
[o:]	[sǒ:]	‘up root’	NCS
[e:]	[bě:lá]	‘wickedness’	NJS
Mid			
[ə:]	[bǎ:lá]	‘calabash with no hole’	NJS
Mid-opened			
[ɛ:]	[ɲgê:lá]	‘meander’	AS
[ɔ:]	[kʷǎ:]	‘be strong’	NCS
Opened			
[a:]	[stǎ:má]	‘navel’	NJS

4.1.2 Vowel phonetic chart

Table 4.2: Ajumbu vowel phones

	Front	Central	Back
Closed	i i: y	ɨ	u u:
Near closed	ɪ		
Mid closed	e e: ø		o o:
Mid		ə ə:	
Mid opened	ɛ ɛ:		ɔ ɔ:
Opened		a a:	

4.1.3 Phonetic Definition of Vowels

Ajumbu vowels are phonetically defined as follow.

- [i] : closed, short, front, tensed, unrounded.
- [i:] : closed, long, front, tensed, unrounded
- [y] : closed, short, front, tensed, rounded
- [ɨ] : closed, short, central, tensed, unrounded
- [ʉ] : closed, short, central, tensed, rounded
- [u] : closed, short, back, tensed, rounded
- [u:] : closed, long, back, tensed, rounded
- [ɪ] : near-closed, short, front, lax, unrounded
- [e] : mid-closed, short, front, tensed, unrounded
- [e:] : mid-closed, long, front, tensed, unrounded
- [ø] : mid-closed, short, front, tensed, rounded
- [o] : mid-closed, short, back, tensed, rounded
- [o:] : mid-closed, long, back, tensed, rounded
- [ə] : mid, short, lax, unrounded
- [ə:] : mid, long, central, lax, unrounded
- [ɛ] : mid-opened, short, front, lax, unrounded
- [ɛ:] : mid-opened, long, front, lax, unrounded
- [ɔ] : mid-opened, short, back, lax, rounded
- [ɔ:] : mid-opened, long, back, lax, rounded
- [a] : opened, short, central, lax, unrounded
- [a:] : opened, long, central, lax, unrounded

4.1.4 Interpretation of long vowels

Following Mutaka (2000) long vowels are interpreted as an association of two underlying short vowels. So, long vowels are analysed as a sequence of two identical vowels occurring in adjacent positions. Thus, the syllable structure of long vowels in Ajumbu is VV and not V.

4.1.5 Opposition in identical context

As it was the case with consonants, two vowels forming a suspect pair are said to oppose in identical context when their commutation at the same paradigm within a word leads to a change in meaning.

4.1.5.1 [i] / [ɯ]: unrounded / rounded

[i] and [ɯ] are opposed at word final position in:

(1)	ɖí	‘mouth’	(161)	KS	tsí	‘hoe’	(191)	NRN
	ɖú	‘travel’	(48)	KS	tsú	‘banana’	(184)	RN

Conclusion: /i/ and /ɯ/ are distinct phonemes.

4.1.5.2 [i] / [u]: front unrounded / back rounded

[i] and [u] are opposed at word final position in:

(2)	tí	‘get old’	(303)	NCS	bí	‘palm nut’	(303)	CGA
	tú	‘add’	(31)	NCS	bú	‘tired’	(131)	CGA
	gí	‘beans’	(236)	KS	kí	‘pay fine’	(131)	NJS
	gú	‘spear’	(203)	KS	kú	‘head’	(157)	NJS

Conclusion: /i/ and /u/ are distinct phonemes.

4.1.5.3 [e] / [o]: unrounded / rounded

[e] and [o] are opposed at word final position in:

(3)	té	‘ladder’	(207)	NRN	ɲmgbé	‘calabash wine share’	(295)	NRN
	tó	‘seedling’	(296)	NRN	ɲmgbó	‘grasshopper’	(250)	NRN

Conclusion: /e/ and /o/ are distinct phonemes.

4.1.5.4 [ɛ] / [ɔ]: unrounded / rounded

[ɛ] and [ɔ] are opposed at word final position in:

(4)	f ^u é	‘roast’	(22)	CGA	b ^w ê	‘rain’	(211)	NJS
	f ^u ɔ	‘loan’	(139)	KS	b ^w ɔ	‘hailstone’	(281)	NJS

Conclusion: /ɛ/ and /ɔ/ are distinct phonemes.

4.1.5.5 [ə] / [a]: mid / opened

[ə] and [a] are opposed at word final position in:

(5)	kpé	‘die’	(149)	NCS	ná	‘climb’	(17)	NJS
	kpá	‘cough’	(230)	NCS	ná	‘leg marrow’	(272)	NJS

Conclusion: /ə/ and /a/ are distinct phonemes.

4.1.5.6 [y] / [u]: front / back

[y] and [u] are opposed at word final position in:

(6)	ŋg ^u ý	‘lake’	(274)	KS
	ŋg ^u ú	‘valley’	(269)	KS
	gý	‘skin’	(323)	NJS
	gú	‘spear’	(203)	NJS
	ǃú	‘hyena’	(245)	CGA
	ǃý	‘slimmy soup’	(329)	CGA

Conclusion: /y/ and /u/ are distinct phonemes.

4.1.6 Complementary Distribution

Vowels here are analysed based on their position and environment. If they share appear in the same environment, they are identified as phonemes of the language. Vowels which are mutually exclusive are interpreted as allophones of the same phoneme. Consider the following:

4.1.6.1 [ɪ] / [i]: lax / tensed

[ɪ] and [i] are contextually distributed as seen below:

(7)		Initial	Middle	Final
	[ɪ]		ndz – ɲ	
			ts - ɲ	
			n - n	
	[i]		f - f	f - #
			ŋg - m	p - #
			ʒ - n	b - #
			j - k	ʃ - #
			ɥ -	ʒ - #
			ɲtʃ - l	mb - #
				k - #
				g - #

Conclusion: /ɪ/ and /i/ are allophones of the same phoneme which is /i/.

4.1.7 Free Variation

Free variation refers to the linguistic phenomenon whereby two sounds alternate at the same position within a word without triggering a change in meaning. Sounds [ø] and [ə] are in free variation in Ajumbu as illustrated in (18). The variation between [ø] and [ə] is perceived in the speech of all the Ajumbu native speakers consulted for this work.

4.1.7.1 [ø] / [ə] : mid-closed / mid

[ø] and [ə] are in free variation at word final position in:

(8)	tə	‘stem’	(198)	NJS	zə	‘god’	(261)	KS
	tø	‘stem’	(198)	KS	zø	‘god’	(261)	NRN

Conclusion: [ø] and [ə] are allophones of the same phoneme which is /ə/.

4.1.7 Phonemic inventory of Vowels

Phonetically, 21 vocalic segments were inventoried in Ajumbu. At the end of the phonological analysis in sections 4.1.5 to 4.1.7, it results that 11 vowels out of the initial 21 are phonemic in Ajumbu. Below are Ajumbu phonemic vowels.

/i, ɪ, ʊ, u, y, e, ə, o, ɛ, ɔ, a/

4.1.8 Definition of Vowel phonemes

The definition of vowel phonemes consists in bringing out the specific features to each individual vowel that oppose and distinguish vowels among them. The vowel system of the Ajumbu language is defined as follows.

/i/ : closed as opposed to /e/, tensed as opposed to /ɪ/, unrounded as opposed to /u/, short as opposed /i:/

/y/ : rounded as opposed to /i/, front as opposed to /u/

/ɪ/ : unrounded as opposed to /ʊ/, central as opposed to /i/, closed as opposed to /ə/

/ʊ/ : rounded as opposed to /i/, central as opposed to /y/ and /u/

/u/ : closed as opposed to /o/, rounded as opposed to /i/

- /e/ : mid-closed as opposed to /i/, tensed as opposed to /ɛ/, unrounded as opposed to /o/, short as opposed to /e:/
- /o/ : mid-closed as opposed to /u/, tensed as opposed to /ɔ/, rounded as opposed to /e/, short as opposed to /o:/
- /ə/ : mid as opposed to /ɛ/, lax as opposed to /e/, unrounded as opposed to /ɔ/, short as opposed to /ə:/
- /ɛ/ : mid-opened as opposed to /e/, front as opposed to /ə/, unrounded as opposed to /ɔ/, short as opposed to /ɛ:/
- /ɔ/ : mid-opened as opposed to /o/, back as opposed to /ə/, rounded as opposed to /ɛ/, short as opposed to /ɔ:/
- /a/ : open as opposed to /ə/, central as opposed to /ɛ/, unrounded as opposed to /ɔ/, short as opposed to /a:/

4.1.9 Classification of Vowel Phonemes

The classification of Ajumbu vowels presented under this subsection is done according to the following criteria:

- Position of the tongue (front, central, back);
- Height of the tongue (closed, near-closed, mid-closed, mid, mid-opened, open);
- Shape of the lips (rounded, unrounded);
- length (short, long);
- Movement of the tongue root (lax, tensed).

4.1.9.1 Position of the tongue

According to the position of the tongue, the following vowels are distinguished:

- Front : /i, y, ɪ, e, ɛ/
- Central : /ɪ, ʊ, ə, a/
- Back : /u, o, ɔ/

4.1.9.2 Height of the tongue

According to the height of the tongue, Ajumbu vowels are classified as follows:

Closed	: /i, i:, i, y, ʊ, u, u:/
Near closed	: /ɪ/
Mid closed	: /e, o/
Mid	: /ə/
Mid opened	: /ɛ, ɔ/
Opened	: /a/

4.1.9.3 Shape of the lips

According to the shape of the lips, the following vowels are distinguished in Ajumbu:

Unrounded	: /i, i:, ɪ, i, e, e:, ə, ə:, ɛ, ɛ:, a, a:/
Rounded	: /ʊ, y, u, u:, o, o:, ɔ, ɔ:/

4.1.9.4 Movement of the tongue root

According to the movement of the tongue root, Ajumbu vowels are classified as follows.

Tensed	: /i, i, ʊ, y, u, e, o/
Laxed	: /ɪ, ə, ɛ, ɔ, a/

4.1.10 Phonemic Chart of Vowels

After defining and classifying Ajumbu vowel phonemes according to their articulatory features, they can be ranged as illustrated in the phonemic chart below.

Table 3.3: Ajumbu vowel phonemes

i	y	i	ʊ	u
e				o
		ə		
ɛ				ɔ
		a		

4.1.11 Distribution of Vowel Phonemes

Table 4.4 summarises the distribution of Ajumbu vowel phonemes within lexemes collected for the present study.

Table 4.4: The Distribution of Vowel Phonemes

	Initial	Middle	Final	number of occurrence
i		+	+	89
ɪ		+	+	44
ɨ			+	28
ʊ		+	+	38
y		+	+	54
u		+	+	260
e		+	+	74
o		+	+	98
ə		+	+	820
ɛ		+	+	128
ɔ		+	+	235
a		+	+	675

Discussion: It appears from Table .4 that the phonemes /ə/ and /a/ are the most distributed in Ajumbu because of their multiple contexts of occurrence.

4.2 Tones

Grassfield languages are known to have a complex tone system as stated by Anderson (2014:13). Before inventorying the tones attested in Ajumbu, a definition of what a tone language is and why Ajumbu is considered as a tone language is provided.

Pike (1948:3) defines a tone language as *a language having significant, contrastive, but relative pitch on each syllable*. In the same light, Yip (2002:65) says *a language with a tone is one in which an indication of pitch enters into lexical realisation of at least some morphemes*. Yip (2002:65) further stresses on the possible differences between tone and segmental phonology, and states that tone differs from many other phonological features in the ways rarely or never observed in more familiar consonant and vocalic features by the following:

- Mobility: Movement away from the point of origin.
- Stability: Survival after loss of the original host segment.
- One-to-many: A single tonal feature shared by two or more segments.
- Many-to-one: Multiple tonal features surfacing on a single host segment.

- Toneless segments potentially tone bearing segments that never acquire phonological tone.

In a nutshell, tone is the change in the pitch that affects the meaning of words and distinguishes grammatical categories. A tone is said to be lexical when it differentiates lexical structures that are identical in their sequence of consonants and vowels and grammatical when it fulfills grammatical functions. This section deals with the lexical function of tone in Ajumbu. Ajumbu is thus considered as a tone language because in section 3.2.1 that follows, it is shown that tone are distinctive and contribute in the meaning of lexical items.

4.2.1 Inventory of Tones

Ajumbu counts three (03) level and four (04) contour tones as examined in the following subsections.

4.2.1.1 Level Tones

The following level tones are attested in Ajumbu language.

4.2.1.1.1 High tone [´]

The high tone is identified in the words in (19).

(9)	ɲú	‘pour’	KS
	fáfá	‘blow air’	AS
	ɲú	‘vagina’	NJS
	méɲéné	‘raise a child’	CGA
	gí	‘beans’	NRN

4.2.1.1.2 Mid tone [ˊ]

The mid tone is identified in the following words.

(10)	zī	‘bury’	NCS
	ɖzē	‘wear’	CGA
	gbō	‘harvest’	KS
	nēn	‘mulch farm’	NCS
	gū	‘open’	AS

4.2.1.1.3 Low tone [ˋ]

The low tone is identified in the following words.

(11)	ɲù	‘person’	KS
	sò	‘handle’	NRN

nù	‘farm’	NJS
d ^w àm	‘back’	CGA
dʒù	‘penise’	NRN

4.2.1.2 Contour Tones

The following contour tones are attested in Ajumbu language.

4.2.1.2.1 Rising tone [˥]

The rising tone is identified in the following words.

(12)	kǎ:só	‘iron’	NRN
	ŋǔ	‘hear’	AS
	bǔ	‘greet’	NCS
	zǒ	‘read’	CGA
	k ^w ǎŋ	‘slip off’	KS

4.2.1.2.2 High-mid tone [˥̌]

The high-mid tone is identified in the following words.

(13)	bĩ	‘cola’	NJS
	tsô	‘to have sex’	NCS
	dʒā:ŋ	‘iron trap’	NRN
	bô:ŋ	‘road junction’	CGA
	tôŋ	‘baby’	

4.2.1.2.3 Mid- low tone [˥̌̌]

The low-mid tone is identified in the words below.

(14)	ŋkô	‘pot’	KS
	gû	‘owl’	NRN
	zâ	‘white ant’	NJS
	tê:ló	‘pride’	AS

4.2.1.2.4 Falling tone [˥̌̌̌]

The falling tone is identified in the following words

(15)	b ^w ê	rain	AS
	ɲâŋ	ascaris	CGA
	kô	fry	NCS
	v ^w ânó	a thatch grass	NJS

b^wɔ hailstone NRN

4.2.2 Tones phonetic chart

The Ajumbu tones inventoried are summarised in Table 4.5.

Table 4.5: Ajumbu tones phonetic chart

Name	Level tones	Name	Contour tones
High	[´]	Rising	[ˇ] [˘]
Mid	[¯]		
Low	[`]	Falling	[^] [ˆ]

4.2.3 Interpretation of Contour Tones

Following Mutaka (2000), contour tones in Ajumbu are best understood as the surface realisation of two level tones linked to a single syllable rather than as independent tonal categories. This interpretation becomes especially clear when considering the role of gliding, since processes such as vowel coalescence or the conversion of a high vowel into a glide often reduce the number of tone-bearing units without eliminating their tones. When two vowels merge or when a vowel becomes [j] [w] or [ɥ], the tones originally associated with these remain active (tone stability), and must be reassigned to the surviving syllable. Their reassociation produces rising or falling pitch movements that appear phonetically as contour tones. In addition, this interpretation is reinforced by the behaviour of long vowels which permit the association of more than one tone on the same syllable. This is so because, a long vowel contains an extended vowel duration which provides sufficient phonetic space for two level tones to be realised within the same syllable. Therefore, gliding and vowel length provide strong evidence that contour tones in Ajumbu are derived from underlying sequences of level tones, confirming Mutaka's view that contours are not underlying tonal categories but the predictable outcome of segmental changes interacting with tonal autosegments.

4.2.4 Identical Context

4.2.4.1 [´] / [¯] : high / mid

[´] and [¯] are opposed in:

(16)	[´]			[¯]			[`]					
	zá	‘eat’	(66)	AS	zā	‘be lost’	(39)	AS	zà	‘bed’	(199)	CGA
	zǐ	‘chain’	(98)	NCS	zī	‘bury’	(84)	NCS	zì	‘wet’	(5)	NCS
	gú	‘spear’	(203)	NRN	gū	‘open’	(24)	NCS	gù	‘evil spirit’	(196)	NRN
	g ^j ǎ	‘cook’	(121)	CGA	g ^j ā	‘cry’	(133)	CGA	g ^j è	‘bridge’	(304)	NJS
	g ^w ásó	‘fire’	(163)	KS	g ^w āsā	‘buy’	(136)	AS	g ^w àsà	‘gun’	(193)	KS
	só	‘excrete’	(47)	AS	sō	‘hatch’	(45)	AS	sò	‘handle’	(300)	NRN

Conclusion: / ´ /, / ¯ / and / ` / are distinct tonemes.

4.2.5 Definition and classification of tonemes

Ajumbu tonemes are defined and classified as follows.

4.2.5.1 Definition of tonemes

The seven (03) tonemes in Ajumbu are defined as follows.

/ ´ / : high as opposed to / ¯ / and / ` /,

/ ¯ / : mid as opposed to / ´ / and / ` /

/ ` / : low as opposed to / ¯ / and / ´ /

4.2.5.2 Classification of tonemes

Ajumbu tonemes are illustrated below.

Table 4.6: Ajumbu tonemes chart.

/ ´ /	/ ¯ /	/ ` /
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4.2.6 Distribution of Tonemes

Table 3.7 presents the distribution of tones within the Ajumbu noun and verb stems collected for the present analysis.

Table 4.7: Tones distribution

tones	number of occurrence
/ ´ /	1343
/ ¯ /	343
/ ` /	178

Summarily, eleven (11) vowels out of the twenty-one where attested as phonemes, vowels /ə/ and /a/ being the most widespread phonemes. Out the 7 surface tones only 3 were established

as tonemes. High tone is the most widespread in Ajumbu followed by the mid-tone. The following sub-section compares the phonological system of Ajumbu with that of Weh and Koshin to throw more light on the genetic affiliation question of Ajumbu phonologically.

4.3 The Implication of the phonology of Ajumbu to its Linguistic Classification

Previously, three different genealogical classifications of Ajumbu have been proposed (see section 0.5.5.2, Figure 3). Hombert (1980:96) quoted by Good & al. (2011:133) classified Ajumbu as a ring variety. Hamm & al (2001:13) classified Ajumbu as belonging to the Western Beoid family. In a most recent work, Good & al. (2011:133) rename the linguistic family from Western Beoid to Yemne Kimbi group arguing that both Hombert and Hamm genetic affiliations do not have enough linguistic evidences, and that any attempt to linguistically classify Ajumbu is premature. Despite the fact that the aforementioned works propose a genealogical classification of the Ajumbu language, its linguistic filiation remains a curiosity, a debate. Based on the results arrived at in this work, this section will attempt an evaluation of the phonological system of the Ajumbu language in comparison and contrast with those of Weh and Koshin, Ring and Western Beoid languages respectively, aiming at accessing which of the former classification plausibly aligns with Ajumbu's real filiation.

4.3. 1 The Vowel systems of Koshin, Weh and Ajumbu

The table below presents the vowel systems of Koshin, Weh and Ajumbu.

Table 4.8.1: Koshin, Weh and Ajumbu Vowel Systems

Language Phoneme	Koshin	Weh	Ajumbu
Short Vowels			
i	+	+	+
ɪ	-	-	+
y	-	-	+
ɨ	+	+	+
ʊ	-	-	+
u	+	+	+
e	+	+	+
o	-	+	+
ə	+	-	+
ɛ	+	-	+
ɔ	+	+	+
a	+	+	+

Language Phoneme	Koshin	Weh	Ajumbu
Long Vowels			
i:	-	+	+
ɪ:	-	+	-
u:	-	+	+
e:	-	+	+
o:	-	+	+
ə:	-	-	+
ɛ:	-	-	+
ɔ:	-	+	+
a:	-	-	+

The following observations can be made from Table 4.3.1:

- **Short Vowels:** The twelve (12) short vowels listed are attested in Ajumbu whereas Koshin counts height (08) and Weh seven (07). Three (03) of them /ɪ, ʊ, and y/ are solely found in Ajumbu. Six (06) of them /i, ɪ, u, e, ə, and a/ are common to Koshin, Weh and Ajumbu. In addition, vowel /ə/ is present both in Ajumbu and Koshin but not in Weh, and vowel /o/ is attested in Ajumbu and Weh but not in Koshin.
- **Long Vowels:** Out of the nine long vowels inventoried, Ajumbu counts height (08), Weh six (06), and Koshin null (0). Six long vowels /iː, uː, eː, oː and ɔː/ are attested both in Ajumbu and Weh. Vowels /iː/ and /əː, ɛː and aː/ are exclusively attested in Weh and Ajumbu respectively.

4.3. 2 The Tone systems of Koshin, Weh and Ajumbu

Consider Table 4.8.2 below paying attention to the tonal systems of Koshin, Weh and Ajumbu.

Table 4.8.2: Koshin, Weh and Ajumbu tone Systems

tones	Koshin	Weh	Ajumbu
˥	+	+	+
˦	+	-	+
˧	+	+	+

The following observations are made from table 4.3.2:

- **Level Tones:** Koshin and Ajumbu have a three-way level tones contrast (High, Mid, and Low) against a two-way level tones contrast (High and Low) in Weh.
- **Contour Tones:** contour tones are interpreted as the association of two contour tones in the three languages.

4.3.3 The Consonant systems of Koshin, Weh and Ajumbu

Consider Table 4.8.3 below paying attention to the consonant systems of Koshin, Weh and Ajumbu.

Table 4.8.3: Koshin, Weh and Ajumbu Consonant Systems

Language	Koshin	Weh	Ajumbu
Phoneme			

Language	Koshin	Weh	Ajumbu
Phoneme			

Oral stops			
p	+	-	-
b	+	+	+
t	+	+	+
d	+	+	+
k	+	+	+
g	-	+	+
kp	+	+	+
nt	+	-	-
nd	+	+	-
ŋk	+	-	-
ŋg	+	+	-
Nasals			
m	+	+	+
n	+	+	+
ɲ	+	+	+
ŋ	+	+	+

Oral Fricatives			
f	+	+	+
v	-	+	+
s	+	+	+
z	-	+	+
ʃ	+	+	+
ʒ	-	+	+
ɣ	+	+	+
bv	-	+	-
ts	+	+	+
dz	+	+	+
tʃ	+	+	+
dʒ	+	+	+
Prenasal Affricates/lateral			
mbv	-	+	-
nts	+	-	-
ndz	+	+	-
ɲʃ	+	-	-

The following generalisations can be made from Table 4.3:

- **Oral Stops:** Seven (07) oral stops out of the height (08) listed are attested in Koshin, Weh and Ajumbu. However, while /p/ is missing in both Weh and Ajumbu, the voiced velar stop /g/ is rather the sounds not attested in Koshin.
- **Prenasalised Stops:** Koshin counts seven (07) prenasalised stops /mb, nt, nd, ŋk, ŋg, ŋmkp and ŋmgb/. Weh counts four (04) prenasalised stop which are all voiced /mb, nd, ŋg, and ŋmgb/. Ajumbu counts (07) prenasalised phones like Koshin.
- **Fricatives:** Ajumbu and Koshin have the same plain fricatives. Almost all Koshin fricatives are voiceless /f, s, and ʃ/ exception made from /ɣ/.
- **Prenasalised Fricatives:** Koshin counts four (04) of them /ɲf, ns, nz, and ɲʃ/, whereas Ajumbu and Weh have none.
- **Affricates:** Ajumbu counts almost all of the 6 affricates listed exception made from pf and bv not also attested in Koshin but present in Weh. Koshin counts four (04) affricates out of the twelve /ts, dz, tʃ, and dʒ/ Ajumbu. While Weh counts six (06) affricates /pf, bv, ts, dz, tʃ, and dʒ/.
- **Lateral:** The lateral alveolar /l/ is present in Ajumbu, Koshin and Weh. The prenasalised counterpart is exclusively attested in Ajumbu.
- **Nasals:** The four (04) nasals phonemes inventoried so far /m, n, ɲ, and ŋ/ are attested in Koshin, Weh and Ajumbu.

- **Glides:** So far, three (03) glides were inventoried /j, w, ɥ/. Two (02) segments /j, and w/ out of the three listed are attested in Ajumbu, Koshin and Weh. The form /ɥ/ is solely found in Ajumbu.

Syntagmatically some of the following generalisations can be made when comparing and constrasting Koshin, Weh and Ajumbu systems:

- **Syllable Types:** Weh and Koshin count the same syllable types: CV, CCV, CVC, and CCVC.
- **Status of complex consonants:** Complex consonants are interpreted as biphonemic in the three languages.
- **(Morpho)phonological Processes:** Some phonological processes common to Koshin, Weh and Ajumbu are glide formation, homorganic nasal assimilation, and insertion rules. The suffixation of -lǎ to certain verbal roots for some grammatical purposes triggers the deletion of the coda, and lengthens the root's vowel in some words both in Weh and Ajumbu.

In a conclusion, based on the preceding comparative and contrastive analysis of the sound systems of Koshin, Weh and Ajumbu, it appears that Koshin seems to be closer to Ajumbu than Weh paradigmatically. Syntagmatically, the three languages share the same syllable structures and some phonological processes. Therefore, based on the preliminary observations which seem to tip the balance in favour of Koshin, Ajumbu can be classified as a western Beoid language phonologically. However, further studies (morphology, morphophology, morphosyntax, and syntax) are deemed necessary in order to draw a solid linguistic conclusion and settle the ongoing debate on the filiation of Ajumbu.

CHAPTER FIVE: SYLLABLE AND PHONOTACTICS

This chapter deals with the syntagmatic relations between phonemes and tonemes within phonological words. The chapter is divided into two main parts. Part one (4.1) deals with the syllable and its structure. It equally tackles tone patterns in noun and verb roots. Part two (4.2) studies the possible combinations of consonants and vowels to form words and syllables in Ajumbu.

5.1 Syllable

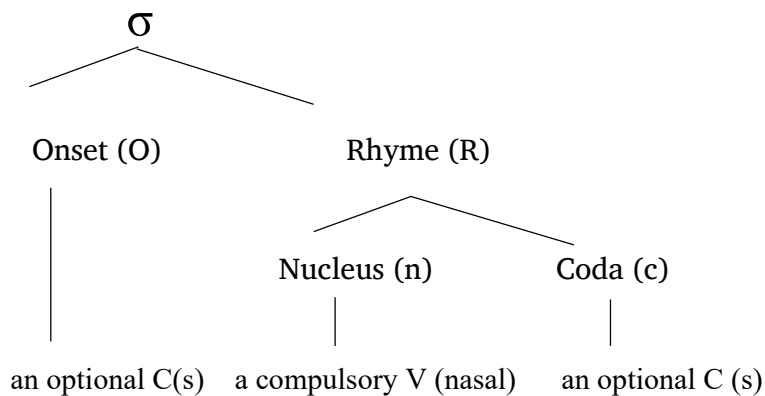
This section deals with the syllable and its structure.

5.1.1 Definition of Syllable

Roach (2009:56) says:

a syllable can be defined both phonetically and phonologically. Phonetically, syllables are usually described as consisting of a centre which has little or no obstruction to airflow and which sounds comparatively loud. Before and after this centre, that is at the beginning and at the end of the syllable, there will be greater obstruction to airflow and/or less loud sound. From the phonological point, a syllable is defined by looking at the possible combinations of phonemes

Many phonological theories treat syllable in varied ways. Most of these theories agree on the hierarchical placement of a syllable. Syllables are arranged into phonological units which according to Kenstowicz (1995: 250) include an obligatory nucleus preceded by an optional consonantal onset and followed by an optional coda. The hierarchical structure of a syllable is illustrated as seen below:



5.1.2 Types of Syllables

Depending on the nature of the vowels and their admission of a coda or not, syllables can be of different types. In terms of vowel length, we can divide syllables into light and heavy syllables. The weight of a syllable is determined based on the number and/or duration of phonological elements on the rhyme. That is, the composition of the peak and coda determines the weight of a syllable. On the one hand, a light syllable has a simple peak, only a short vowel with an optional onset. This implies that, a light syllable lacks long or diphthong vowel on the peak or does not have a coda. On the other hand, a heavy syllable may either have a long vowel or a diphthong vowel which is interpreted as complex and/or a coda. Thus, syllables with a branching rhyme or a branching nucleus are said to be heavy. Examples of heavy and light syllables in Ajumbu include:

(1) light syllables			heavy syllables		
fá	‘give’	NCS	fú:	‘measure’	NCS
nə	‘climb’	AS	ɕʰɔŋ	‘guard’	KS
mú	‘flour’	NRN	mú:	‘to visit’	CGA

Equally, syllables can further be divided into open (codaless) and closed syllables (with coda). An open syllable does not have a consonant at its coda position while a closed syllable comprises a consonant at its coda position. The open syllable is the most frequent type in Ajumbu. Examples of open and closed syllables include:

(2) open syllables			closed syllables		
sásə	‘fireside stone’	NRN	málás	‘orange’	NRN
fʷə	‘hair’	KS	kúŋ	‘oil’	NJS
bú	‘tired’	NCS	fəŋ	‘two’	AS

5.1.3 Syllable Structure

Syllable structure deals with the arrangement of consonants and vowels to form syllables or words in a given language. Clements & Keyser (1983:29) propose the following syllable structures to be canonical for every language that exist in the world:

Type one: CV

Type two: CV, V

Type three: CV, CVC

Type four: CV, V, CVC, VC

Based on the aforementioned syllable types and the structure of phonological words, it can be claimed that the syllable structure of Ajumbu fits with type three, that is CV, CVC. The different configurations of Ajumbu syllables are analysed and presented in table 4.1.

5.1.3.1 Onset

The onset is the part of the syllable margin which consists of an optional consonant(s) that precede the nucleus. In Ajumbu, a consonant at the onset position is compulsory in every syllable. Syllable onsets are filled by almost all the consonants attested in Ajumbu except the voiceless glottal stop [ʔ]. The consonant at the onset position can be simple or complex. The table below presents the distribution of Ajumbu consonants at syllable onset.

Table 5.1: Distribution of Ajumbu consonants at syllable onset

	# - [V ₁]	- V ₁ C	. - [V ₂]
C	1913	969	800

5.1.3.2 Nucleus

A nucleus is the core, centre or peak of a syllable. This is the compulsory part of the syllable. It is usually a tone bearing unit in most languages. In Ajumbu, the nucleus position is mostly occupied by vowels. Notwithstanding, nasals equally play the role of syllable peak in some cases. The following table presents the distribution of vowels and nasals at the nucleus position in Ajumbu.

Table 5.2: Distribution of Ajumbu vowels and nasals at nucleus position

	# - .C	C - #	C - C
V		1399	2300
N	70		

5.1.3.3 Coda

The coda is the part of the syllable margin which consists of an optional consonant(s) that follow the nucleus. Contrarily to the onset position, the coda position in Ajumbu is mostly filled by the voiceless glottal stop [ʔ] and nasals. Nevertheless, the phonemes /s/ and /p/ can also occur at the coda position in some rare cases. Consonants allowed at the coda position are simple consonants as clusters of consonants are forbidden at this position. The distribution of consonants at the coda position in Ajumbu is provided in Table 4.3.

Table 5.3: Distribution of Ajumbu consonants at syllable coda position

	V	CV-	CV.CV-
C	0	2300	800

5.1.4 Syllable Profiles in Noun Roots

The syllable profiles found in Ajumbu noun roots are:

Monosyllabic roots

(3)	CGV	tʃʷí	‘bitter leaf’	KS
	CGVC	ŋgʷân	‘vein’	NRN

Dissyllabic roots

(4)	CV.CGV	jí.kʷé	‘gizzard’	NRN
	CVC.VC	ɣán.kòʔ	‘chameleon’	KS
	CGVC.CVC	bʷín.záɲ	‘food’	NJS
	CGVC.CV	ŋʷàʔ.lə	‘book’	CGA

Trisyllabic roots

(5)	CCVV.CV.CV	nlě:sókə	‘noise’	NRN
	CV.CVC.CV	tʃà.mə.ŋfʷy	‘palm flower’	CGA

5.1.5 Syllable Profiles in Verb Roots

The syllable profiles found in Ajumbu verb roots include:

Monosyllabic roots

(6)	CV	bú	‘tired’	AS
	CGVC	gʷín	‘put’	NCS

Dissyllabic roots

(7)	CV.CV	gbà.kə	‘fall down’	AS
	CCVC.CV	nsàʔ.nə	‘to debate’	CGA

Trisyllabic roots

(8)	CV.CV.CV	rē:sə.kə	‘to be dizzy’	NCS
	CV.CV.CV	mə.ɲə.nə	‘raise a child’	CGA

Quadrisyllabic roots

(9)	CV.CV.CV.CV	tù.kə.bù.lə	‘to stammer’	NCS
-----	-------------	-------------	--------------	-----

5.1.6 Phonological Word

The phonological word can be defined as the smallest meaningful syntagmatic unit. Its structure varies according to the number of syllables that constitute it. Levelt & Indefrey (2000: 82) define phonological words as “domains of syllabification which often do not coincide with lexical words”. Moreover, Marit (2002: 69) says “the phonological word represents the interaction between phonology and morphology in that a phonological word either corresponds to a morphological word or is constructed on the basis of information on the internal structure of morphological words whereas a morphological word is a possible compound stem plus all affixes associated with it.” Therefore, the phonological word in this study is limited to roots only and can be classified into three types: monosyllabic, dissyllabic and polysyllabic.

5.1.6.1 Monosyllabic words

Monosyllabic words are words that are made up of one syllable. They can be opened or closed as illustrated in (10).

(10)	CV	gbú	‘hill’	KS
	CCVC	ηmkpón	‘cloud’	NRN
	CVG	záj	‘tooth’	NRN

5.1.6.2 Dissyllabic words

These are words made up of two syllables. They are opened or closed as in (11).

(11)	CGV.CV	ηfá:.fó	‘eczema’	NRN
	CGVC.CVC	ɔ́ín.báɲ	‘abstinence’	NJS
	CCV.CVC	mbò.lóʔ	‘cow’	KS

4.1.6.3 Trisyllabic roots

These are words made up of three syllables. The last syllable is always opened as in (12).

(12)	CCV.CV.CV	nlě:sákə	‘noise’	NRN
	CV.CVC.CV	tʃà.mə.ηfý	‘palm flower’	CGA

5.1.6.4 Quadrisyllabic roots

These are words made up of four syllables. All the syllables within quadrisyllabic inventoried so far are opened.

- (13) CV.CV.CV.CV tò.kǎ.bù.lǎ ‘to stammer’ NCS
 CV.CV.CV.CV kpàràkpára ‘mat’ KS

5.1.7 Tone Patterns

This subsection studies the distribution of tonemes in noun and verb roots.

5.1.7.1 Tone Patterns in Noun Roots

Nine (09) different tone patterns are identified in Ajumbu noun roots.

Table 5.4: Tone patterns in noun roots in Ajumbu

	Tones	Monosyllabic	Disyllabic	Trisyllabic	Quadrisyllabic
a.	H	ɲó ‘vagina’ NJS gú ‘spear’ NJS	bú.bú ‘pawpaw’ NJS ɲ ^w á.sǎ ‘sun’ NRN	----- -----	ʃéɲ.fǎ.ɣǎ?.nó ‘clitoris’ NRN
b.	HM	bí ‘cola’ KS tǒɲ ‘baby’ CGA	ɲtǒ.mbī ‘groundnut’ KS	-----	-----

c.	HL	ηkʲâ ‘crab’ CGA ɲâɲ ‘vomits’ NJS	ɣáŋkɔʔ ‘chameleon’ KS nú.vʷò ‘family’ NRN	----- -----	----- -----
d.	L	sò ‘handle’ NRN ηù ‘person’ KS	kʷò.lə ‘rope’ KS ɲɔʔù.fə ‘fish’ CGA	tʃà.mə.ŋfʲy ‘palm flower’ KS	----- -----
e.	HL H	dzʷê.só ‘placenta’ NRN ɲâ:fə ‘co-wife’ NJS	----- -----	----- -----	----- -----
f.	LH	lũŋ ‘pimples’ KS bʷə ‘goat’ CGA	kà.só ‘finger nail’ KS ŋgʷò.nə ‘pig’ KS	----- -----	kpà.rà.kpá.rá ‘mat’ KS
g.	LH H	----- -----	măɲsə ‘breast’ KS tʃămá ‘navel’ NJS	----- -----	----- -----
h.	LH H L	----- -----	----- -----	nlɛ:.só.kə ‘noise’ CGA	----- -----
i.	B H H	----- -----	----- -----	ηkò.ηkɔŋ.só ‘peace plant’ NRN ηgù.ηgúŋ.só ‘dragon fly’ NRN	----- -----

5.1.7.2 Tone Patterns in Verb Roots

Fourteen (14) different tone patterns are observed within Ajumbu verb roots.

Table 5.5: Tone patterns in verb roots in Ajumbu

	Tonal	Monosyllabic	Disyllabic	Trisyllabic	Quadrisyllabic
a .	H	bó ‘jump’ NCS ɟá ‘split wood’ NCS	gú.fǎ ‘ride’ AS lé:.sǎ ‘cheat’ CGA	mǎ.ɲǎ.nǎ ‘raise’ KS dú.ɟá.wé ‘respond’ AS	-----
b .	M	v ^w ɔ ‘plait’ KS k ^j ɛ̃ɲ ‘rear’ AS	gwā.sǎ ‘buy’ AS ɲǎ.nǎ ‘stand up’ CGA	-----	-----
c .	H L	kô ‘fry’ CGA zô ‘read’ NCS	vók.nǎ ‘imprison’ NCS bǎɲ.nǎ ‘rule’ AS	-----	túkǎbúlǎ ‘stammer’ CGA
d.	M H	-----	māɲ.sǎ ‘manage’ NCS	rē:.sǎ.kǎ ‘be dizzy’ AS	-----

			nāŋ.tó ‘stretch arms’ NCS		
e .	HL H	-----	nâ:.số ‘yawn’ AS f ^h ŷ.số ‘stir’ NCS	bâ:.vú.kố ‘be ugly’ CGA	-----
f.	HM H	-----	gā:.số ‘reduce’ AS tsǎ.số ‘hang’ CGA	-----	-----
g.	L	ŋ ^w ố ‘bathe’ AS dzìŋ ‘stay’ AS	-----	-----	-----
h.	L H	k ^j ěŋ ‘hock’ AS bě ‘exit’ CGA	tù.món ‘rest’ CGA nsà?.nố ‘debate’ KS	mèŋ.jí.lố ‘hang off’ NCS	-----
i.	LM H	-----	sě:.lố ‘pluck broom’ KS bă:.nố ‘dance on toes’ AS	-----	-----
j.	LH H	-----	ndĩŋ.số ‘level’ AS măŋ.số ‘breastfeed’ NCS	sǎ.tá.fố ‘scatter’ CGA	-----

k.	L M	nũ: ‘see’ NCS mũ: ‘swell’ AS	-----	-----	-----
l.	M L	-----	tsāmtə ‘help’ AS tʃōmtə ‘incantate’ AS	-----	-----
m.	H L H	-----	-----	ǰá.nə.kə ‘turn around’ AS	-----
n.	HL L H	-----	-----	lāʔ.sə.kə ‘wander about’ CGA nô:.bà.fə ‘miscarriage’ NCS	-----

kp	-	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	+	-	+	-
gb	-	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	+	-
ɥ	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	+	-
j	+	+	-	-	-	-	+	+	+	-	-	-	-	-	-	-	+	-	+	-
w	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	+	-	+	-

From table 4.6, it is observed that almost none of the consonant phonemes combines with the 21 vowel phonemes exception made from /b/ which combines with 19 vowels followed by /l/ which combines with 16 vowels. Labio-palatalised and palatalised segments don't combine with /e/ in Ajumbu. Palatalised consonants don't combine with round vowels except /y/ and /u/. Vowels /a, u, ə and ɔ/ are the most combinative vowels.

5.2.1.2 C₁ + V + C₂ type

This section lays emphasis on the different possible combinations within syllable comprising an onset (C₁), a nucleus (V) and a coda (C₂). The first table presents the combination of consonant phonemes at C₁ and C₂ positions. The second table presents vowels that admit a C₂ consonant

5.2.1.2.1 C₁ + C₂

The table below shows possible combinations in CVC syllable type in Ajumbu. Only consonants that occur with another consonant as coda within a C₁ + V + C₂ syllable have been inventoried as C₁.

Table 5.7: Possible combinations of C₁ + C₂ in CVC syllable type in Ajumbu

C ₁ \ C ₂	p	m	n	ɲ	ŋ	s	k	j
b	+		+	+	+			+
m		+		+	+			
f		+	+	+	+			
v							+	
s		+		+	+			
t		+		+	+	+		
t ^ɥ					+			
d		+			+			+
n			+			+		
n ^ɥ					+			
z			+	+				+

l		+			+	+		
ts					+			
dʒ			+		+			
tʃ		+						
ɲ		+	+		+			
j		+			+			
k				+	+			
g					+			
ɣ					+			
kp					+			
w		+	+	+	+			

A keen look at Table 4.7 reveals that the C₂ slot is occupied by 9 consonants exclusively out of 95 in Ajumbu, namely /p, m, n, ɲ, ŋ, ʔ, s, j, and p/. It is also observed that the nasal consonant phoneme /n and ɲ / are more frequent than others, /ŋ/ being the most frequent consonant at C₂ position.

5.2.1.2.2 -V + C₂

The table below summarises the possible combination between a nucleus and a coda in Ajumbu.

Table 5.8: Possible combinations between a nucleus and a coda in CVC Syllables.

C ₁ \ C ₂	p	m	n	ɲ	ŋ	s	k	j
i			+		+			
ɪ			+		+			
ĩ					+			
u			+		+	+		
e			+					
o					+			
ɛ			+	+	+			
ɔ		+			+			+
ə		+			+	+		
a	+	+	+	+	+	+	+	

Table 4.8 reveals that long vowels in Ajumbu do not admit a C₂ consonant. Nearly all short vowels accept a coda except /u/ and /y/. Vowel /a/ is the most combinable vowel in Ajumbu as it admits a diversity of consonants as coda.

5.2.2 Syllable Combinations in Dissyllabic Words

This section examines the possible combinations of monosyllabic to form dissyllabic words in Ajumbu.

Table 5.9: Possible combinations of syllables to form disyllables.

$\sigma_2 \backslash \sigma_1$	CV	CVC
CV	+	+
CVC	+	+

5.2.3. $V^1 + V^2$

The common dissyllabic structures in Ajumbu are CV.CV, CVC.VC and CV.CVC. Despite its existence, the CVC.CVC syllable type is very uncommon in Ajumbu.

Leaving out consonant phonemes $V_1 + V_2$ can be examined as illustrated below.

Table 5.10: Possible Combinations between $V_1 + V_2$ in Disyllables

$V_2 \backslash V_1$	i	y	ɨ	ʉ	u	u:	e:	o	o:	ɛ	ɛ:	ə	ə:	ɔ	a	a:
i	+	+								+		+				
ɨ		+														
u					+										+	
o								+								
e														+		+
ə	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+
ɛ											+					
ɔ														+		
a															+	+

It is observed in Table 4.10 that vowels /ɪ, e, ɔ: and i:/ do not occur in dissyllabic words.

Vowel /ə/ occurs the most at the V_2 slot in Ajumbu.

5.2.3 Combination of Syllables in Trisyllabic words

Possible combinations in words comprised of three syllables are shown below.

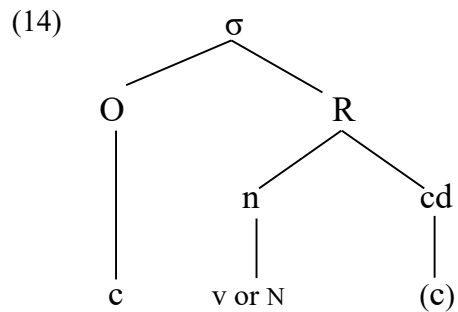
Table 5.11: Possible Combinations in Trisyllabic words

$\sigma_1 \backslash \sigma_2 + \sigma_3$	CV.CV	CV.CVC	CVC.CV
CV	+	+	+
CVC	+	+	+

Among all the six possible combinations illustrated in Table 4.11, the most widespread in Ajumbu is the CV.CV.CV syllable type.

Conclusion

From on the ongoing argumentation, the canonical structure of the syllable in Ajumbu can be depicted as in (14).



As illustrated in (14), in Ajumbu, when dealing with noun and verb roots, the syllable comprises an obligatory onset, followed a nucleus, and an optional coda. The nucleus can be vowel or a nasal consonant. It should be noted that when the nucleus slot is occupied by a nasal consonant, any other element is bound to occupy the onset and coda positions. This being done, the next chapter will study the phonological processes that occur in Ajumbu.

CHAPTER SIX: PHONOLOGICAL PROCESSES

The previous chapter discussed the syllable and described the different structures that are found in Ajumbu. *Phonological processes are situations that happen in speech sound and affect them during articulation. The affected sound reveals changes in place of articulation, manner of articulation and or voicing* (Mndeme & Ligembe 2022: 41). The present chapter studies the different segmental and autosegmental processes encountered within both verb and noun roots in Ajumbu.

6.1 Consonants

Consonants in Ajumbu undergo the following phonological processes.

5.1.1 Assimilatory Processes

Assimilation is *a phonological process where one sound changes to become more like some other sound in its environment* (Katamba 1989:36). Assimilation can be classified based on the following factors.

a) Direction of Influence

Assimilation is said to be regressive if the direction of influence comes from the left side of the resultant consonant and it is said to be progressive if it comes from the right side. That is, assimilation is regressive when a sound is influenced by the preceding sound and progressive when the influence comes from the following sound.

b) Degree of Influence

Assimilation in its application can be partial or total. Assimilation is said to be total when the resultant sound is completely identical to the sound that influences it, and partial when the resultant sound simply copy some features of the sound that triggers assimilation. The different types of assimilation found in Ajumbu are examined in the following sub-sections.

6.1.1.1 Hormorganic Nasal Assimilation (HNA)

Crystal (2008:231) says *homorganic is a general term in phonetic classification of speech sounds which are produced at the same place of articulation*. HNA is a process in which a nasal consonant copies the place of articulation of the following sound. This process operates as a word formation process in Ajumbu. The nasal is close enough to the stop for assimilation to occur. The examples below illustrate homorganic nasal assimilation in Ajumbu.

- (1)
- | | | | |
|---------|---------|---------------|-----|
| N + bí | → mbí | ‘world’ | CGA |
| N + fá: | → mfá: | ‘slave’ | KS |
| N + tú | → ntú | ‘enthroned’ | NCS |
| N + ʒí | → nʒí | ‘buffalo’ | NJS |
| N + kú | → ŋkú | ‘chief’ | KS |
| N + gb | → ŋmgbó | ‘grasshopper’ | NRN |

It is observed in (1) that the nasal [N] assimilates the point of articulation of the following consonants. It becomes [m] after bilabials, [ŋ] after labio-dentals, [n] after alveolars, [ɲ] after palatals, [ŋ] after velars, and [ŋm] after labio-velars. The homorganic nasal assimilation rule display in (1) can be formalised as in (2).

$$(2) \quad R_{HNA} : \left(\begin{array}{c} + \text{ cons} \\ + \text{ nas} \end{array} \right) \longrightarrow \left[\begin{array}{c} \alpha \text{ place} \end{array} \right] / - \left(\begin{array}{c} + \text{ cons} \\ \alpha \text{ place} \end{array} \right)$$

The application of the nasal homorganic assimilation rule (R_{HNA}) in (2) is illustrated by the following derivation.

(3) **Derivation**

	mbí	ntú
UR /	N-bí	N-tú /
R_{HNA} :	m-bí	n-tú
PR [	mbí	ntú]

6.1.1.2 Palatalisation of the Alveolar Nasal (PAN)

Palatalisation occurs when a non-palatal consonant changes its place of articulation to the hard palate due to the influence of a high front vowel like [i] or a palatal glide like [j]. In Ajumbu, the alveolar nasal [n] changes to [ɲ] when it is immediately preceded by the high front unrounded tensed vowel [i] at word final position or syllable coda.

Examples include:

(4)	Phonetic Form	Underlying Form	Gloss	CNC
	[tájɲ]	/ táijɲ/	‘deny’	NCS
	[bájɲ]	/ báijɲ/	‘fold arms’	NCS
	[ɲójɲ]	/ níójɲ/	‘bird’	KS

The palatalisation of the alveolar nasal rule (R_{PAN}) can be formalised as in (5).

$$(5) \quad R_{PAN}: \begin{pmatrix} + \text{cons} \\ + \text{nas} \\ + \text{cor} \\ + \text{ant} \end{pmatrix} \longrightarrow \left[- \text{ant} \right] / \text{---} \begin{pmatrix} + \text{syll} \\ + \text{hi} \\ + \text{ATR} \\ - \text{rd} \\ - \text{bk} \end{pmatrix} \begin{pmatrix} + \text{cons} \\ - \text{hi} \\ - \text{ATR} \end{pmatrix}$$

The derivation in (6) exemplifies the application of the palatalisation of the alveolar nasal rule (R_{PAN}) in Ajumbu.

(6) **Derivation**

	taɲ	báɲ	ɲáɲ
UR /	táin	báin	/
R_{PAN} :	ɲ	ɲ	ɲ
PR [	ɲǎ	ɲǎ	ɲó]

6.1.3 Alveolarisation (ALV)

Alveolarisation refers to a phonological process whereby a non-alveolar consonant shifts its place of articulation from elsewhere in the vocal tract to the alveolar ridge. This process is observed in Ajumbu when the durative marker [-kə] is adjoined to some verb roots. The onset of the verb root changes from a non alveolar consonant to an alveolar consonant retaining the voicing feature of the input consonant as illustrated below in examples (10).

(7)	Durative	Gloss	Verb root	Gloss	CNC
	də-kə	‘crying’	gʲə	‘cry’	AS
	sə-kə	‘telling’	ʃə	‘tell’	NCS

In example (a) above, the vowel [i] devocalizes and deletes before the alveolarisation rule is applied.

The alveolarisation rule in Ajumbu is formalised as in (8).

$$(8) \quad R_{ALV}: \begin{pmatrix} + \text{cons} \\ + \text{nas} \\ - \text{ant} \end{pmatrix} \longrightarrow \left[\begin{pmatrix} + \text{ant} \\ + \text{cor} \end{pmatrix} \right] / \# \text{---}$$

The derivation in (9) illustrates the application of the fronting rule (R_{ALV}) in Ajumbu.

- (9)
- | | |
|-------------|-------------|
| | $sókə$ |
| UR | / $ʃə-kə$ / |
| R_{ALV} : | $sə-kə$ |
| PR | [$sókə$] |

6.1.4 Spirantisation (SPIR)

This is a lenition process where stops become fricatives. A change in the manner of articulation from a complete closure followed by explosion to a narrow closure which allows air to pass by friction occurs. This process is frequent in the consultant NRN's speech. Before spirantisation takes place, there is a permutation (R_{PER}) between the root and the affix. The prefix moves to the right side of the root and becomes a suffix. Then, there is total harmony between the vowel of the root and that of the suffix. Afterwards, it is observed that the consonant [b] is now found in an intervocalic position which favors less obstruction therefore [b] changes to [β] as illustrated in (10).

- (10)
- | | | | | |
|-------------|----------------|---------------|-------|------------|
| Plural form | Gloss | Singular form | Gloss | CNC |
| / $bə-ǃá$ / | → [$ǃá -βá$] | 'faces' | $ǃá$ | 'face' NRN |

The spirantisation rule (R_{SPIR}) is formalised as follow.

- (11)
- $$R_{SPIR} : \left(\begin{array}{c} + \text{ cons} \\ + \text{ vd} \\ - \text{ cont} \\ - \text{ ant} \\ - \text{ cor} \end{array} \right) \Rightarrow \left[+ \text{ cont} \right] / \left(\begin{array}{c} + \text{ syll} \\ + \text{ low} \\ - \text{ ATR} \end{array} \right) - \left(\begin{array}{c} + \text{ syll} \\ + \text{ low} \\ - \text{ ATR} \end{array} \right)$$

The permutation rule (R_{PER}) is formalised as follow.

- (12) $R_{PER} : \sigma_1. \sigma_2 \longrightarrow \sigma_2. \sigma_1$

The derivation in (13) illustrates the application of the fronting rule (R_{SPIR}) in Ajumbu.

- (13)
- | | |
|-------------------|-----------|
| | ǃá-ǃá |
| UR | / bǃ-ǃá / |
| R _{PER} | : ǃá-bǃ |
| R _{VH} | : ǃá-bá |
| R _{SPIR} | : β |
| PR | [ǃáβá] |

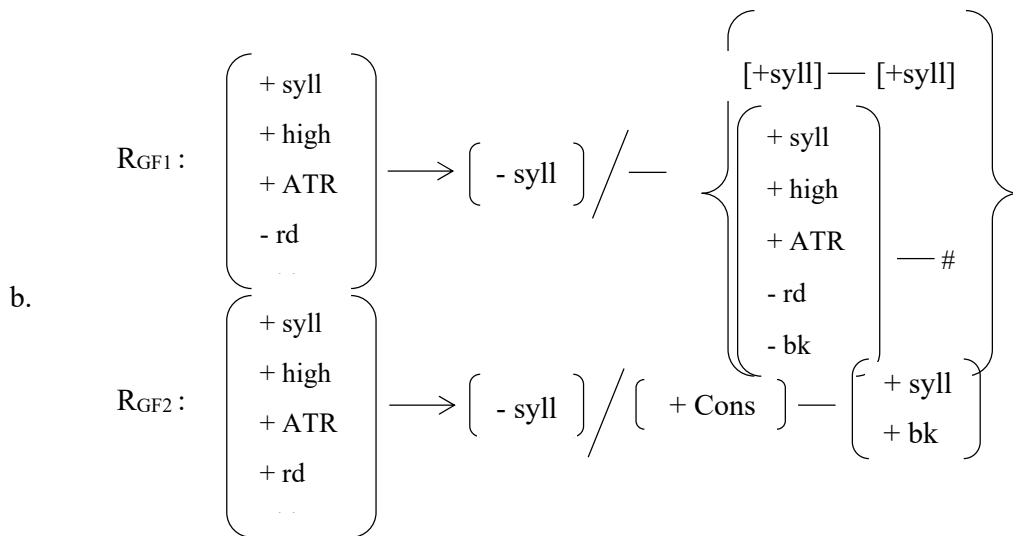
6.1.5 Glide Formation (GF)

Glide Formation is a phonological process which has the effect of changing high vowels into glides during the articulation of some words with these sounds (Mndeme & Ligembe 2022: 45). Gliding is attested in Ajumbu because this language doesn't permit the occurrence of vowel clusters. The examples below illustrate devocalisation in Ajumbu.

(14)	Phonetic Form	Underlying Form	Gloss	CNC
a.	[kʲǃ]	/kǃǃ/	'stone'	CGA
b.	[fɥó]	/fýó/	'meat'	NJS
c.	[fʷánǃ]	/fúánǃ/	'think'	AS
d.	[záj]	/záí/	'tooth'	NJS

The data in (14) show that high vowels [i], [y], and [u] in Ajumbu, when followed by another vowel be it high or low, devocalize at root initial, middle and final positions to form glides [j] (14a and e), [ɥ] (14b and d), and [w] (14c) respectively as illustrated by rules in (18).

(15) a.



c.

$$R_{GF3} : \begin{pmatrix} + \text{syll} \\ + \text{high} \\ + \text{ATR} \\ + \text{rd} \\ - \text{bk} \end{pmatrix} \rightarrow \left[\begin{pmatrix} - \text{syll} \end{pmatrix} \right] / \left[\begin{pmatrix} + \text{Cons} \end{pmatrix} \right] - \begin{pmatrix} + \text{syll} \\ + \text{bk} \\ + \text{ATR} \\ - \text{rd} \\ \dots \end{pmatrix}$$

The derivation in (16) exemplifies the application of glide formation (GF) rules in Ajumbu.

(16) **Derivation**

	kʲú	kʷé	kɥó
UR /	kíú	kúé	kýió /
R _{GF} :	j	w	ɥ
PR [	kʲú	kʷé	kɥó]

6.1.6 Voicing (VD)

Voicing describes a phonological process whereby voiceless segments become voiced in certain environments. This process is very rare in Ajumbu. It is observed in (17), the only example found so far.

(17)	Plural Form	Singular form	Gloss	CNC
	/ tá-s-má/ → [tázé-má]	tás	‘fist’	CGA

In the example above, after the adjunction of the plural suffix [má], the central mid vowel [ə] is inserted (R_{V_{al}}) at morpheme boundary to avoid consonants cluster and facilitate pronunciation. As a consequence, the root coda [s] becomes [z].

The voicing rule (R_{VD}) in (17) can be formalized as in (18).

$$(18) \quad R_{VD} : \begin{pmatrix} + \text{cons} \\ + \text{ant} \\ + \text{cor} \\ - \text{vd} \\ + \text{cont} \end{pmatrix} \rightarrow \left[\begin{pmatrix} + \text{vd} \end{pmatrix} \right] / \left[\begin{pmatrix} + \text{syll} \end{pmatrix} \right] - \left[\begin{pmatrix} + \text{syll} \end{pmatrix} \right]$$

Vowel [ə] insertion rule (R_{V_{al}}) can be formalized as in (19).

$$(19) \quad (R_{Val}): \quad \emptyset \rightarrow \left(\begin{array}{c} + \text{syll} \\ + \text{bk} \\ - \text{rd} \\ - \text{lo} \end{array} \right) / \left(\begin{array}{c} + \text{cons} \\ - \text{vd} \end{array} \right) + \text{---} \left(\begin{array}{c} + \text{cons} \\ + \text{vd} \end{array} \right)$$

The derivation in (20) exemplifies the application of the voicing (R_{VD}) and [ə] insertion rules in Ajumbu.

$$(20) \quad \begin{array}{ll} & \text{tázə-ma} \\ \text{UR} & / \text{tás-má} / \\ \text{R } R_{Val}: & \text{tásə-má} \\ \text{R}_{VD}: & \text{z} \\ \text{PR} & [\text{tázəma}] \end{array}$$

6.1.7 Aspiration (AS)

Aspiration is a strong burst of breath that accompanies the release or closure of some obstruents (Mndeme & Ligembe 2022: 49). In Ajumbu, aspiration usually occurs during the articulation of the voiceless bilabial stop [p] and its prenasal counterpart [mp] at word initial position as illustrated in example (21).

(21)	Phonetic Form	Underlying Form	Gloss	CNC
	[p ^h ú]	/pú/	‘woven dish’	CGA
	[p ^h ú]	/pú/	‘trough’	CGA
	[p ^{hw} ó]	/puó/	‘sweat’	NRN
	[mp ^h úfə]	/m̃.púfə/	‘huckle berry’	KS

The aspiration rule (R_{AS}) in (21) can be formalised as in (22) below.

$$(22) \quad R_{AS}: \left(\begin{array}{c} + \text{cons} \\ - \text{vd} \\ - \text{cont} \\ + \text{ant} \\ - \text{cor} \end{array} \right) \Rightarrow \left(\begin{array}{c} + \text{sg} \end{array} \right) / \# \text{---} \left(\begin{array}{c} + \text{syll} \\ + \text{rd} \end{array} \right)$$

The derivation in (23) exemplifies the application of the aspiration rule (R_{AS}) in Ajumbu.

(23)

		p ^h ú		p ^h ú	
UR	/	pú		p ^h ú	/
R _{AS} :		p ^h		p ^h	
PR	[	p ^h ú		p ^h ú	]

6.2 Vowels

Vowels, likewise consonants, also undergo phonological processes in Ajumbu. Generally speaking, Ajumbu distinguishes three major types of phonological processes in relation to vowels: assimilation, harmony, and lengthening.

6.2.1 Assimilatory Processes

Vowel assimilation is observed within verbal forms in the durative aspect. The following assimilatory processes are attested in Ajumbu.

6.2.1.1 Backing (Bk)

Backing refers to the phonological process whereby a central unrounded low vowel becomes a back rounded mid-opened vowel. In Ajumbu, when the verb root associates with the durative marker, the root's vowel [a] changes to [ɔ] in a velar context. Consider the examples below paying attention to the roots vowels in the durative form.

(24)	Durative	Gloss	verb	Gloss	CNC
a.	tɔ:kə	'counting'	tánɲ	'count'	NCS
b.	mɔ:kə	'rainfalling'	mâ:	'fall (rain)'	AS
c.	ɣɔ:kə	'incisting'	ɣánɲ	'incist'	NCS
d.	gɔ:kə	'slicing'	gánɲ	'slice'	KS

It is observed from the data in (24) that, when the durative affix is adjoined to the verb root, the verb root vowel [a] turns to the back lax mid-low rounded vowel [ɔ] in close syllables ending with the velar nasal [ɲ] (24a)-(24c)-(24d), and in an open syllable like in (24b). It is equally noticed in (24a)-(24c)-(24d) that the roots final velar nasal [ɲ] deletes at morpheme boundary when followed by the durative marker. The deletion of the valar nasal certainly occurs to avoid a cluster of velar sounds at morpheme boundary. Two additional processes

observed in (24) are, vowel lengthening (see 6.2.3 also) and nasal deletion. The backing rule (R_{BK}), the lengthening rule (R_{LENG}) and nasal deletion rule (R_{NDEL1}) are formalised as follow.

(25)

$$R_{BK} : \begin{pmatrix} + \text{syll} \\ + \text{bk} \\ - \text{ATR} \\ + \text{lo} \end{pmatrix} \Rightarrow \begin{pmatrix} + \text{rd} \\ - \text{hi} \\ - \text{lo} \end{pmatrix} / \text{---} \left\{ \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ + \text{nas} \end{pmatrix} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ - \text{vd} \end{pmatrix} \right\}$$

(26)

$$R_{LENG} : \begin{pmatrix} + \text{syll} \\ + \text{bk} \\ - \text{ATR} \\ - \text{lo} \\ + \text{rd} \end{pmatrix} \Rightarrow \begin{pmatrix} + \text{long} \end{pmatrix} / \text{---} \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ + \text{nas} \end{pmatrix} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ - \text{vd} \end{pmatrix}$$

(27)

$$R_{NDEL1} : \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ + \text{nas} \end{pmatrix} \Rightarrow \emptyset / \text{---} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ - \text{vd} \end{pmatrix}$$

The derivation in (28) exemplifies the application of the backing (R_{BK}), lengthening (R_{LENG}), and nasal deletion (R_{NDEL1}) rules in Ajumbu.

(28) **Derivation**

	gò:kə	tò:kə	ɣò:kə
UR /	gájŋ	tájŋ	ɣájŋ /
R_{BK} :	gòŋkə	tòŋkə	ɣòŋkə
R_{NDEL1} :	gò-kə	tò-kə	ɣò-kə
R_{LENG} :	ɔ:	ɔ:	ɔ:
PR [	gò:kə	tò:kə	ɣò:kə]

6.2.1.2 Fronting (FR)

Fronting, in Ajumbu, refers to a phonological process occurring within verbal roots ending in a palatal nasal to which is adjoined the durative aspect marker -kə̀. The addition of the durative affix triggers the root central low lax unrounded vowel [a] to turn to [ɛ], contrarily to the cases in (24) where in a velar environment the root vowel rather turns to [ɔ].

(29)	Durative	Gloss	verb	Gloss	CNC
	tɛ:kə̀	‘denying’	táɲ	‘deny’	NCS
	tɛ:kə̀	‘fearing’	fáɲ	‘fear’	AS
	sɛ:kə̀	‘disappearing’	sáɲ	‘disappear’	KS

As in (24), two additional processes are equally observed in (32), vowel lengthening and nasal deletion. The fronting rule (R_{FR}), and nasal deletion rule (R_{NDEL2}) are formalised as follow.

$$(30) \quad R_{FR} : \begin{pmatrix} + \text{syll} \\ + \text{bk} \\ - \text{ATR} \\ + \text{low} \end{pmatrix} \rightarrow \begin{pmatrix} - \text{rd} \\ - \text{hi} \\ - \text{lo} \\ - \text{bk} \end{pmatrix} / \text{---} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ \cdot \end{pmatrix}$$

$$(31) \quad R_{LENG} : \begin{pmatrix} + \text{syll} \\ - \text{bk} \\ - \text{ATR} \\ - \text{lo} \\ - \text{hi} \end{pmatrix} \rightarrow \left[+ \text{long} \right] / \text{---} \begin{pmatrix} - \text{ant} \\ + \text{cor} \\ + \text{nas} \end{pmatrix} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ - \text{vd} \end{pmatrix}$$

$$(32) \quad R_{NDEL2} : \begin{pmatrix} - \text{ant} \\ + \text{cor} \\ + \text{nas} \\ + \text{cor} \end{pmatrix} \rightarrow \emptyset / \text{---} + \begin{pmatrix} - \text{ant} \\ - \text{cor} \\ - \text{nas} \\ - \text{vd} \end{pmatrix}$$

The derivation in (33) exemplifies the application of the backing (R_{FR}), lengthening (R_{LENG}), and nasal deletion (R_{NDEL2}) rules in Ajumbu.

(33) **Derivation**

	tè:kà	fè:kà	sè:kà
UR /	tájɲ	fájɲ	sájɲ /
R _{FR} :	tɛɲkà	fɛɲkà	sɛɲkà
R _{NDEL2} :	tɛ-kà	fɛ-kà	sɛ-kà
R _{LENG} :	ɛ:	ɛ:	ɛ:
PR [	tè:kà	fè:kà	sè:kà]

6.2.2 Vowel Harmony (VH)

Vowel harmony refers to a type of assimilation taking place within a word or a phrase whereby the governing vowel constrains the other vowels within the same domain to share some phonological features. The most frequent harmony pattern in Ajumbu is the [αFeature] Harmony-like type.

In Ajumbu, [αFeature] harmony refers to a phonological process taking place within a domain, be it in a noun or in a compound noun, whereby the vowel of an affix, of a root or one of the compound nouns constrains the root vowels or other vowels in the domain to be identical and agree in one or more features with it. Consider the examples in (36) paying attention to the quality of vowels.

(34) a. Noun derivation/noun

	Derived noun	Gloss	source	CNC
i.	ɲùbíʒí	‘blackman’	ɲù-bá-ʒí man-ASS-black	NRN
ii.	fíʃé	‘ash’	fɛ-ʃé NCL-ash	KS
iii.	b ^w ômtsô	‘rainy season’	b ^w ê-mtsô rain-season	NRN

b. Plural formation

	Plural form	Singular form	Gloss	CNC
i.	á-nsáná	nsàné	‘friend’	NRN
ii.	ká-ɲg ^w óné	ɲg ^w óné	‘pig’	KS

In (34ai), the high back tensed rounded vowel [u] of the noun root ɲù ‘man’ when associated to the adjective ʒí ‘black’ constrains the vowel associative marker bó to totally assimilate the features of the following vowel becoming [i], and agreeing with the former vowel in heightness and tenseness.

In (34aii), taking into consideration that palatalised consonant [C^j] are /Ci/ in the underlying representation in Ajumbu, the root high front tensed unrounded vowel [i] turns the singular noun class prefix [ə] to [i] and the root final vowel [ɛ] to [i]. An additional rule is seen in (36aii). The root-final vowel, the front mid-low lax unrounded vowel [ɛ] agrees in tenseness with the other vowels of its domain and turns to [e], this is known as [αATR] harmony (see 38).

In (34aiii), the noun root mtsô ‘season’ back mid-high tensed rounded vowel [o] constrains the preceding noun root front mid-low lax unrounded vowel [ɛ] to totally copy its features becoming [o].

In some very few words in Ajumbu, the noun class plural markers triggers the noun root vowels to be identical to theirs as illustrated in (34b). The vowel harmony rule (R_{VH}) is formalised as in (35).

$$(35) \quad R_{[\alpha F]VH} : \begin{pmatrix} + \text{syll} \\ \alpha \text{ hi} \end{pmatrix} \rightarrow \begin{pmatrix} \alpha F \end{pmatrix} / \begin{pmatrix} \begin{pmatrix} + \text{hi} \\ + \text{ATR} \end{pmatrix} + \text{---} + \begin{pmatrix} \alpha F \end{pmatrix} \\ \text{---} + \begin{pmatrix} \alpha F \end{pmatrix} \\ \begin{pmatrix} - \text{hi} \\ - \text{ATR} \end{pmatrix} + \left\{ \begin{array}{l} [\alpha F]_1 \text{---}_2 \\ \text{---}_1 [\alpha F]_2 \end{array} \right\} \end{pmatrix}$$

$$(36) \quad R_{[\alpha \text{ ATR}]VH}: \begin{pmatrix} + \text{syll} \\ - \text{hi} \end{pmatrix} \rightarrow \left[\begin{array}{c} \alpha \text{ ATR} \end{array} \right] / \left[\begin{array}{c} \alpha \text{ ATR} \end{array} \right] \text{ — } \text{ — }$$

The derivation in (37) exemplifies the application of the $[\alpha \text{ ATR}]$ ($R_{[\alpha \text{ ATR}]VH}$) and $[\alpha \text{ Feature}]$ ($R_{[\alpha \text{ F}]VH}$) vowel harmony rules in Ajumbu. For the glide formation rule (R_{GF1}), see section 6.1.5 (18a).

(37) **Derivation**

	fí-ǰié	b ^w ômtsô
UR /	fǎ-ǰiǎ	b ^w êmtsó /
$R_{[\alpha \text{ F}]VH}$:	fí-ǰiǎ	b ^w ômtsô
R_{GF1} :	j	
$R_{[\alpha \text{ ATR}]VH}$:	é	
PR [	fí-ǰié	b ^w ômtsô]

6.2.3 Vowel lengthening

This is a phonological process whereby short vowels become long triggered by the context. It is observed, in examples in (38), that the vowels of the singular noun roots that form their plural by the circumfixation of kǎ- ... -lǎ become long in the plural form.

(38)	Plural form	singular form	Gloss	CNNC
	kǎ-v ^w ǎ:-lǎ	v ^w ǎ	‘house’	AS
	kǎ-tsí:-lǎ	tsín	‘arm’	
	kǎ-f ^u ó:-lǎ	f ^u ó	‘meat’	NJS
	kǎ-kú:-lǎ	kú	‘head’	CGA
	kǎ-d ^w á:m-ǎ	d ^w ám	‘back’	KS
	kǎ-k ^w ǎ:-lǎ	k ^w ǎ	‘belly’	
	kǎ-dzá:-lǎ	dzán	‘rattle’	

The vowel lengthening rule (R_{VL}) is formalised as follows.

$$(39) \quad R_{VL}: \begin{pmatrix} + \text{syll} \\ - \text{long} \end{pmatrix} \rightarrow \left[\begin{array}{c} + \text{long} \end{array} \right] / \left[\begin{array}{c} + \text{syll} \end{array} \right] + C_0 \text{ — } C_0 + \left[\begin{array}{c} + \text{cons} \end{array} \right]$$

The derivation in (40) exemplifies the application of the vowel lengthening rule (R_{VL}) in Ajumbu.

(40) **Derivation**

		kǎ-v ^w ǎ:-lǎ	kǎ-k ^w ǎ:-lǎ	kǎ-f ^u ó:-lǎ
UR	/	kǎ-v ^w ǎ:-lǎ	kǎ-k ^w ǎ:-lǎ	kǎ-f ^u ó:-lǎ /
R _{VL}		ɔ:	ɔ:	o:
PR	[	kǎv ^w ǎ:lǎ	kǎk ^w ǎ:lǎ	kǎf ^u ó:lǎ]

6.3 Syllables

Phonological processes associated with syllables in Ajumbu include truncation and reduplication.

6.3.1 Truncation

Truncation refers to a process that consists of reducing one or more segments of a word or morpheme (Benua 1995: 77) mostly for euphonic purposes. Two major types of word reduction were observed during data collection. Ajumbu speakers truncate some roots beginning with the velar nasal [ŋ] and some words ending in the central mid lax unrounded vowel [ə].

6.3.1.1 Truncation of the Velar Nasal (TVN)

Some words in Ajumbu are pronounced with the velar nasal truncated at word-initial and/or final position. As earlier stated, truncation mostly takes place in Ajumbu for euphonic purposes, that is to ease pronunciation especially during oral communication. The truncation of the velar nasal is context-free.

(41)	Truncated forms	Source forms	Gloss	CNC
	ùb ^j ǎ	ŋùb ^j ǎŋ	‘red man’	NRN
	ùk ^j ǎlǎ	ŋùk ^j ǎlǎ	‘elder’	CGA

The truncation of the Velar Nasal rule (R_{TVN}) is formalised as in (44).

$$(42) \quad R_{TVN} : \left(\begin{array}{c} - \text{ant} \\ - \text{cor} \\ + \text{nas} \end{array} \right) \rightarrow \emptyset / \left\{ \begin{array}{c} \# \text{ —} \\ \text{ —} \# \end{array} \right\}$$

The derivation in (43) exemplifies the application of the truncation of the velar nasal rule (R_{TVN}) in Ajumbu.

(43)

		ùbʲǎ	ùkʲâlǎ
UR	/	ɲù-biǎɲ	ɲù-kíâlǎ /
R_{TVN}		ù-biǎ	ù-kíâlǎ
R_{GF}		ù-bʲǎ	ù-kʲâlǎ
PR	[	ùbʲǎ	ùkʲâlǎ]

6.3.1.2 Truncation of Vowel [ə] ($TVə$)

The central mid lax unrounded vowel [ə] is truncated at word final position when preceded by the bilabial nasal [m]. It is also observed in (46) that the root vowel is shortened.

(44)

Truncated forms	Source forms	Gloss	CNC
lám	lá:mǎ	‘tongue’	NJS
wám	wá:mǎ	‘swing’	CGA
fám	fá:mǎ	‘beg’	AS

The rules illustrating the truncation of vowel [ə] ($R_{TVə}$) and the root vowel shortening (R_{VS}) are formalised as in (45) and (46).

(45)

$$R_{TVə}: \left(\begin{array}{c} + \text{syll} \\ + \text{bk} \\ - \text{rd} \\ - \text{lo} \\ - \text{ATR} \end{array} \right) \longrightarrow \emptyset / \left(\begin{array}{c} + \text{ant} \\ - \text{cor} \\ + \text{nas} \end{array} \right) \text{ — } \#$$

(46)

$$R_{VS}: \left(\begin{array}{c} + \text{syll} \\ + \text{low} \\ + \text{long} \end{array} \right) \longrightarrow [-\text{long}] / \text{ — } \left(\begin{array}{c} + \text{ant} \\ + \text{nas} \\ - \text{cor} \end{array} \right)$$

The derivation in (47) exemplifies the application of the truncation of vowel [ə] ($R_{TVə}$) and vowel shortening (R_{VS}) rules in Ajumbu.

(47) **Derivation**

		lám	fám	wám
UR	/	lá:mó	fá:mó	uá:mó /
R _{GF}				wá:mó
R _{TVø}		lá:m	fá:m	wá:m
R _{VS}		a	a	a
PR	[	lám	fám	wám]

6.3.2 Reduplication

Reduplication is a type of word formation – in the broad sense, including both derivation and inflection – in which the phonological form of the reduplicant is determined in whole (Total reduplication) or in part (partial reduplication) by the phonological form of the base to which it adjoins (Wiltshire & Marantz 2000: 557).

Phonologically, reduplication is the repetition of vowels, consonants or prosodic units such as syllables, tones. From a purely formal perspective, two major types of reduplication are distinguished in Ajumbu: total vs. partial reduplication.

6.3.2.1 Total Reduplication

Total reduplication refers to the process consisting of copying totally the segments of a root and attaching it to the same root for grammatical purposes. Some nouns in Ajumbu are clear cases of total reduplication even if the source word from which they have or could have been derived were not found at this level of the study.

(48)	Reduplicated Forms	Gloss	Source	Glossary	CNC
	fífí	‘cockroach’	fí	‘pay fine’	KS
	ntántáŋ	‘box’	ntá	‘ground’	NRN
	gbágbá	‘duck’	gbá	‘fall’	AS
	búbú	‘pawpaw’	bú	‘lazy’	NCS

6.3.2.2 Partial reduplication

Unlike total reduplication where the entire root is copied (see example 48), partial reduplication copies only a portion of the root attaching it to the same root for grammatical purposes. The shape of the partially reduplicated portion of the stem is not always constant as illustrated in (49). It is observed in (49) that the shape of the partially reduplicated syllable varies in Ajumbu. It is VC in (49a)-(49c), and CV in (49b)-(49d)-(49e). Furthermore, one can also observe that

the VC and CV shapes behave differently. The -VC reduplicant is suffixed whereas the CV-reduplicant is prefixed.

(49)	RED Forms	Gloss	CNC	Source	Gloss	CNC
a.	mbòlóló-óló	‘calf’	NRN	mbòlóló	‘cow’	KS
b.	kpà-kpáló	‘mat’	KS	kpá	‘a cough’	NRN
c.	tòlóló	‘peace plant’		tó	‘pillar’	
d.	ηkò-ηkólóló	‘dragon fly’	NJS			
e.	ηgù-ηgúlóló	‘faced pillar’	NRN			

6.1.3.3 Resyllabification (RS)

According to Odden (2005: 142) “*Resyllabification is a phonological rule that applies across morpheme or word boundaries to adjust the syllable structure of words so that they conform to the phonotactic rules of the language. It often results in a consonant that is in the coda of one syllable being reanalyzed as the onset of the following syllable*”. Some Ajumbu nouns in their singular forms take a prefixal homorganic nasal $\acute{N}$ - to form their plural forms. The prefixal nasal assimilates the point of articulation of the onset of the root (see 6.1.1.1 (2) for the homorganic nasal assimilation rule (R_{HNA})). After the prefixation process, the nasal merges with the root’s onset to constitute a prenasal consonant changing the syllabic structure of the the noun from $\acute{N}$.-CVC₀. σ_0 to NCVC₀. σ_0 as illustrated in (53).

(50)	singular	underlying plural form	surface plural form	Gloss	CNC
a.	fá-kpín	/m-kpín/	[ηmkpín]	‘tree’	CGA
b.	fá-bé:ló	/m-bé:ló/	[mbé:ló]	‘cutlass’	KS
c.	fá-kpán	/m-kpán/	[ηmkpán]	‘belt’	NRN

The rule illustrating the resyllabification of the homorganic nasal (R_{RSHN}) is seen in (54).

$$(51) \quad R_{RSHN}: \quad \acute{N}$$
.-CVC₀. $\sigma_0 \longrightarrow$ NCVC₀. σ_0

The derivation in (52) exemplifies the application of the resyllabification of the homorganic syllabic nasal rule (R_{RSM}).

(52)		ɲmkpáɲ	mbé:ló
UR	/	ń-kpáɲ	ń-bé:ló /
R_{RSHN} :		ɲm-kp	m-b
R_{RSM}		ɲmkp	mb
PR	[	ɲmkpáɲ	mbé:ló]

6.4 Some Tone Processes

Tone processes refer to tonal changes or variations conditioned by the environment of occurrence. Like segments, tones exhibit assimilatory, dissimilatory and deletion processes. These processes can be anticipatory or regressive in direction. Tone processes in Ajumbu include: Contourtone formation, tone copying, tone spreading, and tonepolarity.

6.4.1 Contour Tone Formation (CTF)

Contour tone formation involves the merging of two distinct level tones to form a contour tone. The following level tones merge in Ajumbu to form contour tones

(53)	L H Fusion	H L Fusion	L M Fusion	H M Fusion
	ɲ ^w ǒ	k ^h âɲ	mb ^h ǎɲ	k ^w ĩn
UR: /	ɲuo	kiaɲ	mbiaɲ	kyin /
	⋮	⋮	⋮	⋮
	LH	HL	LM	HM
R_{GFI} :				
	ɲwo	kjaɲ	mbjaɲ	kɥin
	LH	HL	LM	HM
R_{CTF} :				
	ɲ ^w o	k ^h ǎɲ	mb ^h ǎɲ	kɥin
	LH	HL	LM	HM

PR: [	ŋ ^w ǒ	k ^l âŋ	mb ^l ǎŋ	k ^ɥ ĩn]
	‘drink’ AS	‘separate’ NCS	‘wooden staff’ KS	‘wood’ KS

5.4.2 Tone Sandhi

This is a phonological process where a word’s original tone changes because of the tone of a surrounding word or affix. That is, either the tone of the root or that of the affix is changes because of the surrounding tones. Here tone pitches are raised or lowered depending on the environment of a high or a low tone.

In Ajumbu, most noun and verb roots with an underlying level tone once in a derived environment change, copy and bear the high or low tone of the affix as shown in (54).

(54)a.	surface plural form	underlying plural form	Noun	Gloss	CNC
L	kǎk ^w ǒlǎ	/kǎ-k ^w ǒlǎ/	k ^w ǒlǎ	‘rope’	NRN
roots	ǎŋgú?	/ǎ-ŋgù?/	ŋgù?	‘canoe’	KS
H & L	surface durative form	underlying durative form	Verb	Gloss	CNC
roots	gù:kǎ	/gū-kǎ/	gū	‘open eye’	CGA
	ǧù:kǎ	/ǧú-kǎ/	ǧú	‘add’	AS

6.4.3 Tone Spreading

Tone spreading refers to the phonological process where an underlying tone associated to a tone bearing unit propagates leftward or rightward and associates to one or more following or preceding tone bearing units. Tone spreading is done from left to right in Ajumbu that is rightward. The underlying tone of the root associates to the first tone bearing unit then spreads rightward and associates to the following available tone bearing units as illustrated in (55).

(55)	Underlying Representation	Tone spreading	Phonetic Representation	Gloss	CNC
	/ǧéŋfǎǧǎ?nó/	/ǧéŋfǎǧǎ?no/	/ǧéŋfǎǧǎ?no/	‘clitoris’	NRN
H					
root	H	H	H		
	/sǎ:fǎ/	/sǎ:fǎ/	/sǎ:fǎ/	‘squeeze’	CGA
M					
root	M	M	M		

	/tʃàmə̀ɲfỳ́/	/tʃàmə̀ɲfỳ́/	/tʃàmə̀ɲfỳ́/	‘palm flower’	NRN
L					
root	L	L	L		

6.4.3 Tone Polarity

Tone polarity is a dissimilatory process where a toneless tone bearing unit that is assigned a tone opposite to that borne by a neighboring tone bearing unit. In Ajumbu, this process is observed within reduplicated forms. The reduplicated syllable bears a tone opposite to that of the stems. Reduplicated forms are bolded in (56).

(56)	surface form	underlying form	Tone polarity	Gloss	CNC
	kparàkpará	/kpara-kpara/	/ kpara -kpara/	‘mat’	KS
			$\begin{array}{c} \text{H} \\ \\ \text{L} \end{array}$ $\begin{array}{c} \text{L} \\ \\ \text{H} \end{array}$		
	tòʔʔ	/tòʔ-ʔʔ/	tòʔ-ʔʔ/	‘faced pillar’	KS
			$\begin{array}{c} \text{L} \\ \\ \text{H} \end{array}$ $\begin{array}{c} \text{L} \\ \\ \text{H} \end{array}$		
	ɲgùɲgùsə́	/ɲgu-ɲguəsə/	/ ɲgu -ɲguəsə/	‘dragon fly’	NRN
			$\begin{array}{c} \text{H} \\ \\ \text{L} \end{array}$ $\begin{array}{c} \text{L} \\ \\ \text{H} \end{array}$		

Conclusion

This chapter aimed at describing the phonological processes of sounds and tones in Ajumbu language. Consonant processes identified are homorganic nasal assimilation, palatalisation of the alveolar nasal, fronting, alveolarisation, spirantisation, glide formation, voicing and aspiration. Vowel processes include backing, fronting vowel harmony and lengthening. Syllable processes include deletion, reduplication and resyllabification. Tone processes are contour formation, tone spreading and tone polarity. These processes affect the syllable structures and tone patterns in the verb and noun roots in Ajumbu.

CHAPTER SEVEN: ALPHABET

7.0 Ajumbu Orthography: A Writing System Proposal

First, a distinction ought to be made between an alphabet and an orthography. An ALPHABET comprises all the GRAPHEMES (letters) or characters used in writing a language (Tadadjeu & Sadembouo 1984: 4). Note that it does not or must not include all phonemic sounds of a language but rather all graphemes representing exhaustively all phonemic sounds of a given language (Ibrahim 2022). An ORTHOGRAPHY refers to a set of SIGNS and PRINCIPLES defining how to write and read a language. In Cameroon, the General Alphabet of Cameroon languages (GACL) contains the norm prescribed by the Government when establishing a writing system for a Cameroonian language.

7.1 Guideline Principles for Designing the Ajumbu Orthography

The choice of graphemes proposed in this alphabet is not only influenced by the linguistic analysis done in the previous chapters, but equally by other factors like the English and French alphabets, the level of literacy of the targeted population and the aesthetic forms of words. Smalley (1964: 13) doesn't seem to refute this when he says "*writing systems after all are cultural phenomena used by people with feelings and emotions, with prejudices and fears. In fact, it is surprising how much heat a controversy over orthography can be produce*". This section briefly outlines the most crucial factors/guidelines that are considered in devising Ajumbu writing system.

7.1.1 General Guidelines

Tadadjeu & Sadembouo (1984:3) principles for the elaboration of an orthography is take into consideration, as much as possible, in establishing Ajumbu orthography:

- **Practical Utility:** An alphabet will be of practical utility if due consideration has been given to possibilities for hand writing, existing typewriter keyboards, adoption on new keyboards as well as publishing possibilities.
- **The Ease of Reading and Writing:** The graphemes chosen should facilitate reading and writing for the native speaker of a language without confusion.
- **Preference for Phonemic Representation:** The letters used in writing a language should preferably represent the phonemes of that language. Allophones will only be symbolised with letters in exceptional circumstances.

The following Ibrahīm's (2022) general guideline principles for the elaboration of orthography are taken into consideration:

- Graphemes and symbols should be chosen with respect to the proposal made in the General Alphabet of Cameroonian Languages, and not borrowed from foreign languages;
- Only phonemes should be represented in the orthography, not allophones;
- Avoid unnecessary letters: extra and unnecessary symbols that do not represent phonemes of the language should be excluded from the script;
- Tones should be marked and not left out. Trainees should be taught to recognize contrastive tonal melodies and transcribe them as such, each time they perceive them;
- Orthographies should be always tested before their adoption and publication as their evaluation, if well done, adds understanding, and helps to identify their strengths and weaknesses enabling to correct the latter, and enhance credibility. The phases of development of an orthography are as follows: tentative – experimentation – extension - generalization.

7.1.2 Specific Guidelines

This section lays emphasis on how to proceed to establish an orthography of the Ajumbu language that will be easy to learn and practical in respect with generalizations outlined in the preceding section.

7.1.2.1 Problem Associated with the *NC*, *Cw*, *Cj*, and *C^u*-like digraphs

A digraph is a compound letter, a sequence of two characters representing a single phoneme. Though prenasalized, labialized, palatalised, and labio-palatalised consonants are phonemic in Ajumbu, it is advised not to include them in the alphabets as they constitute an association of two monographs that will taught by complementary orthographic rules formulated as in (2):

2.a	<i>Ajumbu has consonant clusters in which the first segment is a nasal pronounced at the same point of articulation as the following consonant (1a_{iii}). Consonants v, b, t, d, s, z, l, ʒ, k, g, kp, gb in some Ajumbu words are preceded by such a nasal. This nasal</i>
-----	--

	<i>is signal orally by a snoring at the beginning of the sequence. This nasal is written m in front of p, b, v, gb, kp; n in front of t, d, s, z, l, ts, dz, ʒ, ʃ, dʒ; ŋ in front of k, g.</i>
b.	<i>In addition to prenasalized consonants, Ajumbu also counts labialized consonants. This class of consonants is special in that the second grapheme of the cluster is the semi-vowel [w], represented orthographically by the letter w (1aiv). In fact, w is the derived form taken by vowel u in context when followed or preceded by another vowel within the same word.</i>
c.	<i>Ajumbu also counts palatalised consonants. This class of consonants is special in that the second grapheme of the cluster is the semi-vowel [j], represented orthographically by the letter y (1aiii). In fact, [j] is the derived form taken by vowel i in context when followed or preceded by another vowel within the same word.</i>
d.	<i>Ajumbu equally counts labiopalalized consonants. This class of consonants is special in that the second grapheme of the cluster is the semi-vowel [ɥ], represented orthographically by the letter uy (1av). In fact, ɥ is the derived form taken by vowel u or y in context when followed by vowel i within the same word.</i>
e.	<i>Digraphs like ts and dz to represent affricates /ts/ and /dʒ/ are written by associating letters t and s</i>

It is agreed here with Bauernschmidt (1980) that *the best orthography is not necessarily the one which uses one symbol for every element which is in phonemic contrast*. Remember in 0.2, it was noted that an alphabet does not or must not include all phonemic sounds of a language but rather all graphemes representing exhaustively all phonemic sounds of a given language. Recommending the omission of NC, C^w, C^j and C^ɥ-like letters in Ajumbu alphabet should not be considered as a fault actually as it is not everything that is meaningful that should be marked. From the preceding argumentation, it is strongly prescribed to limit the overall number of letters in Ajumbu alphabet by living out the C^w, C^j, C^ɥ and NC-like sounds.

7.2.1.2 Problem Associated with Long Vowel

A quick look at Ajumbu lexicon reveals that some vowels are longer in pronunciation than others in some words. Those which are lengthened are said to be ‘long’ and those which are brief are ‘short’. Conventionally (Tadadjeu & Sadembouo 1984), to mark the distinction between these two types of vowels, the same vowel is double to mark lengthening. Following an intuition from Ibrahima (2022), likewise the *C^w*, *Cⁱ*, *C^u* and *NC*-like sounds, long vowels would not be included in the Ajumbu alphabet, but rather, an orthographic rule requiring to double a simple vowel when lengthening is perceived will be applied.

7.3 Note on Ajumbu Tones

Ajumbu is a three-level tone language (High, Mid, and Low). Following the principle of Tadadjeu & Sadembouo (1984) which states that when a language has three level tones two are marked and one is left out, the high and low tones will be represented in the Ajumbu alphabet and the mid tone will be left out. Contour tones are going to be derived through orthographic principles.

7.4 Ajumbu Sound System: Orthographic principles

This section presents some key orthographic rules in Ajumbu. These writing principles are limited to the analysis portrayed in Chapters two and three.

7.4.1 Orthographic Principles for Consonants

- If a nasal sound is perceived before a consonant within the same syllable, always write /m/ before sounds like /b, kp, gb, f, v, and w/; write /ŋ/ in front of /g, k/; and /n/ in front of any consonant not cited here.
- When /n/ is preceded by /i/ at the end of a word or /n/ is immediately followed by /i/ with another vowel at the beginning of a word, is written as < ny > as in the Ajumbu words **tany** ‘deny’ AS and **nya** ‘grass’ NJS.
- Affricates /ts/ and /dz/ are orthographically written by associating < t > and < s > for /ts/ and < d > and < z > for /dz/ respectively.

7.4.2 Orthographic Principles for Vowels

- When the vowel [u] is followed by [u, e, o, ε, ɔ or a], always write < w > as in the words **fwó** ‘foam’ NRN and **kwú** ‘camwood’ KS.

- If [u, or y] is directly followed by /i/, always write <w̃>, and maintain the last vowel of the word as in **f̃w̃ó** ‘meat’ NRN.
 - When vowel [i] is preceded or followed by another vowel always write <y> before or after the vowel as in **yám** ‘many’ NRN and **záy** ‘tooth’ NJS.
 - Each time the sound [e] is pronounced as in the English word tell, write it <ɛ> as in the Ajumbu word **sé** ‘dress’ KS. When [e] is pronounced as in the Ajumbu words **té** ‘ladder’ CGA and **kpé** ‘die’, write <e>.
 - If the sound [o] is pronounced as in the English word pot it is written <ɔ> in **bǎ** ‘greet’ NCS.
- Always double a vowel when its pronunciation is lengthened.

7.4.3 Orthographic Principles for Tones

- Three level tones are attested in Ajumbu. However, only the high and the low tones are marked while the mid tone is unmarked.
- Contour tones are written by dividing them into two level tones. If it is associated to a short vowel the vowel is doubled and each part of the tone is associated to each vowel.

7.5 Ajumbu Sound System: The Graphemes

The following section presents the consonant, vowel and tone graphemes retained to constitute the Ajumbu alphabet.

7.5.1 Consonant Graphemes

Twenty-five phonemes (25) out of the twenty-seven consonant phonemes attested have been retained for the Ajumbu alphabet, and one grapheme is proposed for each sound.

Table 7.1: Consonant Graphemes

Phonemes	Allophones	Graphemes	Examples	Glosses	CNC
/b/	[b]	< b >	bá	‘today’	NJS
/P/	/p/	< p >	lápé	‘palm barren fruit’	NCS
/t/	[t]	< t >	pú	‘trough’	CGA
/d/	[d]	< d >	pó	‘sweat’	CGA
/f/	[f]	< f >	fá	‘give’	AS
/v/	[v]	< v >	vù	‘odour’	KS

/m/	[m]	< m >	míi	‘swallow’	AS
/n/	[n]	< n >	né	‘climb’	NCS
/s/	[s]	< s >			
/z/	[z]	< z >			
/ɲ/	[ɲ]	< ny >	nyá	‘grass’	NJS
/ŋ/	[ŋ]	< ŋ >	ŋù	‘person’	CGA
/ʃ/	[ʃ]	< sh >	ʃó	‘axe’	KS
/ʒ/	[ʒ]	< zh >	ʒì	‘wet’	NCS
/tʃ/	[tʃ]	< c >	tʃó	‘to cane’	AS
/ɕ/	[ɕ]	< j >	jù	‘penis’	NRN
/k/	[k]	< k >	kú	‘head’	KS
	[kx]		ké	‘chaff’	NRN
	[kxʲ]		káàlé	‘elder’	NGS
/g/	[g]	< g >	gáasé	‘reduce’	NCS
/ɣ/	[ɣ]	< gh >	ɣánɲ	‘insist’	AS
/kp/	[kp]	< kp >	kpé	‘die’	NCS
/gb/	[gb]	< gb >	gbú	‘hill’	KS
/j/	[j]	< y >	jólé	‘learn’	AS
/l/	[l]	< l >	lókō	‘cassava’	NJS
/w/	[w]	< w >	wán	‘shout’	NCS
/ɥ/	[ɥ]	< w̥ >	wàfé	‘light clear’	NCS

7.5.2 Vowel Graphemes

This study adopts a many to one correspondence for vowel phonemes because of the great influence of the English alphabet known by a majority of Ajumbu speakers. Moreso, vowels /ɪ, i, ʊ, ə/ are not practical on most writer keyboards the native speakers are exposed to. Establishing the aforementioned vowels as graphemes might increase the feeling of fear and prejudice that could lead to the reject of the alphabet proposal. The majority of the Ajumbu speakers interested in literacy programs are adults, and adult native speakers are known to be very conservative and reticent to change when it concerns their mother tongue.

Table 7.2: Vowel graphemes

Phonemes	Allophones	Graphemes	Examples	Glosses	CNC
/i/, and /ɪ/	[i]	< i >	ʒi	‘bury’	NJS
	[ɪ]		ntsín	‘spit’	KS
	[i]		ɕí	‘mouth’	KS

/u/, /ʊ/, /y/	[u]	< u >	fú	‘skin’	NRN
	[ʊ]		fú	‘pass’	NCS
	[y]		ṅgŭú	‘lake’	KS
/ɛ/	[ɛ]	< ɛ >	ké	‘have’	NCS
/e/, /ə/	[e]	< e >	té	‘ladder’	NJS
	[ə]		kpé	‘die’	NCS
	[ø]		zé	‘God’	NRN
/o/, /ɔ/	[o]	< o >	ṅkòo	‘pot’	KS
	[ɔ]		kɔ̀	‘fry’	AS
/a/	[a]	< a >	kpá	‘a cough’	

7.5.3 Tone Graphemes

Two level tones, the High and Low tones, are retained for the Ajumbu alphabet.

Table 7.3: Tone Graphemes

Tonemes	Graphemes	Examples	Glosses	CNC
/ ´ /	< ´ >	ʒí	‘chain’	NCS
/ ` /	< ` >	ṅù	‘person’	NRN

7.6 Ajumbu Sound System: The Alphabet

The proposed Ajumbu alphabet counts thirty-one (31): Twenty-five (23) consonants, six (06) vowels, and two (02) level tones as illustrates below.

A a, B b, C c, D d, E e, ɛ ɛ, F f, G g, Gh gh, Gb gb, I i, J j, K k, Kp kp, L l, M m, N n, Ny ny, ɲ ɲ, O o, P p, S s, T t, U u, V v, W w, Ẁ Ẁ, Y y, Z z, ´, `

GENERAL CONCLUSION

This study aimed at describing the sound system of the Ajumbu language using the traditional structural phonology approach aided by some generative phonology theories like the feature theory and autosegmental phonology. This concluding section is twofolds. Section 0.1 presents the major findings; Section 0.2 provides some recommendations for further studies.

0.1 Findings

This subsection summarises the claims made and results obtained within this study in response to the main of this research, the study of Ajumbu sound system. Below are the major results reached at.

1. The phonological system of Ajumbu counts 95 consonants phonemes (26 plain, 17 prenasalised, 16 palatalised, 22 labialised, and 14 labio-palatalised), 20 vowel phonemes (12 short and 08 long) and 07 tonemes (3 level and 4 contour tones).
2. Ajumbu distinguishes two syllable types, that is, open and closed syllables.
3. The different syllable structures found in Ajumbu monosyllabic words are CV and CVC.
4. Common tone melodies in monosyllabic noun and verb roots include H, M, L, LH, HL, HM, and LM. In dissyllabic roots we have the following; H-M, L-L, H-H, M-M, LM-

H, HL-H and LH-H. The tone melodies of monosyllabics and those of disyllabics combine together to form the melodies of polysyllabics.

5. Complex consonants, long vowels and contour tones are monophonematic in Ajumbu.
6. Major phonological processes for consonants are homorganic nasal assimilation, devocalisation, alveolarisation, fronting, spirantisation, aspiration and voicing.
7. Major phonological processes for vowels include backing, fronting, vowel harmony, and lengthening.
8. Major phonological processes associated with the syllable are truncation, reduplication, resyllabification, deletion, and insertion.
9. Major tonal processes are contour tone formation, spreading, copying, and tone polarity.
10. The alphabet has 33 letters with 25 consonants, 06 vowels and 02 marked tones.
11. The most combinative consonant phoneme in CV and CVC monosyllabic structures is /b/. It combines with almost all the vowel phonemes except vowels /i, ɛ: and i:/.
12. CV is the most merging syllable structure for the formation of the dissyllables and polysyllables in Ajumbu.
13. The most occurring vowel at V₁ and V₂ positions is /ə/.
14. Vowel /a/ is the vowel phoneme that admits a diversity of consonant at coda position.
15. Palatalised consonants mostly combine with vowels /u, ʊ, y, ə and a/.
16. Vowel /i/ only combines with fricatives /f, s and z/ and affricates such as /ts and dz/.
17. The consonants /z and n/ are the only alveolars sounds that combine with the high front unround vowel /i/ in Ajumbu.
18. Labio-palatalised consonant phonemes only combine with vowels /u, ʊ, y, o, ɔ, ɛ, a and a:/.
19. Vowel /ɪ/ only combines with the affricates /ts, dz, tʃ, dʒ, ntʃ, and ndʒ/ and the stops /b and kp/.
20. The most combinative consonant at the C₂ position within CVC syllable structure is /ŋ/.

0.2 Recommendations for Future Research

This study was limited at describing the sound system of Ajumbu and proposing a phonemic based orthography. Further research on this language can be done on the verbal and nominal morphology, syntax (basic and generative), semantics, sociolinguistics and pragmatics.

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APPENDICES

What follows is a sample list of Ajumbu words extracted from the KPAAM-CAM Geo word list that was used in collecting data that served for the phonological analysis of Ajumbu presented in this dissertation. Two appendixes are presented in the following sections. Appendix 1 comprising verbs and appendix 2 made of nouns followed by pronouns, adverbs, adjectives and numerals.

Appendix 1: Verbs

The infinitive marker is separated from the root by a dash and any linguistic difference noticed among the informants of speakers should be considered and idiolectal variation and not dialectal.

N ⁰	VERBS	CGA	AS	NCS
1	rescue	fí	fí	é-fí
2	hit the table	é-tʃʷɔ	é-tʃʷɔ	tʃʷɔ
3	plit wood	ʃá	ʃá	ʃá
4	advice	tʃū	bé-tʃū	é-tʃū
5	wet	ʒì	ʒì	ʒì
6	fal	gbá	gbá	è-gbá
7	add	tʃú	tʃú	é-tʃú
8	align	k'ǎŋ	bé-k'ǎŋ	é-k'ǎŋ
9	wear	dzə	bə-dzə	é-dzə
10	read	zǒ	zǒ	zǒ
11	debate	nsàʔnə	nsàʔnə	nsàʔnə
12	put	gʷín	gʷín	é-ŋgʷín
13	heap up wood	kòʔɔsə	kòʔɔsə	é-kòʔɔsə
14	ressemble	b'ú	b'ú	é-b'ú
15	come	tā	tā	è-tā
16	cut thatch grass	bāp	bāp	bāp
17	climb	nə	ñ.nə	nə
18	ask	bâfə	báfə	ébáfə
19	weed	sá:fə	sá:fə	sá:fə
20	judge	sá	sá	sá
21	bark (dog)	gbáfə	gbáʔfə	gbáfə
22	roast	f'ɛ	f'ɛ	f'ɛ
23	guess	súŋ	súŋ	súŋ
24	open eye	gū	gū	gū

25	be ugly	bâ:vúkó	bâvúkó	bâ:vúkó
26	be bad	g'è-mbé:ló	g'è-mbé:ló	g'è-bè:ló
27	be rotten	f'á	g'è-f'á	ó-f'á
28	be big	d ^w ó	d ^w ó	ó-d ^w ó
29	till	g'è-sám	sám	ó-sám
30	bring down	g'è-fí:	fí:	ó-fí:
31	be lazy	g'è-bú	g'è-bú	ó-bú
32	bring down	fí:	fí:	ó- fí:
33	be dirty	k'á	zíkà	ó-k'á
34	pluck feather	t ^w é	t ^w é	t ^w é
35	go	néŋ	néŋ	ó-néŋ
36	swear	káŋjí	káŋjí	káŋjí
37	be happy	sàŋná	sàŋná	ónsàŋná
38	be heavy	dó	dó	á-dó
39	be lost	zā:	zā	ó-zā
40	be mad	z'á	z'á	ó-z'á
41	glue	náŋ	náŋ	ó-náŋ
42	play music	ó-b ^w ú	ó-b ^w ú	b ^w ú
43	be poor	ŋ ^w è:nó	ŋ ^w è:nó	è-ŋí:nó
44	be pregnant	bèz'á	bèz'á	è-bèz'á ~ z'á
45	hatch	sō	sō	sō
46	slaughter	gáŋ	gáŋ	gáŋ
47	excrete	só	só	só
48	travel	dzú	dzú	dzú
49	be short	g'è-tásó	g'è-tásó	tásó
50	share	g'è-g'á:ló	g'è-g'á	ó-g'á
51	belch	ǫú	ǫú	ó-ǫú
52	be strong	g'è-k ^w ǝ:	g'è-k ^w ǝ:	ó-k ^w ǝ:
53	jump	bó	bó	ó-bó
54	be tall	g'áfá	g'è-g'áfá	ó-g'áfá
55	tree dry up	ŋ'ín	ŋ'ín	ó-ŋ'ín
56	initiate	g'íŋ	g'íŋ	è- g'íŋ
57	to restrict	lú	lú	lú
58	to lack	lá?	lá?	lá?
59	quarrel	dúnó	g'è-dúnó	ó-dúnó
60	beat (severely)	tǝ:	tǝ:	tǝ
61	talk	dú	dú	ó- dú
62	to lie	wáŋ	wáŋ	ó-wáŋ
63	peel elephant stalk	ŋ ^w ó	ŋ ^w ó	ó-ŋ ^w ó
64	plant	ní	ní	ó- ní

65	to ban	dzú	dzú	dzú
66	eat	ə-zá	ó-zá	ə-zá
67	blow (air)	fáfə	fáfə	fáfə
68	sing	ɲóm	ɲóm	ɲóm
69	off light	ó- ɲóm	ɲóm	ó- ɲóm
70	borrow	fɥó	fɥó	fɥó
71	grow	kʲá	kʲá	kʲá
72	think	fʷânə	fʷânə	fʷânə
73	break	bʷɛɲ	bʷɛɲ	bʷɛɲ
74	pray	bô	bô	bô
75	wrestle	ó-bʷáʔ	ó-bʷāʔ	bʷáʔ
76	breath	ɲʷă:fə	ɲʷă:fə	ɲʷăfə
77	pick to eat	tú	tú	tú
78	escape	ó- vɥó	ó- vɥó	vɥó
79	pin something	tsú	tsú	tsú
80	build (house)	vʲú	vʲú	vʲú
81	build, heap (mud)	mă:	mă:	mâ:məntáɲ
82	see	nũ:	nũ:	nũ:
83	insist	ó-ɣáɲ	ó-ɣáɲ	ó-ɣáɲ
84	bury	ó-ʒĩ	ó-ʒĩ	ó-ʒĩ
85	pick up	gʷó	gʷó	gʷó
86	join	kɥó	kɥó	kɥó
87	cut thatch grass	bāp	ó- bāp	ó-bāp
88	finish by itself	kā	kā	kā
89	fetch water	dū	dū	ó-dū
90	peel corn	fɥǒ	fɥǒ	fɥǒ
91	measure	fú:	ó-fú:	fú:
92	cheat	lé:sə	lé:sə	lé:sə
93	find	ké	ké	ké
94	carve (artefacts)	ó-mâ:	ó-mâ	ó-mâ
95	dance on toes	bă:nə	ə-bă:nə	ó-bă:nə
96	castrate (animal)	ókʲáɲ	ókʲáɲ	ókʲáɲ
97	breathe	ó-ɲʷă:fə	ó-ɲʷă:fə	ó-ɲʷă:fə
98	chain (someone)	ó-ʒĩ	ó-ʒĩ	ó-ʒĩ
99	pour	ɲú	ɲú	ɲú
100	shine	ó-bʷó	bʷó	ó-bʷó
101	feed	dzə	dzə	dzə
102	ignite	ʃʷáɲ	ʃʷáɲ	ʃʷáɲ
103	to nail	mbáɲ	mbáɲ	ó-mbáɲ
104	urinate	dʒʲásə	dʒʲásə	ó-dʒʲásə

105	thatch the house	ó-fǔ:	ó-fǔ:	ó-fǔ:
106	pass	ó-fú	ó-fú	ó-fú
107	hear	ŋǔ	ŋǔ	ŋǔ
108	lick	mʲó	mʲó	ó- mʲó
109	hit box	tʷú	tʷú	ó-tʷú
110	close (door)	bán	bán	bán
111	danse	bán	bán	bán
112	clot, coagulate	tū	tū	ó-tú
113	greet	bǎ	bǎ	bǎ
114	send	těŋ	těŋ	těŋ
115	ride	gúfá	gúfá	gúfá
116	pay debt	náʔ	náʔ	ó-náʔ
117	cut	gbʷó	gbʷó	gbʷó
118	commit suicide	sísá	sísá	ó-sísá
119	laugh	ó-kʲǎ	ó-kʲǎ	ó-kʲǎ
120	conduct (stick)	wám	wám	ó-wámá
121	cook	gʲá	gʲá	gʲá
122	give	fá	fá	fá
123	sex	tsó	ó-tsó	ó-tsó
124	be good	ɲdʒʷě:lá	àdón	ɲdʒʷě:lá
125	count	tán	tán	tán
126	plait	vʷǎ	vʷǎ	vʷǎ
127	enthroned	ntú	ntú	ntú
128	crack (kernel)	kɥín	kɥín	kɥín
129	inherit	nzá	ó-nzá	ǎ-nzá
130	pluck banana	kǐ	kǐ	kǐ
131	pay fine	kí	kí	ó-kí
132	shout	wán	wán	wán
133	cry	gʲǎ	gʲǎ	gʲǎ
134	drag	kúfá	kúfá	ó- kúfá
135	curse	ó-nlá	ó-nlá	ó-ñ.nlá
136	buy	gʷāsǎ	gʷāsǎ	ó-gʷāsǎ
137	bore hole	bū	bū	bū
138	cook	gʲá	gʲá	gʲá
139	to loan	ó-fɥó	fɥó	ó-fɥó
140	wound someone	zásá	zásá	zásá
141	to gossip	ɲtúná	ɲtúná	ó-ɲtúná
142	omit	lé:sá	lé:sá	lé:sá
143	give birth	dʒʷó	dʒʷó	dʒʷó
144	to be dirty	kɥá	kɥá	kɥá

145	deny, refuse	táɲ	táɲ	táɲ
146	descend	ʃĩ	ʃĩ	ʃĩ
147	fold arms	báɲ	báɲ	báɲ
148	grind on machine	g ^w ʒ:	g ^w ʒ:	g ^w ʒ:
149	die	kɔ́	kɔ́	kɔ́
150	visit	mú:	mú:	mú:

Appendix 2

Nouns

The worlist below presents a representative sample of nouns collected and used within the present study. Roots are separated from the singular and plural affixes by a dash. Segmental and autosegmental differences observed are based on the speaker's idiolect. Slashes helps to distinguish singular vs. plural forms. Singular forms are on the left side while plural forms are on the right side.

N ⁰	Nouns	NJS	KS	NRN
151	child	wán / á-tɔŋ	wán / á-tɔŋ	wǎ:nó / á-tɔŋ
152	firewood	kʷín / kó-kʷín-ló	kʷín / kó-kʷí:-ló	kʷín / kó-kʷí:-ló
153	father	à-tʃé / á-tʃě-bó	tsé / á-tsé:	tsé / á-tsé:
154	earth	mbí / á-mbí	mbí	mbí
155	chair	kə-ŋkʲân / bó-ŋkʲân	kə-ŋkʲân / bó-ŋkʲân	kə-ŋkʲân / bó-ŋkʲân
156	ground	fə-ntá / m-ntá	fə-ntá / m-ntá	fə-ntá / m-ntá
157	head	kú / kə-kú:-ló	kú / kó-kú:-ló	kú / kó-kú:-ló
158	face	fá / bó-fá	fá / bó-fá	fá / fǎ-bǎ
159	eye	ɕísə / kó-zísó	zísó / á-zísó	zísó / à-zísó
160	nose	vú / kə-vúló	vú / kónvúló	vú
161	mouth	ɕí / kó-ɕíló	ɕí / kó-ɕíló	ɕí / kó-ɕíló
162	ear	kə-tún / bə-tún	kə-tún / bə-tún	tún / bə-tún
163	pillar	kə-tó / bə-tó	kə-tó / bə-tó	kə-tó / bə-tó

164	tooth	záj / ká-záj-nó	záj / á-záj	à-záj
165	tongue	lám / ká-lá:má	lám / ká-lá:m-ó	lámó / kè-lă:má
166	neck	ñ.tʃò / kèntʃô:ló	nt ^w ó / à-nt ^w á	nt ^w ó / á-nt ^w á
167	chief	ŋ-ŋkú / ká-ŋkú:-ló	ŋ-ŋkú / ká-ŋkú:-ló	ŋkú / à-ŋkú
168	gauze	fə-t ^w ěŋ / ká- t ^w ěŋ	t ^w ěŋ / ká- t ^w ěŋ	t ^w ěŋ / ká- t ^w ěŋ
169	sheath	bó / ká-bó	bó / ká-bó	bó / ká-bó
170	upper grinding stone	ká-kʲó / bá-kʲó	ká-kʲó / bá-kʲó	ká-kʲó / bá-kʲó
171	hair	f ^w ò / kə-f ^w ó:-ló	f ^w ò / ká-f ^w ó:-ló	fòkú~f ^w ò / fòlká ~ kəf ^w ó:ló
172	tears	kə-ndéj / bə-ndéj	kə-ndéj / bə-ndéj	ndéj
173	war	g ^u íŋ / ká-g ^u íŋ	g ^u íŋ / ká-g ^u íŋ	g ^u íŋ / ká-g ^u íŋ
174	calabash sp.	mbú / ká- mbú	mbú / ká- mbú	mbú / ká- mbú
175	Indian bamboo	fý / ká-fý:-ló	fý / ká-fý:-ló	fý / ká-fý:-ló
176	arm	tsìŋ / kátsé:ŋnó	tsíŋ / ká-tsíŋ	tsíŋ / á-tsé
177	mortar	ŋgú / áŋgú	ŋgú / àŋgú	ŋgú / áŋgú
178	navel	tsámá / kətsámó	tsámó / kətsámó	tsámó / kətsámó
179	place	kə-déj / bə-déj	kə-déj / bə-déj	kə-déj / bə-déj
180	pepper	fə-ntó / m-ntó	fə-ntó / m-ntó	fə-ntó / m-ntó
181	fowl	ʃì / ká-ʃí:ló	ʃì / ká-ʃí:ló	ʃì / ká-ʃí:ló

182	bitter leaf	ṭʰíṭ / m-ṭʰíṭ	ṭʰíṭ / ká-ṭʰíṭ	ṭʰíṭ
183	stomack	à-kʷɔ́ / á-kʷɔ́já	kà-kʷɔ́ / bá-kʷɔ́	kʷɔ́ / à-kʷɛ-já?
184	banana	tsú / ká- tsú	tsú / ká- tsú	tsú / ká- tsú
185	house	vʷɔ́ / kàvʷɔ́:lá	vʷɔ́ / ká vʷálá	vʷɔ́ / ká vʷálá
186	rat	kʰíṭ / ká- kʰíṭ	kʰíṭ / ká- kʰíṭ	kʰíṭ / ká- kʰíṭ
187	buttock	nù: / ká-nú:-lá	nú / à-nú	nú / á-nú
188	anus	dʒúná / kà-dʒúná	dʒúná / ká-dʒúná	dʒúná / ká-dʒúná
189	foot	kpé / ká-kpélá	kpé / á-ké	kpé / á-ké
190	meat	fʷó / ká- fʷó:-lá	fʷó / ká- fʷó:-lá	fʷó / ká- fʷó:-lá
191	hoe	kə-tsí / bá-tsí	kə-tsí / bá-tsí	kə-tsí / bá-tsí
192	wallshelf	fə-ndú / m-ndú	fə-ndú / m-ndú	fə-ndú / m-ndú
193	gun	gʷàsə / ká-gʷàsə	gʷàsə / ká-gʷàsə	gʷàsə / ká-gʷàsə
194	testicle	à-fú / kà-fú-lá	à-fú / ká-fúlá	á-fú
195	vagina	kəṇó / bəṇó	kəṇó / bəṇó	kəṇó / bəṇó
196	evil spirit	gù / ká-gú	gù / ká-gú	gù / ká-gú
197	armpit	fə-ndzíṭ / m-ndzíṭ	fə-ndzíṭ / m-ndzíṭ	fə-ndzíṭ / m-ndzíṭ
198	stem	kà-tó / bá-tá	kà-tá / bá-tá	kà-tó / bá-tó
199	bed	zà / kázá	zà / kázá	zà / kázá
200	cola	bí/ kábí:lá	bí/ kábí:lá	bí/ kábé:lá
201	yam	vú / ká-vú	kà-vú / bá-vú	vú / ká-vú

202	plate	ηmkpá / η- ηmkpá	ηmkpá / η- ηmkpá	fè-ηmkpá / η- ηmkpá
203	spear	kó-gú / bó-gú	gú / kó-gú	kè-gú / bó-gú
204	finger nail	kâsô / kâ-kâ:sô	kâsô / kâ-kâ:sô	kâsô / á-kâ:sô
205	palm beetle	fʷá: / kófʷá:	fʷá: / kófʷá:	fʷá: / kófʷá:
206	nostril	vʲú / vúlákè má	vʲú / kó-vʲú	ηfʲòηvú / à-ηfʲó.á-vú
207	ladder	kó-té / bó-té	kó-té / bó-té	kó-té / bó-té
208	hanged ceiling	bʷín / ká-bʷín	bʷín / ká-bʷín	bʷín / ká-bʷín
209	knee	nʷà / kà-nʷá-lá	nʷá	à-nʷá
210	aerial /	dzè / á-dzê	dzè / á-dzê	dzè / á-dzê
211	rain	bʷê	bʷê	bʷê
212	owl	kè-gù / bà-gù:lá	kè-gù / bà-gù:lá	gù / ká-gù:
213	road	ɕá / ká-ɕá	ɕá / ká-ɕá	ɕá / ká-ɕá
214	hill	gbú / ká-gbú	gbú	gbú
215	cane	kó-tá / bó- tá	kó-tá / bó- tá	kó-tá / bó- tá
216	mountain	kè-gbó / bó-gbó	kè-gbó / bó-gbó	kègbó / ηmgbó
217	cock	ká-tʷó / bó-tʷó	ká-tʷó / bó-tʷó	ká-tʷó / bó-tʷó
218	cockroach	kà-fífí / bó-fífí	ká-fífí / bó-fífí	ká-fífí / bó-fífí
219	fish	fè-ηdùfè / m-ηdùfá	fè-ηdùfè / m-ηdùfá	fè-ηdùfè / m-ηdùfá
220	raffia	ɕúná / ká-ɕúná	ɕúná / ká-ɕúná	ɕúná / ká-ɕúná
221	calf	mʷí / ká-mʷí	ká-mʷí.mbòlóló?	mbòlólóló?
222	female name	népì	népì	népì

223	bone	ká-k ^w áfá / bó k ^w áfá	ká-k ^w áfá / bó k ^w áfá	ká-k ^w áfá / bó k ^w áfá
224	frog	qík ^w ê	fà-qík ^w ê / ká-qík ^w ê	fà-qík ^w ê / ká-qík ^w ê
225	knuckle	ká-fásá / bó-fásá	kà-fásá / bó-fásá	ká-fásá / bó-fásá
226	vein	ng ^j ân / m-ng ^j ân	ng ^j ân / m-ng ^j ân	fà-ng ^j ân / m-ng ^j ân
227	marathon	v ^w ó / ká -v ^w ó	v ^w ó / ká -v ^w ó	v ^w ó / ká -v ^w ó
228	spit	ntsín / m- ntsín	ntsín / m- ntsín	ntsín / m- ntsín
229	catarrh	ŋ ^w ó	ŋ ^w ó	ŋ ^w ó
230	a cough	kpá / ká-kpá:ló	kpá / ká-kpá:ló	kpá / ká-kpá:ló
231	blood	m- ɲf ^ɲ ín	ɲf ^ɲ ín	m- ɲf ^ɲ ín
232	yellow soup	m-t ^ɲ ín	t ^ɲ ín	t ^ɲ ín
233	farm	ɲú / ká-ɲú	ɲú / ká-ɲú	ɲú / ká-ɲú
234	faeces	báj	báj	báj / ká- báj
235	female	kà-ɕóŋ / bó-ɕóŋ	kà-ɕóŋ / bó-ɕóŋ	kà-ɕóŋ / bó-ɕóŋ
236	beans	gí / á-gí	gí / á-gí	gí / á-gí
237	snore	k ^w ó / kák ^w ó:ló	k ^w ó / kák ^w ó:ló	k ^w ó / kák ^w ó:ló
238	pipe	kà-mb ^w ú / bó-mb ^w ú	kà-mb ^w ú / bó-mb ^w ú	kà-mb ^w ú / bó-mb ^w ú
239	net	ŋ ^w ě:fá / ká-ŋ ^w ě:fá	ŋ ^w ě:fá / ká-ŋ ^w ě:fá	ŋ ^w ě:fá / ká-ŋ ^w ě:fá
240	gizzard	kà-jík ^w ê / bó-jík ^w ê	kà-jík ^w ê / bó-jík ^w ê	ká-jík ^w ê / bó-jík ^w ě
241	pig	ng ^w óná / ká-ng ^w óná	ng ^w óná / ká-ng ^w óná	ɲ.ng ^w ónà / ká-ng ^w óná
242	wine	m-mbáj	mbáj / ká-mbáj	m.mbáj
243	palm nut pestle	k ^w ásá / ká-k ^w ásá	k ^w ásá / ká-k ^w ásá	k ^w ásá / ká-k ^w ásá
244	place	kà-déj / bó-ndéj	déj / ká-ndéj	déj / ká-ndéj

245	hienia	ɸú / á-ɸú	ɸú / á-ɸú	ɸú / á-ɸú
246	thatch grass	kə-/ bə- vʷânə	kə-/ bə-vʷânə	kə-vʷânə / bə-vʷânə
247	law	ndúnə / ké-ndúnə	ndúnə / ké-ndúnə	ndúnə / ké-ndúnə
248	fungi pimples	kə-básə / bə-básə	kə-básə / bə-básə	básə / k-ə-básə
249	dry season	wʷín / á-wʷín	wʷín / á-wʷín	wʷín / á-wʷín
250	grasshopper	ŋ-/m-ŋmgbó	ŋ-/m-ŋmgbó	ŋ-/m-ŋmgbó
251	juju	kə-tʃá / bə-tʃá	kə-tʃá / bə-tʃá	kə-tʃá / bə-tʃá
252	ring worm	nɕóŋ / ké-nɕóŋ	nɕóŋ / ké-nɕóŋ	nɕóŋ
253	locust	ŋmgbó:/ m-ŋmgbó:	ŋɸá:fə	ŋɸá:fə
254	fire side stone	sásə / ké-sásə	sásə / ké-sásə	sásə / ké-sásə
256	umbrella	bá? / ké-bá?	bá? / ké-bá?	bá? / ké-bá?
257	mbanga soup	kə-bʲá / bə-bʲá	kə-bʲá / bə-bʲá	kə-bʲá / bə-bʲá
258	fufu	kə-ŋá / bə-ŋá	kə-ŋá / bə-ŋá	kə-ŋá / bə-ŋá
259	foam	fʷó / fʷófʷó	fʷó	fʷó
260	grass	kə-ŋá / bə-ŋá	kə-ŋá / bə-ŋá	kə-ŋá / bə-ŋá
261	God	kə-zə / bə-zə	kə-zə / bə-zə	kə-zə / bə-zə
262	elder (palace)	ŋù- kxʲâlə / ànè-kxʲâlə	ŋù- kxʲâlə / ànè-kxʲâlə	ŋù- kxʲâlə / ànè-kxʲâlə
263	fire	kə- gʷásə / bə- gʷásə	kə-/ bə- gʷásə	gʷásə
264	toilet	kpʷó / ké-pʷó:lə	kpʷó / ké-pʷó:lə	kpʷó / ké-kpʷó:lə
265	barren palm	lápé / m-nlápé	lápé / m-nlápé	lápé / m-nlápé
266	dysentery	ʃʷó	ʃʷó / ké-ʃʷó	ʃʷó
267	money	kə- kpáfə / bə-kpáfə	kə-/bə-kpáfə	kə-/bə-kpáfə

268	ankle	n ^w á / kó-n ^w á	n ^w á / kó-n ^w á	n ^w á / kó-n ^w á
269	valley	ɲg ^u / à-ɲg ^u	ɲg ^u / á-ɲg ^u	ɲg ^u / á-ɲg ^u
270	knowlegde	f ⁱ ɲ / kó-f ⁱ ɲ	f ⁱ ɲ / kó-f ⁱ ɲ	f ⁱ ɲ / kó-f ⁱ ɲ
271	palm bamboo	kə-f ^w ý / bə-f ^w ý	kə- f ^w ý / bə- f ^w ý	kəf ^w ý/ bə- f ^w ý
272	leg marrow	ná / á-ná	ná / á-ná	ná / á-ná
273	buffalo	kə-ɲɔ́ / bə- ɲɔ́	kə-ɲɔ́ / bə- ɲɔ́	kə-ɲɔ́ / bə- ɲɔ́
274	lake	ɲ-ɲg ^u ý / áɲg ^u ý	ɲ-ɲg ^u ý / áɲg ^u ý	ɲ-ɲg ^u ý / áɲg ^u ý
275	wooden dish	jû: / kó- jû:	jû: / kó- jû:	jû: / kó- jû:
276	sheep	ɲ-ɲɔ́ / kə-ɲɔ́	ɲ-ɲɔ́ / kə-ɲɔ́	ɲ-ɲɔ́ / kə-ɲɔ́
277	soot	fə-ɲɔ́ / ɲ-ɲɔ́	ɲɔ́ / ɲ-ɲɔ́	ɲɔ́ / ɲ-ɲɔ́
278	flour	mú / kə-mú:lə	m-mú / á-mú	mú
279	barren palm cone	kə-ɲás / bə- ɲás	kə-ɲás / bə- ɲás	ɲás / kə- ɲás
280	call	nzɔ̃ / kə-nzɔ̃	kə-nzɔ̃ / bə-nzɔ̃	nzɔ̃ / ɲ-nzɔ̃
281	hailstone	b ^w ɔ̃	b ^w ɔ̃ / kə-b ^w ɔ̃	b ^w ɔ̃
282	person	ɲù / à-né	ɲù / à-né	ɲù / à-nè
283	slave	ɲ-ɲfá: / á-ɲfá:	ɲ-ɲfá: / á-ɲfá:	ɲ-ɲfá: / á-ɲfá:
284	zinc	kə-kás / bə-kás	kə-kás / bə-kás	kə-kás / bə-kás
285	smooth lizard	kə-ká / bə-ká	kə-ká / bə-ká	kə-ká / bə-ká
286	oil mill	nsám / á- nsám	nsám / á- nsám	nsám / á- nsám
287	palm tree	ɲf ^w ý / kə-ɲf ^w ý	ɲf ^w ý / kə-ɲf ^w ý	ɲf ^w ý / kə-ɲf ^w ý
288	fruit	kə-tám / bə-tám	kə-tám / bə-tám	kə-tám / bə-tám
289	needle	fə-nsá / ɲ-nsá	fə-nsá / kə-nsá	ɲ-nsá

290	name	kà-ndzín / bə-ndzín	kà-ndzín / bə-ndzín	ndzín
291	husband	kà-/ à-m ^u íŋ	kà-/ à-m ^u íŋ	kà-/ à-m ^u íŋ
292	calabash sp.	fə-bǎ:ló / mbǎ:ló	fə-bǎ:ló / mbǎ:ló	fə-bǎ:ló / mbǎ:ló
293	fight	ñ-ndzín / ká-ndzín	ñ-ndzín / ká-ndzín	ñ-ndzín / ká-ndzín
294	beggar	kà-nín / bə-nín	nín / ká-nín	nín / ká-nín
295	calabash wine share	ŋmgbé / ká-ŋmgbé	ŋmgbé / ká-ŋmgbé	ŋ-ŋmgbé / ká-ŋmgbé
296	seedling	ká-tó / bə-tó	ká-tó / bə-tó	tó / ká- tó
297	swell	mũ:/ ká- mũ:	mũ:/ ká- mũ:	mũ:/ ká- mú:
298	piano string	kà-tsó / bə-tsó	kà-tsó / bə-tsó	kà-tsó / bə-tsó
299	rice	gî / á-gî	gî / á-gî	gî / á-gî
300	handle	kà-sò / bə-só	kà-sò / bə-só	kà-sò / bə-sò
301	salt calabash	fə-mb ^u í / ñ-mbí	fə-mb ^u í / ñ-mbí	fə-mb ^u í / ñ-mbí
302	soup dish	ɕ ^w ê:sá	ɕ ^w ê:sá / ká-ɕ ^w ê:sá	ɕ ^w ê:sá / ká-ɕ ^w ê:sá
303	palm nut	ká-bí / bə-bí	bí / ká-bí	bí / ká-bí
304	bridge	g ^j ə / ká-g ^j ə	g ^j ə / ká-g ^j ə	g ^j ə / ká-g ^j ə
305	jaw	ká-/bə-mbàŋ	ká-/bə-mbàŋ	ká-/bə-mbàŋ
306	eczema	ŋfá:fá	ŋfá:fá	ŋfá:fá
307	walking stick	ká-/bə-mb ^j àŋ	ká-/bə-mb ^j àŋ	ká-/bə-mb ^j àŋ
308	back	d ^w àm / ká- d ^w ám	d ^w àm / ká- d ^w ám	d ^w àm / ká- d ^w ám
309	guard	ká-ɕ ^j əŋ / bə-ɕ ^j əŋ	ká-ɕ ^j əŋ / bə-ɕ ^j əŋ	ká-ɕ ^j əŋ / bə-ɕ ^j əŋ
310	wind	ŋvùlǎ	ŋvùlǎ	ŋvùlǎ
311	spoon calabash	fə-ŋɕ ^j ápàŋ / ñ-ɕ ^j ápàŋ	fə-ŋɕ ^j ápàŋ / ñ-ɕ ^j ápàŋ	fə-ŋɕ ^j ápàŋ / ñ-ɕ ^j ápàŋ

312	plantain	ṁ-/fə-ŋg ^w àm	ṁ-/fə-ŋg ^w àm	fə-ŋg ^w àm / ṁ-ŋg ^w ám
313	kernel chaff	kxə	kxə / á-kxə	kxə
314	power	tʰáʔ / kə- tʰáʔ	tʰáʔ / kə- tʰáʔ	tʰáʔ
315	wrist	(à-) nɕɔ̀ŋnə	(à-) nɕɔ̀ŋnə	(à-) nɕɔ̀ŋnə
316	sweat	pɔ	zúʔsə / m̄-zúʔsə	p ^h ɔ
317	trough	p ^h ú / kə-p ^h úlə	ŋgú / kə-p ^h úlə	p ^h ú / kə-p ^h úlə
318	hunt	ɕʷámá / kə-ɕʷámá	ɕʷámá / kə-ɕʷámá	ɕʷámā / kə-ɕʷámá
319	rat mole	dʒó / kə-dʒó	dʒó / kə-dʒó	dʒó / kə-dʒó
320	sugar cane	kə-ɕíɕʰə	kə-ɕíɕʰə / bə-ɕíɕʰə	kə-ɕíɕʰə
321	swell	kə-tú: / bə-tú:	kə-tú: / bə-tú:	kə-tú: / bə-tú:
322	palm nut chaff	kə-tʃó / bə-tʃó	tʃó / kə-tso:lə	tʃó / kə-tʃó
323	skin	gɨ / á-gɨ	gɨ / kə-d ^w àm	gɨ / á-gɨ
324	net	ŋ ^w é:fə / kə-ŋ ^w é:fə	ŋ ^w é:fə / kə-ŋ ^w é:fə	ŋ ^w é:fə / kə-ŋ ^w é:fə
325	aged person	ɲ-ɲtʃilə / ànè-tʃilə	ɲtʃilə / ànèntʃilə	ɲtʃilə / ànèntʃilə
326	bush rope	bə / kə-bə:lə	bə / kə-bələ	bə / kə-bə:lə
327	axe	zā / kə-zā	zā / kə-zā:lə	zā / kə-zā:lə
328	fence	fə-sê / ṁ-sê	fə-sê / m̄-sê	fə-sê / m̄-sê
329	slimmy soup	fʰý / m̄-ŋfʰý	fʰý / ŋfʰý	fʰý / ŋfʰý
330	dress	kə-sé / bə-sé	kə-sé / bə-sé	kə-sé / bə-sé

Subject Pronouns			
331	m̃	I	KS
332	wɔ̃	you	KS
333	wɔ̃	he/she	KS
334	sà	we	KS
335	bé	you	KS
336	b ^w á	they	KS

Object Pronouns			
337	mè	me	KS
338	wɔ̃	you	KS
339	wé	him	KS
340	sâ	us	KS
341	bè	you	KS
342	b ^w á	them	KS

Adjectives of colour			
343	bíəŋ	red	CGA
344	ŋ ^w àlǎ	white	CGA
345	ʒí	black	CGA

Interrogative Pronouns			
346	mǎ	why	NCS
348	ndǎ	who	NCS
349	má	what	NCS

Adverbs of Time			
350	bá	today	NCS
351	bâ	now	NCS
352	tsísǎ	tomorrow	NCS
353	n ^u íŋ	afternoon	NCS
354	ŋ ^u íŋ	last year	NCS

Adverbs of place			
355	fá:	up	KS
356	fé	here	KS

Numbers			
357	m ^w ɔ̃	one	NRN
358	kp ^w ê	five	NRN
359	nd ^w àk'átò	sixteen	NRN
360	ànɕòp kéŋì	nineteen	NRN